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## **High-performance judo: identification of the organizational factors influencing international sporting success**

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**Up to five keywords for indexing purposes:** combat sports, sport management, sport policy, elite sport system, sport-specific level.

**Structured abstract. Research question:** As sports are different by nature, can their respective specificities influence the development of the sport-specific systems? Is there room for research that takes a Systems Theory approach to each sport? This research offer insights into sport policies and systems at a sport-specific level. In addition, the results may have implications for the management of judo and other sports, especially combat sports. **Research methods:** to identify the organisational factors (i.e., system elements manageable by sport organisations), we interviewed 33 international judo experts that worked at the Olympic level. The study employed content analysis with a deductive-inductive approach and used the Krippendorff's alpha coefficient to verify the reliability. **Results and Findings:** Despite the particularities and historical and cultural characteristics in each sport, and their respective systems in different contexts and countries, a total of 44 subcategories emerged, which can be considered as the organisational factors. They were subsequently clustered into 11 categories that represent a possible systemic model. In managerial terms, these factors impact the path and actions of sport organisations. However, while some factors can be managed directly, others must be considered and managed indirectly by sport organisations. **Implications:** In terms of its theoretical contribution, this research enhances the understanding of sport systems at a sport-specific level. In terms of practical implications, the results offer a framework for empirically assessing the development and management of sport systems in the context of judo. At the same time, the study's findings can be helpful for managers involved in other combat sports.

## **High-performance judo: Identification of the organisational factors influencing international sporting success**

### **Abstract**

The purpose of this study was to identify the organisational factors (i.e., system elements manageable directly or indirectly by sport organisations) that influence international sporting success at a sport-specific level. This article deals with the combat sport of judo. Interviews were conducted with 33 international judo experts, among them eight athletes, eight coaches, nine performance directors, and eight experts that worked at the Olympic level. The study employed content analysis with a deductive-inductive approach and used the Krippendorff's alpha coefficient to verify the reliability. The analysis yielded a total of 878 textual elements ( $Kalpha = 0.48$ ), which were organised into 44 organisational factors influencing international sporting success. These factors were consequently clustered into 11 categories of a possible theoretical systemic model. The study contributes to the understanding of elite sport policies and systems at a sport-specific level and has potential implications for the development and management of one sport based on a systemic perspective.

**Keywords:** combat sports, sport management, sport policy, elite sport system, sport-specific level.

## Introduction

In the current context of international elite sport, the existing scholarship has identified the following trends: a higher number of countries investing and a growing number of states that developed a strategic approach to winning medals in the major international sport events (Shibli, De Bosscher, Van Bottenburg, & Westerbeek, 2013). Such developments suggest that countries are also looking for some kind of return related to the elite sport (Bergsgard, Houlihan, Mangset, Nodland, & Rommetvedt, 2007; Grix & Carmichael, 2012; Houlihan & Green, 2008). However, in the elite sport context, there are few winners and many losers, and, while some nations are on a steady path that leads to international sporting success, others seem to lag behind (Digel, 2013).

Based on these insights, researchers and sport managers are interested in understanding and explaining the reasons behind such discrepancies. Several published studies aimed to describe the organisation of sport in different countries and to identify determinants that could explain international sporting success achieved by some nations (Andersen & Ronglan, 2012; Bergsgard et al., 2007; De Bosscher, De Knop, Van Bottenburg, & Shibli, 2006; Digel, Burk, & Fahrner, 2006; Green & Oakley, 2001; Houlihan & Green, 2008). Many of these studies used Systems Theory or concepts similar to those in Systems Theory. Each country has a sport system in which the elite sport policies are implemented, high-performance athletes are developed, and multiple elements managed by sport organisations to achieve international elite sporting success. Moreover, the available scholarly literature asserts that sport systems are embedded in broader systems that encompass environmental factors, such as historical, cultural, social, and economic characteristics of each country (Chelladurai, 2009; De Bosscher, Shibli, Westerbeek, & Van Bottenburg, 2015).

At the same time, success of countries tends to concentrate in specific sports or events. As such, *‘There is no country with a competitive advantage in the Olympics. Rather, countries*

*have a competitive advantage in individual sports or, more specifically, individual events within these sports.*' (Sport Industry Research Centre - SIRC, 2002). Therefore, recently, research has focussed on elite sport systems at a sport-specific level. Studies examined these issues in athletics (Böhlke & Robinson, 2009; Grix, 2009; Truyens, De Bosscher, Heyndels, & Westerbeek, 2014); sprint canoe (Sotiriadou, Gowthorp, & De Bosscher, 2013); swimming (Digel et al., 2006; Madella, Bayle, & Tome, 2005); tennis (Andersen & Ronglan, 2012; Brouwers, Sotiriadou, & De Bosscher, 2015); and triathlon (Phillips & Newland, 2014), among others. In general, these studies have found specific characteristics that influence the development of sport at a specific level and determine the pursuit of international sporting success when it is the established objective. As sports are different by nature (Breuer, Hallmann, & Wicker, 2011), can their respective specificities influence the development of the sport-specific systems? Is there room for research that takes a Systems Theory approach to each sport?

In this study, we investigate judo. Judo has a millenary tradition and culture, but today it is also a well-established Olympic combat sport, practised by millions of people around the world (Niehaus, 2006; Peset et al., 2013). In 2016, 56 Olympic medals were awarded in this sport, making it the fourth sport by a total of medals awarded, behind athletics, swimming, and wrestling. In the upcoming Tokyo Olympics in 2021, there will be 60 medals available, including team competition. Although in any given Olympics a country can only win up to 14 medals (15 in 2021), many nations consider judo an attractive investment target in their elite sport policies.

Therefore, this study aims to identify the organisational factors that influence international sporting success in judo. These factors encompass the elements that are present in a system, that can be managed directly or indirectly and should be considered by judo organisations in different countries. For more robust sport management, it is necessary to have

both general and specific information for decision making (O'Boyle, 2014). Knowing the essential system elements, managers can seek better management of the sport (Chelladurai, 2009). If the goal is international sporting success, the elements of the sport system must be recognised as organisational (success) factors. Thus, the results identified in this research offer insights into sport policies and systems at a sport-specific level. In addition, the information about system elements, or organisational factors, may have implications for the management of judo and other sports, especially combat sports, and offer knowledge to those interested in further developing their sport systems.

