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## Intellectual capital and performance in temporary teams

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# Intellectual capital and performance in temporary teams

## Structured Abstract

**Purpose:** The objective of this study is to deepen resource-based view theory by analyzing how Intellectual Capital (IC) affects performance in temporary teams and by showing the moderating role of integrative mechanisms.

**Design/methodology/approach:** The research context focuses on 153 National Teams of Football (NTF), also referred to as national soccer teams, as an example of temporary groups. A Partial Least Squares (PLS) methodology was utilized on a dataset built from transfermarkt.com and FIFA world rankings. Three main hypotheses were developed and tested using first a PLS and then an OLS approach.

**Findings:** The results show how IC contributes to performance, extending the findings of previous studies to the context of temporary teams. Additionally, the results show how some integrative mechanisms such as assembly decisions and team leader experience influence temporary team performance by creating an interaction effect with existing IC.

**Originality/value:** This study contributes to IC theories for three reasons. First, it applies IC research to a specific research context: temporary teams, where specific organizational capabilities are required to coordinate resources. Second, the study analyzes the role of integrative mechanisms as moderators of the relationship between IC and performance in temporary teams. Third, the study focuses on NTF as an example of temporary teams.

## Keywords

Intellectual Capital, National Teams of Football, performance, integrative mechanisms, structural equation modeling, partial least squares

# Intellectual capital and performance in temporary teams

## 1. Introduction

The relationship between resources and performance has been widely studied in the extant literature using the broad lens of the Resource-Based-View (RBV) Theory (Andersén, 2011). Within the RBV, Intellectual Capital (IC), defined as the knowledge resources possessed by a company such as know-how, patents, and reputation, has been described as the most important resource to driver performance of organizations (Edvinsson and Malone, 1997). Since the mid-1990s an increasing number of papers have provided insights to support the positive relationship between IC and performance (Ibarra Cisneros and Hernandez-Perlines, 2018). However, to allocate, deploy and coordinate IC in a distinct and superior way, organizations need to develop context-specific integrative mechanisms such as high-level routines “to make sure employees’ actions, and decisions are well coordinated among each other” (Lombardi *et al.*, 2019, p. 3). Indeed, to be effective, teams need to circulate knowledge among people, departments, and organizations, and several integrative mechanisms can be used to support this process. For example, Jiang and Cheng (2018) found that explicit team cooperative norms can affect team knowledge sharing and innovative performance. Similarly, focusing on multinational organizations, Singh (2008) found that multi-regional coordination mechanisms such as personal rotation can help to increase the value of Research and Development activities.

Different organizations might require different integrative mechanisms, and some authors argue that the relationship between IC and performance should be deepened focusing on these specific aspects. For example, integrative mechanisms are posited to be different for among Small and Medium Enterprises, Public Entities and other types of organizations (Massaro, Dumay and Bagnoli, 2015; Massaro, Dumay and Garlatti, 2015). Temporary teams are a specific research context (Edmondson, 2012) that challenges traditional theories (Valentine, 2017) since they bring together a group of individuals who might have little experience in working together and need to jointly utilize their skills in order to successfully undertake complex tasks (Bechky, 2006). The use of temporary teams has been growing in many different business contexts. For example, Chae *et al.* (Chae *et al.*, 2015) reported the use of temporary teams in creative industries, while Dicken (Dicken, 2014) discussed the role of temporary teams in multinational consultancy firms. Temporary teams have also been widely used in knowledge firms such as NASA (Shenhar *et al.*, 2005). Hence, although IC

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3 and integrative mechanisms complement each other, their relationship might be context-  
4 dependent, and temporary teams represent a specific research area that deserves attention (Lee  
5 and Choi, 2003).  
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9 This study analyzes how IC affects performance in temporary teams, showing the moderating role  
10 of integrative mechanisms. The research context focuses on National Teams of Football (NTF), also  
11 referred to as national teams of soccer, as an example of temporary groups. A Partial Least Squares  
12 (PLS) methodology was utilized on a dataset built from transfermarkt.com and FIFA world rankings.  
13 An Ordinary Least Squares (OLS) regression is then used to confirm results. The study is novel for  
14 several reasons. First, it applies IC research to a specific research context: temporary teams. Second,  
15 the study analyzes the role of integrative mechanisms as moderators of the relationship between  
16 IC and performance in temporary teams. Third, this study focuses on NTF as an example of  
17 temporary teams. Sports organizations have been previously analyzed in management studies for  
18 several reasons. Sport, in general, represents an economically significant industry sector worth  
19 between 350 and 450 billion euro globally with soccer/football being worth more than 20 billion  
20 euros in ticket sales alone (Kearney, 2011). Interestingly, not only soccer/football represents an  
21 important part of the national GDP in many economies (Trequattrini *et al.*, 2018), but several studies  
22 have found a direct connection between the stock market and NTF (Ashton *et al.*, 2011; Kaplanski  
23 and Levy, 2010). For example, according to Edmans *et al.* (2007, p. 1967) “a loss in the World Cup  
24 elimination stage that could lead to a next-day abnormal stock return of 49 basis points” due to the  
25 psychological investor mood.  
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41 The remaining part of the paper is organized as follows. Section two reports the theoretical  
42 background and the hypotheses developed. Section three depicts the research methodology.  
43 Section four describes the main findings, while section five discuss them. A conclusion section ends  
44 the paper.  
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## 49 **2. Theoretical background and hypotheses**

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52 Since its first development, RBV theory assumes that the exploitation of resources contributes to  
53 the performance of organizations (Newbert, 2008). Within the spectrum of organizational  
54 resources, knowledge assets, also called IC, are considered a key production factor and an IC-based  
55 view of the firm has emerged as a mid-range theory within the RBV (Reed *et al.*, 2006)<sup>i</sup>. The first  
56 attempts at developing an overall knowledge theory define IC as shaped by three main pillars –  
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3 human capital, relational capital, and structural capital (Massaro *et al.*, 2017, 2018). Competencies,  