### **Theoretical framework**

This study's theoretical framework is based on Systems Theory. The term 'system' is used in various areas such as biology, applied social sciences, engineering, natural sciences, humanities, agriculture, and health (Adams, 2015). Systems Theory is often credited to the Austrian researcher and biologist Ludwig von Bertalanffy, although numerous researchers from different areas used this approach before him (Castellani, 2015).

In sport management, Systems Theory has been used in studies on the performance and effectiveness of sport organisations (Bayle & Robinson, 2007; Chelladurai, 2009; Ferrand & McCarthy, 2009; Madella et al., 2005; Papadimitriou & Taylor, 2000; Shilbury & Moore, 2006; Winand, Zintz, Bayle, & Robinson, 2010). Other studies have used some concepts of Systems Theory to analyse the elite sports policies in different countries (De Bosscher, Bingham, Shibli, Van Bottenburg, & De Knop, 2008; De Bosscher et al., 2015; Digel, 2013; Green & Oakley, 2001; Lyle, 1997).

Systems Theory defines a system either as a whole that consists of interrelated elements, integrated to accomplish a clearly defined objective, or as a set of interrelated elements and factors that work as a whole to achieve common goals (Chelladurai, 2009; Lyle, 1997). Drawing

on this theory, Chelladurai (2009) suggests dividing the elements in a system into four groups: inputs, processes, outputs, and the environment.

Inputs vary and depend on the desired objectives to be achieved by the system. They are generally concerned with financial, material (e.g., for consumption, equipment) and human resources (e.g., practitioners, athletes, and sport professionals). Madella et al. (2005) used a multiple-constituency approach based on Systems Theory to elaborate on the dimensions (as system elements) and their respective indicators for the measurement of the organisational effectiveness of national swimming federations in four Mediterranean countries (Italy, Greece, Portugal, and Spain). The authors considered two main sets of resources as inputs: human resources (number of athletes, coaches, managers, sport participation, and average number of swimmers/total of nationally registered athletes); facilities (swimming facilities per capita, swimming facilities per registered athlete); and financial resources (total assets, distribution, and costs).

Processes are actions necessary to reach the products (outputs) desired by the system. Planning, organisation, control, and evaluation are essential elements in any procedural development. These elements allow for other actions to be implemented and resources to be leveraged. In different studies and different sports, the processes have already been presented through numerous themes, among them: the location of athletics tracks / the type of management for the use of those tracks; the initiation, development, and training of athletes; the quality and adequacy of participation in the competitive events; the talent identification processes; the role and development of coaches; and institutional communication (Böhlke & Robinson, 2009; Madella et al., 2005; Phillips & Newland, 2014; Sotiriadou et al., 2013; Truyens et al., 2014).

Outputs represent the effectiveness of the processes in terms of the resources used. The outputs in sport systems can be represented in many ways, among them, the number of medals

won; mass sports participation of the population; improving health and quality of life for specific groups; the services provided; or financial results for professional sports (Bergsgard et al., 2007; Houlihan & Green, 2008; Hums & MacLean, 2008; Madella et al., 2005). If the international sporting success is the goal, some authors have suggested defining outputs in terms of the development of athletes who would achieve the best performance levels and conquer medals in major international competitions (Houlihan & Green, 2008; Röger, Rütten, Ziemainz, & Hill, 2010). However, even the targeted results (or outputs) of the elite sport systems can be relative, as some nations aim to lead the medal count, while others consider it a significant achievement to have their athletes participate in major international sporting events (Shibli et al., 2013). De Bosscher and colleagues (2015) presented the concept of outcomes, which are the possible effects of the outputs and the system performance as a whole. If there is a success, it may lead to such effects as the increase in sports practice, greater availability of resources, greater interest from governments, sponsors, and the media, etc. Obviously, if there is no success, the effects can be different.

Finally, the environment influences other elements or parts of the system (Chelladurai, 2009; Slack & Parent, 2006). The environment relates to the social, cultural, political, and economic aspects in the context of a country, territory, or culture (Chelladurai, 2009; Slack & Parent, 2006). Sport-specific research highlighted the environment since the sport's particular culture or characteristics influence the sport-specific development, such as the lifestyle in sprint canoe and commercial context in tennis (Brouwers et al., 2015; Sotiriadou et al., 2013).

The environment is also crucial in terms of competitive advantage achieved by countries when specific systems are configured according to the opportunities that exist in their environments (Böhlke & Robinson, 2009; Madella et al., 2005; Phillips & Newland, 2014; Sotiriadou et al., 2013; Truyens et al., 2014). Ferrand and McCarthy (2009), Digel (2013), and Phillips and Newland (2014) argued for the strategic importance of the environment for the



good development of the (elite) sport systems. In particular, these scholars emphasised the interaction between the sport organisations and other types of organisations and/or other systems (state and political system, educational system, the military system, science, economy, private sector, and mass media, among others).

Those interested in the application of Systems Theory should consider the complexity of the systems (Andersen, Houlihan, & Ronglan, 2015). A systemic approach can be useful here to understand the elite sport systems in a given country. Despite the lack of research on the local cultures, histories, characteristics, and professional capabilities, Systems Theory and its elements (inputs, processes, outputs, and the environment) can provide a conceptual basis to identify organisational factors that can be managed directly or indirectly by sport managers (Slack & Parent, 2006). As noted in previous studies (De Bosscher et al., 2008, 2015), there is room for further research on the sport systems that would address the specificities of each sport. In fact, most of the studies that drew on Systems Theory considered sport in general, disregarding the differences among sports.

Sport-specific research can contribute to the understanding of differences in the sport-specific systems and the identification of the new organisational factors and systemic elements (Brouwers et al., 2015). Moreover, sport-specific inquiry can create opportunities for advancing research on the application of Systems Theory in sport, as it offers an alternative for an in-depth understanding of the influence of the given sport's particular characteristics on the sport-specific systems. Also, sport-specific research can be helpful as practical support for decision-making by sport managers (Truyens et al., 2014).

For decades, judo was the only Asian combat sport consolidated in the official Olympic programme (Brousse & Messner, 2015). Currently, to attain a higher world ranking and qualify for the Olympic Games, most judo athletes have their own multidisciplinary teams and receive support for their preparation from multiple sources, among them: governments, national

organisations and federations, sponsors, and family (Franchini & Takito, 2014; Guilherme & Franchini, 2017; Villamón, Brown, Espartero, & Gutiérrez, 2004). Increasingly, more countries have been participating in the major international judo competitions and actively competing for international medals once won only by a small group of countries (mainly in the Olympics) (Mazzei, Silva Neto, Vieira, & Böhme, 2012). However, little research exists on policies or management of judo or other Olympic combat sports. These sports represent between 20 and 25% of all medals disputed in the history of the Olympic Games (Franchini, Gutierrez-Garcia, & Izquierdo, 2018; Peset et al., 2013). Therefore, this study may offer a relevant contribution to the knowledge of combat sports in the Olympic context, in addition to the sport-specific application of Systems Theory.

## **Methods**

### *Sample*

Consistent with the qualitative research approach, the sampling method helped recruit participants who could provide the ‘most’ and the ‘best’ information to achieve the aim of this study (Holt et al., 2018). Since the Olympic Games is the most important competition in judo (Franchini & Julio, 2015; Franchini & Takito, 2014; Guilherme & Franchini, 2017; Julio, Panissa, Miarka, Takito, & Franchini, 2013; Lascau & Rosu, 2013; Niehaus, 2006; Sato, 2013; Villamón et al., 2004), athletes, coaches, performance directors, and other experts were selected from 20 countries with the highest scores in the Olympic judo competitions between 1992 (when the weight categories were finally stabilised, and women were included in the Olympic judo) and 2012 (last edition of the Olympic Games before the beginning of data collection).

The top 20 countries were determined on a scoring system employed by other similar studies (Condon, Golden, & Wasil, 1999; De Bosscher et al., 2008) and the IJF World Ranking System 2009-2012 (Franchini & Julio, 2015; Lascau & Rosu, 2013). In this scoring system, 10

points were assigned for each gold medal, 6 points for silver, 4 points for bronze, 2 points for the fifth place, and 1.6 points for the seventh place. The ‘top 20’ countries in decreasing order were: Japan (383.2 points), France (233.2 points), Korea (209.2 points), Cuba (185.2 points), China (148.8 points), Germany (121.2 points), Russia (115.6 points), the Netherlands (97.2 points), Brazil (96.0 points), Spain (76.4 points), Italy (73.2 points), Belgium (67.2 points), Georgia (66.4 points), Hungary (55.6 points), United Kingdom (53.6 points), DPR Korea (52.8 points), Poland (51.2 points), United States (49.2 points), Mongolia (42.4 points), and Azerbaijan (38.0 points).

National judo federations from those countries received an invitation to participate in this research. Individuals from Spain, the United Kingdom, and Poland referred to a lack of availability or willingness to participate. Contacts from other countries, such as Azerbaijan, China, South Korea, North Korea, Georgia, and Mongolia, either did not respond to the invitations or, when responded, mentioned the low proficiency in the languages used in this research (Portuguese, Spanish, or English). Those who confirmed their participation included eight athletes, eight coaches, nine performance directors, and eight other experts from 11 countries (55% of total). Table 1 shows the composition of the sample.

**Table 1.** Nationality and occupation of sample of individuals interviewed.

<b>Country</b>	<b>Athletes</b>	<b>Coaches</b>	<b>Performance Directors</b>	<b>Experts</b>	<b>Total</b>
<b>Belgium</b>	1	-	1	-	2
<b>Brazil</b>	2	2	1	1	6
<b>Cuba</b>	2	1	1	1	5
<b>France</b>	-	1	2	1	4
<b>Germany</b>	-	1	-	2	3
<b>Hungary</b>	-	1	1	-	2
<b>Italy</b>	-	-	-	1	1
<b>Japan</b>	1	-	-	2	3
<b>Netherlands</b>	-	-	1	-	1
<b>Russia</b>	-	-	1	-	1
<b>United States</b>	2	2	1	-	5
Total	8 (24.24%)	8 (24.24%)	8 (27.27%)	8 (24.24%)	33 (100%)

The athletes' sample consisted of four men and four women ( $26 \pm 3$  years old), 75% of whom obtained a higher education degree. All eight coaches were male ( $53 \pm 7$  years old) with higher education degrees. Performance directors were eight men and one woman ( $48 \pm 10$  years old), all with higher education degrees. Finally, experts were seven men and one woman ( $51 \pm 15$  years), all with MSc or Ph.D. degrees. All study participants took part in it voluntarily after reading and signing an informed consent form that explained the procedures and benefits of the present investigation. The local ethics committee approved all procedures.

### *Data Collection and Instruments*

One researcher conducted face-to-face interviews in Portuguese, Spanish, or English during the XXVII Judo World Championships and the 8<sup>th</sup> International Judo Research Symposium, both held in Rio de Janeiro in 2013. Also, some interviews were conducted at the workplaces and/or training venues of the participants from European countries (Belgium, France, and the Netherlands). Interviews were semi-structured, each lasting between 30 and 60 minutes. The study aims and outputs were presented to the interviewees, namely the existence of athletes who have achieved international success and who won medals in international competitions, particularly the Olympic medals. Interview questions revolved around the following topics:

1. the critical organisational factors for winning medals at major international judo competitions (expectation: inputs and process elements);
2. the strengths and weaknesses of judo in the given country and in other nations (expectation: inputs, process, environment elements);
3. particular policies and management actions to develop elite judo in the country and to win more medals at the Olympic Games (expectation: process and environment elements).

The interviewers used the expectations as guides and were cautious in phrasing the questions so that the specific answers were not induced but rather helped identify the largest number of potential organisational factors. For this purpose, two experts revised the questions and the research proposal and did not recommend significant changes.

### *Data Analysis*

Content Analysis with a deductive-inductive approach was used to analyse the interview data. This procedure involved the identification of textual elements that have common characteristics or meanings and can be clustered in subcategories and categories (Krippendorff, 2013; Li, Pitts, & Quarterman, 2008). The categorisation can be done in three ways: closed, open, or mixed. The closed categories are related to a deductive approach that defines them based on the evidence from the literature. The open categories are new elements emerging from the interviews that can generate new concepts or theories (inductive approach). In turn, the mixed categories combine characteristics of the open and closed approaches, allowing adaptations in the existing theoretical models (classified as a deductive-inductive approach) (Krippendorff, 2013; Li et al., 2008). In this study, we used the mixed deductive-inductive approach, where the concepts from Systems Theory (inputs, processes, outputs, and the environment) were used as a starting point of the analysis and for a cohesive organisation of the identified categories.

The QSR NVivo software (version 10.0) was used in the data analysis process. Two of the researchers familiar with the theoretical approaches carried out the categorisation process independently. Krippendorff's alpha agreement coefficient was used to measure the reliability of the categorisation performed. This coefficient is used in order to reduce the possible subjectivity present in qualitative research (Creswell & Plano Clark, 2011). Krippendorff's alpha ( $K_{\alpha}$ ) measures the agreement between two or more researchers who categorised,

evaluated, observed, or judged the data content (Hayes & Krippendorff, 2007). The values for Krippendorff's alpha range from zero to one:  $0 \leq \text{alpha} \leq 1$ , where a coefficient equal to zero represents total disagreement, and a coefficient equal to one denotes total agreement in the categorisation process performed. Krippendorff's alpha coefficients can be interpreted as follows:  $< 0.20$  – very weak;  $> 0.20$  and  $< 0.40$  – weak;  $> 0.40$  and  $< 0.60$  – moderate;  $> 0.60$  and  $< 0.80$  – strong; and  $> 0.80$  – very strong (Seppänen, 2009). To measure Krippendorff's alpha SPSS (version 20.0) was used, in addition to the macro package software developed by Hayes and Krippendorff (2007).

## Results

A total of 878 textual elements emerged from the categorisation process. Those textual elements were organised into 44 subcategories, which can be considered as the organisational factors influencing international sporting success in judo. They were subsequently clustered into 11 categories that represent the system elements (inputs, processes, and environment). Outputs were previously established in terms of the athletes who have achieved international success and won medals in international competitions, particularly the Olympic medals. The categorisation process had a moderate agreement level ( $K_{\text{alpha}} = 0.48$ ). The number of textual elements identified is highlighted below, with the respective number of interviewees who cited the textual elements in each category and their subcategories. Table 2 summarises these results.

**Table 2.** System Theory, categories and subcategories generated from the content analysis performed for textual elements (TE) and a number of interviewees (N) (data presented as absolute (number) and relative values (%)).

<b>System Theory</b>	<b>Categories</b>	<b>Subcategories</b>
	<b>1. Sport participation at all levels</b> <i>TE= 143 (16.3%); N= 30 (90.9%)</i>	<b>1. Absolute number of Judo practitioners - TE= 76 (8.7%); N= 25 (75.8%)</b>
		<b>2. Quality of young practitioners - TE= 38 (4.3%); N= 20 (60.6%)</b>
		<b>3. Quality of Judo partners/sparrings - TE= 29 (3.3%); N= 18 (54.5%)</b>
		<b>4. General funding - TE= 63 (7.2%); N= 25 (75.8%)</b>
		<b>5. Funds for competitions and training - TE= 23 (2.6%); N= 15 (45.5%)</b>
<b>Inputs</b>	<b>2. Financial resources</b> <i>TE= 102 (11.6%); N= 28 (84.8%)</i>	<b>6. Funds for athletes - TE= 8 (0.9%); N 6 (18.2%)</b>
		<b>7. Funds for management structure - TE= 3 (0.3%); N= 4 (12.1%)</b>
		<b>8. Funds for coach education - TE= 3 (0.3%); N= 3 (9.1%)</b>
		<b>9. Funds for multidisciplinary team - TE= 2 (0.2%); N= 3 (9.1%)</b>
	<b>3. Training facilities</b> <i>TE= 38 (4.3%); N= 16 (48.4%)</i>	<b>10. Training centres - TE= 25 (2.8%); N= 14 (42.4%)</b>
		<b>11. Local spaces for practice - TE= 13 (1.5%); N= 9 (27.3%)</b>

<b>System Theory</b>	<b>Categories</b>	<b>Subcategories</b>
		<b>12. Sport system</b> - <i>TE= 47 (5.3%); N= 23 (69.7%)</i>
		<b>13. Organisation</b> - <i>TE= 38 (4.3%); N= 17 (51.5%)</i>
	<b>4. Sport system, organisation, and structure</b>	<b>14. Long-term planning</b> - <i>TE= 33 (3.7%); N= 16 (48.5%)</i>
	<i>TE= 183 (20.8%); N= 28 (84.8%)</i>	<b>15. Professional staffs</b> - <i>TE= 21 (5.3%); N= 15 (45.4%)</i>
		<b>16. Clear roles of Judo organisations</b> - <i>TE= 16 (1.8%); N= 11 (33.3%)</i>
		<b>17. Management structure</b> - <i>TE= 15 (1.7%); N= 10 (30.3%)</i>
		<b>18. Communication - Integration among Judo organisations</b> - <i>TE= 13 (1.5%); N= 8 (24.2%)</i>
		<b>19. Support for balancing training - professional possibilities</b> <i>TE= 40 (4.5%); N= 20 (60.6%)</i>
	<b>5. Athletic career and post-career support</b>	<b>20. International internships and training camps</b> - <i>TE= 30 (3.4%); N= 16 (48.5%)</i>
	<i>TE= 120 (13.7%); N= 28 (84.8%)</i>	<b>21. Holistic support</b> - <i>TE= 28 (3.2%); N= 20 (60.6%)</i>
		<b>22. Post-career program</b> - <i>TE= 15 (1.7%); N= 10 (30.3%)</i>
		<b>23. Technical and tactical support</b> <i>TE= 7 (0.8%); N= 5 (15.2%)</i>
		<b>24. Quality of teachers at the grassroots level</b> - <i>TE= 34 (3.9%); N= 14 (42.4%)</i>
<b>Process</b>	<b>6. Quality of teachers and coaches</b>	<b>25. Training programs for teachers and coaches</b> - <i>TE= 29 (3.3%); N= 14 (42.4%)</i>
	<i>TE= 99 (11.3%); N= 24 (72.7%)</i>	<b>26. Quality of elite-level coaches</b> - <i>TE= 28 (3.2%); N= 13 (39.4%)</i>
		<b>27. Professional conditions for teachers and coaches</b> - <i>TE= 8 (0.9%); N= 7 (21.2%)</i>
		<b>28. International competitions</b> - <i>TE= 28 (3.2%); N= 16 (48.5%)</i>
	<b>7. Events / Competitions</b>	<b>29. Competition experience</b> - <i>TE= 10 (1.1%); N= 8 (24.2%)</i>
	<i>TE= 58 (6.6%); N= 22 (66.6%)</i>	<b>30. National calendar and competition structure</b> - <i>TE= 9 (1.0%); N= 8 (24.2%)</i>
		<b>31. Host nation effect</b> - <i>TE= 6 (0.7%); N= 5 (15.2%)</i>
		<b>32. Competitions at the grassroots level</b> - <i>TE= 5 (0.6%); N= 4 (12.1%)</i>
	<b>8. Talent identification and development</b>	<b>33. Selection process</b> - <i>TE= 14 (1.6%); N= 9 (27.3%)</i>
	<i>TE= 21 (2.4%); N= 11 (33.3%)</i>	<b>34. Competition for selection</b> - <i>TE= 5 (0.6%); N= 7 (21.2%)</i>
		<b>35. Talent promotion</b> - <i>TE= 2 (0.2%); N= 3 (9.1%)</i>
	<b>9. Scientific support</b>	
	<i>TE= 20 (2.3%); N= 9 (27.2%)</i>	<b>36. Applied research</b> - <i>TE= 20 (2.3%); N= 9 (27.3%)</i>



System Theory	Categories	Subcategories
	<b>10. Tradition, history, and culture</b> <i>TE= 59 (6.7%); N= 24 (72.7%)</i>	<b>37. Success tradition and role models - <i>TE= 21 (2.4%); N= 22 (66.7%)</i></b>
		<b>38. Popularity of Judo - <i>TE= 14 (1.6%); N= 22 (66.7%)</i></b>
		<b>39. Fighting spirit - <i>TE= 12 (1.4%); N= 9 (27.3%)</i></b>
		<b>40. History of Judo in the country - <i>TE= 8 (0.9%); N= 6 (18.2%)</i></b>
<b>Environment</b>		<b>41. High-performance culture - <i>TE= 4 (0.5%); N= 5 (15.2%)</i></b>
	<b>11. Politics, sponsors, and the media</b> <i>TE= 35 (3.9%); N= 17 (60.6%)</i>	<b>42. Political interest - <i>TE= 18 (2.1%); N= 16 (48.5%)</i></b>
		<b>43. Media and sponsorship - <i>TE= 12 (1.4%); N= 9 (27.3%)</i></b>
		<b>44. Country's location - <i>TE= 5 (0.6%); N= 5 (15.2%)</i></b>

The 11 categories added to the established outputs can be considered system elements of a model for decision-making and strategic planning in elite judo. They fit well in the systemic model based on Systems Theory, as graphically represented in Figure 1.

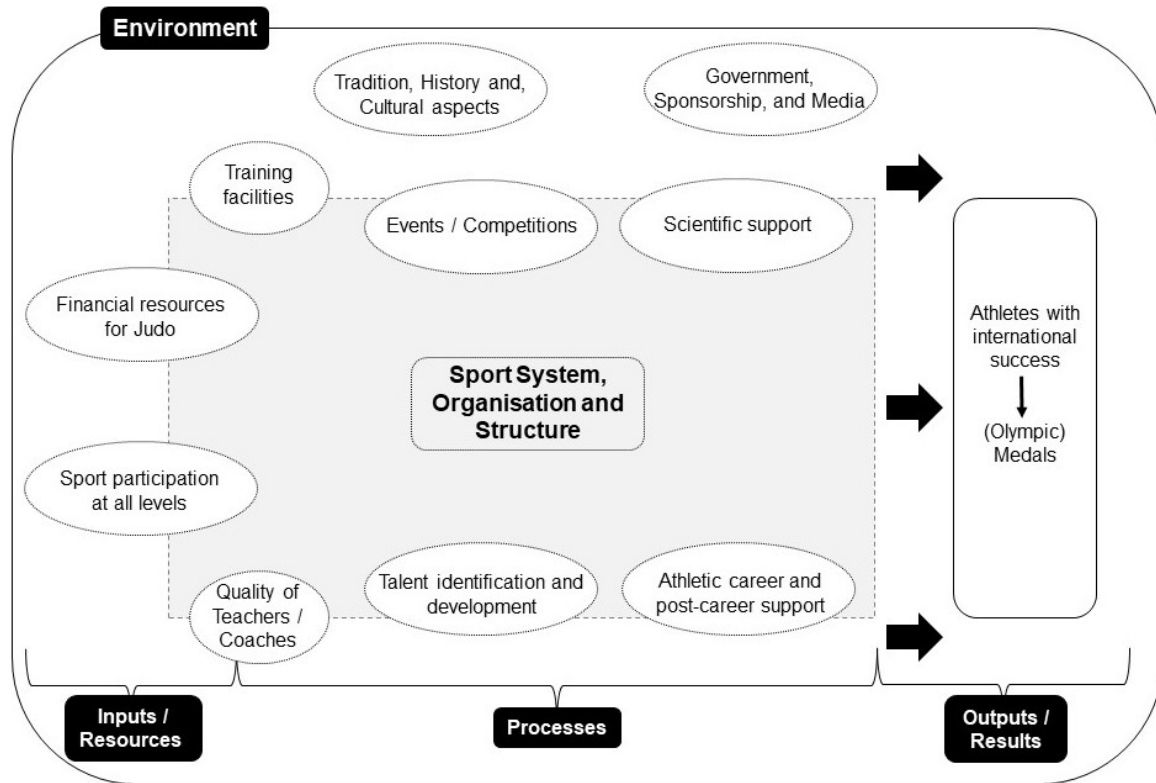


Figure 1: Systemic model related to the elite judo.

The details about each category follow below.

### *Inputs*

Inputs elements are generally concerned with financial, material, and human resources. Within the category *Sport participation at all levels*, the subcategory ‘Absolute number of judo practitioners’ was the most frequently mentioned organisational factor (with 76 textual elements and mentioned by 25 different interviewees). The interviewees also highlighted the importance of having a sufficient number of sparring partners in the nation, with high technical qualifications as a precondition for athletes to be able to train at a world-class level.

*'Today we have about 600,000 people fighting judo. It's a lot. This is what makes judo strong in our country. Above all, it's the number of people who train every day'* (Interviewee 14).

*'[...] you have sufficiently skilled human resources because there were many people practising judo. But if you don't have a good level of athletes at the grassroots level, then things are difficult when they become adults'* (Interviewee 06).

*'The quality of the judo competitions is determined by the quality of the training partnership. The better the partnership, the better the judoka'* (Interviewee 17).

In the opinion of the interviewees, financial resources were another important input element. They noted that financial resources should be used judiciously in the quest for international sporting success and allocated towards organisational factors such as funds for competitions and training, athlete support, management structure, professional development of the coaches, and the multidisciplinary team.

*'A budget [is needed] obviously. It is important to have enough funding to do everything you believe is best for the team'* (Interviewee 32).

*'[We need funds] to travel overseas for a tournament. You know... to train together, fight and come back, and travel again. It is a hard experience for us'* (Interviewee 30).

*'That is one of our problems, to have athletes full-time. Athletes do not have to work, or they can go to school. [We] fund all of them, if we can'* (Interviewee 30).

*'[...] As it is with the economy, without resources, part of this structure would disappear'* (Interviewee 10).

*'If you want to organise many training sessions, you need a lot of people. You need a lot of money and time for these teachers to come to these training sessions'* (Interviewee 14).

*'In modern judo, financial management can provide all means for proper preparation, that is to say, all necessary means to get proper training for athletes'* (Interviewee 13).

With regard to *Training facilities* (material resources), interviewees highlighted the importance of appropriate equipment for both grassroots and high-performance levels. Also, the existence of world-class training centres was seen as an essential factor. Such a facility would provide medical, physiotherapeutic, nutritional, psychological, physiological, and biomechanical support to the athletes.

*'I think there is a big tendency in many countries put all the athletes together in one [sport] centre and build everything around that centre'* (Interviewee 01).

*'[There are] enough places with a minimum infrastructure to practice judo all over the country, not only for the National team. All over the country, judokas are available in every training centre'* (Interviewee 10).

### *Processes*

*Sport system, organisation, and structure*, was the most prevalent theme in the interview accounts and could be identified as an element of the central process of the system. It was reported that international sporting success is the result of an organised management structure, whereby seven organisational factors were identified, among them: sport system; organisation; long-term planning; professional staffs; a clear role and task description of the judo organisation; management structure; and adequate communication among the judo organisations at all levels. The central idea articulated by the interviewees was that success is conditional on the existence of a system, with managerial and other processes in place for the development of elite sports.

*'I think you need to have a system. For sure, you need to have a system. If you have a system, everything else is easier to reach' (Interviewee 29).*

*'I mean, organisation... like I said, they did a really good job with the exposure during the Olympics and the success that we had. They're really doing a good job, taking the success and running with it, you know?' (Interviewee 32).*

*'It is about planning. I think the main issue is planning. [Country name] succeeds because of exactly this, they have a very, very good capacity for organisation and they don't work without planning' (Interviewee 18).*

*[There is a need for] 'more qualified managers in all areas of sport. For good organisation, for example, you need good, competent people who will be hired and valued' (Interviewee 05).*

*'I think [Country name] is a highly organised country in this regard. Everyone has own responsibilities' (Interviewee 04).*

*'So, if you do not have a high-level management structure, you cannot have a sufficient number of qualified athletes to compete' (Interviewee 18).*

*'Communication networks between federations and clubs should be well implemented in order to allow them to progress toward the same objectives. So, judo would get increasingly better, constantly achieving higher levels and better results. I think this is it' (Interviewee 04).*

For *Athletic career and post-career support*, the interviewees highlighted the different kinds of support that contribute to the development of judo athletes, allow their full dedication to athletic career and stimulate their performance improvement in international competitions.

*'[We need a situation where] the athletes are employed in a company, so they are financially secure and can concentrate on their athletic career' (Interviewee 26).*

[...] *'It is impossible [to train with many good athletes in our country], so we need to go to other countries for good intensive training. You will need to be comparable to the best ones'* (Interviewee 02).

*'In our country, we are able to provide our athletes with basic psychological support, medical and physical therapeutic attention from the very beginning ... We have a multidisciplinary team with psychologists, coaches, doctors, and physical therapists. I don't think others have this approach'* (Interviewee 9).

*'Our athletes have the possibility to make a living from sport and have a relatively smooth career transition to prepare for a post-sport career'* (Interviewee 7).

*'The coaching staff and experts involved must prepare the athlete in such a manner that they are capable of giving their best performance in the context of the competition'* (Interviewee 27).

Next, *Quality of teachers and coaches* focussed on two types of professionals in judo. Teachers, or *senseis*, are usually responsible for judo initiation by providing judokas' first learning of the sporting philosophy, techniques, and tactics (Nunes & Rubio, 2012). Coaches are responsible for a more general preparation of athletes, including technical and tactical training, as well as the coordination of physical preparation and other training aspects involved in high-performance sport (e.g., psychological preparation) (Nunes & Rubio, 2012). Sometimes one individual can have both roles, but this is not usually the case. The training programmes and professional conditions for these teachers and coaches were seen as essential organisational factors to develop successful judokas.

*'We need high-level coaches to teach judo. If this coach doesn't exist, one cannot teach judo... judo would get weird, very poor... stay in small dojos'* (Interviewee 29).

*'We need more qualified coaches to adjust or improve our development in our national judo'* (Interviewee 13).

*'The most important [thing] again is the coach to match a judo fighter with the right style of judo'* (Interviewee 01).

[...] *'career perspectives for a judo coach. We need a structure for teaching and [we need] teachers'* (Interviewee 27).

Another group of processes is concerned with *National and international events/competitions*. For the interviewees, previous experiences in international tournaments are essential before participating in major competitions, such as the Olympic Games. Additionally, national competitions can stimulate competitiveness, impact the athletes' development, and serve as a criterion for the selection of young talents. The participants also reported that hosting international sporting events has a positive effect on judo development in the country.

*'They can travel; they can compete and be exposed to all types of fights'* (Interviewee 32).

*'In judo, we have to compete ...and for us, this is very difficult because international competitions are costly. As a result, we end up having insufficient competition experience, which greatly impacts our performance at a big competition'* (Interviewee 09).

*"In that system, there is a training and competition programme that helps to grow an athlete at the right time and right phase"* (Interviewee 27).

*'I think hosting major events brings bad things, but it also motivated a lot. For this reason and in general, we are living in a better moment than the other countries'* (Interviewee 08).

*'A lot of the 750 judokas started to compete when they were kids. For example, we have the kids in judo festivals' (Interviewee 27).*

Several interviewees ( $n = 11$ ) pointed to *Talent identification and development* as a necessary process element to promote highly skilled judo athletes. For some interviewees, due to a low number of practitioners in some countries, sport scouting helped in the development of judo athletes.

*'The most important is, for example, the organisation and talent hunting. Any talent, wherever they are, at any age, we hunt' (Interviewee 09).*

*'We send some coaches to see if competing athletes have certain abilities... when they are old enough to start high school. As it is a national coach that knows these guys, it is possible for both men and women to be selected and enroll in a sport programme' (Interviewee 14).*

*'It [Talent promotion] is important because it is often lost talents who passed and got 'burnt'. It is necessary that they gradually pass through all the stages, from the early to the adult stage. When they reach the level of national teams, they will already be professional [...]' (Interviewee 10).*

Finally, under the category of *Scientific support*, nine interviewees reported the significance of the scientific knowledge regarding specific physical training in judo and appropriate pedagogical practices as essential factors to achieve international sporting success.

*'We now have 100 people in this institute, with two professionals fully dedicated to judo, which is very good. The scientific evidence is used directly in training' (Interviewee 20).*

## *Outputs*



Building on the study aims and the topics that guided the data collections and instruments, the outputs were determined as follows: the existence of athletes who have achieved international success and who won medals in the international, especially Olympic competitions.

### *Environment*

As *environmental* elements, the analysis identified the following categories or dimensions. The interviewees considered *Tradition, history, and culture* as important ‘facilitators/inhibitors’ in achieving international sporting success. This category mainly refers to the role models (i.e., victorious veteran athletes and idols and their stories can provide successful ‘formulas’ in the present, see Andersen & Ronglan, 2012; Grix & Carmichael, 2012) and the popularity of judo in some countries, like Japan, France, and Brazil, among others. The interviewees also referred to a *fighting spirit* as a link between tradition, historical aspects, war preparation, and the athletes’ psychological behaviour. In some cultures, interviewees noted, people in general and athletes in particular see themselves as warriors, patriots, determined to win, and influenced by the history of judo in the country.

*‘...We won 54 world medals for females, and 16 of those were gold medals; and we also won 24 Olympic medals, of which 6 were gold...’* (Interviewee 09).

*‘Judo is, of course, the most popular and strongest elite sport in [Country name].’* (Interviewee 26).

*[...] ‘the willpower, the heart – we are strong women of our country, despite the obstacles’* (Interviewee 13).

*‘There is a natural development. Because of the Japanese colonization, which favoured the development of judo, we have highly developed judo here’* (Interviewee 06).

*'I think [Country name] is one of the sports powerhouses in the world. Things happen to develop athletes here' (Interviewee 31).*

*Politics, sponsors, and the media* are a set of environmental factors that influence international judo success. These factors were considered by the interviewees to be important preconditions that can facilitate or inhibit the development of judo in a country. Politics was reported to influence investments and sport development. Sponsors and the media play a crucial role in communicating about sport more broadly and serve as a source of financial support. Finally, the geographical location of a country was reported as a significant factor as well. The proximity of countries to the IJF international competition circuit affects the preparation and attendance of athletes.

*'Athletes understand, and the country, the prime minister, and the Ministry support the job 100%' (Interviewee 28).*

*'In my opinion, the media is fundamental in this system as they communicate both our work and the underlying outcomes. We can't get sponsorship without the media' (Interviewee 05).*

*'I think it is very different for us because we are so far away from everybody' (Interviewee 30).*

## **Discussion**

The study aimed to identify the organisational factors that influence international sporting success in judo. The term 'organisational factors' encompasses all factors that, in some way, influence the system. In managerial terms, these factors impact the path and actions of each organisation, as well as its responsibility to advance system performance (McKenna, 2000). While the factors that comprise inputs and processes can be managed directly, the

environment elements must be considered and managed indirectly by the national judo organisations in different countries, as discussed next.

The study results indicate that the categories presented as system elements are similar to those in other studies, both general and sport-specific. However, as pointed out by Sotiriadou et al. (2013) and Brouwers et al. (2015), sports have their particularities related to technical specificities and historical and cultural characteristics, which ultimately influence their development within their respective systems in different contexts and countries. Therefore, the organisational factors and the system elements described here have particularities of judo and are consistent with the current context of international judo.

For example, the categories *Sport participation at all levels* and *Quality of teachers and coaches* could be considered either in the inputs (as human resources) or in the processes (improving the quantity and quality of these human resources). However, following the interpretation of the interviewees' statements, the subcategory *Sport participation at all levels* was classified under inputs (resources) and the *Quality of teachers and coaches* under processes. In fact, during the data analysis and interpretation, the researchers were mindful of the notion of systems complexity since inevitably the elements interact and can be hardly isolated in practice (De Bosscher et al., 2006).

The system elements and their respective organisational factors that were most cited by the interviewees: *Sport system, organisation, and structure of elite sport; Sport participation at all levels; Athletic career and post-career support; Financial resources; and Quality of teachers and coaches*. These categories may also make sense when applied in other sports and their respective systems.

*Sport system, organisation, and structure* category confirmed the perspective that sport organisations need to become increasingly professional to fit in the current international elite sport context (O'Boyle, 2014; Robinson, 2012; Sotiriadou, 2013). If the procedural elements

are actions to be implemented and resources to be leveraged this set of organisational factors are the engine of the system. An adequate central and systemic management can implement processes necessary to achieve the expected outputs, in addition to developing processes that seek to improve the system inputs, or in this case, the organisational factors grouped under *Sport participation at all levels*, *Financial resources*, and *Training facilities*.

The organisational factor ‘Absolute number of judo practitioners’ was perceived as the most crucial organisational factor. Interestingly, despite the prominence of sport participation as a factor that determines international sporting success, the relevant literature does not support the relationship between the number of practising and winning athletes (De Bosscher et al., 2015; Grix & Carmichael, 2012). However, interviewees highlighted the importance of the total number of judo practitioners and primarily the number of elite athletes with high technical qualities in the country. The idea that better partners stimulate better judokas competing at the elite level seems to be very pertinent to a combat sport such as judo.

A significant aspect mentioned by the interviewees was participation in the international internships/training camps, which was previously acknowledged by Green and Oakley (2001) as being critical to international sporting success. The category *Financial resources* with its factors was recognised as one of the characteristics of international elite sport at the moment, with a capacity to predict the success of countries in the Olympic Games (Bernard & Busse, 2004; De Bosscher et al., 2015; Vagenas & Vlachokyriakou, 2012). However, for the achievement of international success in judo, the financial resources are only effective when applied in a planned manner and in relevant circumstances, as already evidenced by other authors (Pappous & Hayday, 2016).

Next, the category *Quality of teachers and coaches* confirmed the importance of processes that seek a greater quality of human resources in a sport system, as already identified in other studies (Chelladurai & Madella, 2006; Doherty, 1998; Taylor & McGraw, 2006). In

elite sport, this is especially true when human resources are sport teachers and coaches (Brouwers et al., 2015; De Bosscher et al., 2006; Sotiriadou et al., 2013). The existing studies about teachers and coaches in judo reveal that their competence comes from theoretical knowledge and practical experience (Maduro, Guedes, Guedes, & Vieira, 2018; Santos, Fernández-Río, Almansba, Sterkowicz, & Callan, 2015). The specific training programmes for teachers and coaches must be different: for teachers, they should focus on sports pedagogy, and for coaches - on sports training (Côté, 2006; Cushion, Armour, & Jones, 2003). Nevertheless, once these professionals are qualified and motivated, they can have a multiplier effect on the development of sport in a country, even if other factors are not as highly developed. Teachers and coaches can make a difference in proper sport development, as already demonstrated in other studies (Côté & Gilbert, 2009; Olusoga, Maynard, Hays, & Butt, 2012).

The discussion of judo-specific context brings to light such organisational factors as experiences in international tournaments before participating in major global competitions and the number of facilities that provide high-quality training and safe practice of judo, since this sport involves many throws and falls per training session.

Interestingly, fewer participants indicated talent identification and scientific support as organisational factors. In the case of talent identification, its infrequent mention can be explained by the variety of weight categories, the significance of tactical and technical components that characterise a combat sport such as judo, as well as the late specialisation that exist in this sport (Franchini & Takito, 2014; Julio et al., 2011). As to scientific support, its relatively low importance in the interview accounts may be related to high cultural and traditional content present in judo, thus creating a potential resistance to change, or proximity between science and practice (Peset et al., 2013).

The study findings are also supported by the earlier research that found that the environment should be considered when analysing and developing the elite sport systems (i.e.,

the influence of tradition, history, culture, politics, sponsors, and the media in each country) (Bergsgard et al., 2007; Digel et al., 2006; Houlihan & Green, 2008). Elite sport systems at a sport-specific level can reflect particular environmental factors related to specificity, traditions, and cultures existing in each sport. It is hard to measure and manage the intangible influences of the environment (De Bosscher et al., 2015). Consequently, the results suggest that the development of international success at sport-specific levels, as in the case of judo, largely depends on external (environmental) factors that cannot often be managed directly by sport managers. A similar dependency on governments or national agencies was identified in athletics (Truyens et al., 2014), pointing to a developmental characteristic of the elite systems at a sport-specific level.

However, research found that the influence of environmental factors tends to decrease when sport organisations enhance their management (O'Boyle, 2014; Robinson, 2012). Moreover, partnerships and programmes with other systems can facilitate better sport development, especially the agreement with governments, companies, the media, educational institutions (at the basic or university level), and the military (Bayle & Robinson, 2007; Digel, 2013; Digel et al., 2006; Ferrand & McCarthy, 2009).

In conclusion, this study's findings were consistent with those from other studies and models that used Systems Theory. However, since each sport has specific characteristics, there is a need to advance knowledge on sport systems at a sport-specific level. Moreover, researchers should be mindful of the role of the elements in the *Sport system, organisation, structure* category, environmental factors, and outcomes in the development and management of sports. Those factors can be country or sport-specific.

In terms of its theoretical contribution, this research enhances the understanding of organisational factors and sport systems at a sport-specific level. In terms of practical implications, the results of this study offer a framework for empirically assessing the

development and management of sport systems in the context of judo. At the same time, the study's findings can be helpful for managers involved in other combat sports.

Finally, the limitations of this study included the absence of other data sources (e.g., documents), relatively short interviews, and partial participation of individuals from target countries. On the other hand, a notable strength of this study is a considerable sample of the participants from countries that achieved international success in judo. Further research can improve the quantitative validation of the qualitative evidence presented in this article and deepen the understanding of the relation between the organisational factors that influence international sporting success at the sport-specific level.

#### **Declaration of interest statement**

No potential conflict of interest was reported by the authors.

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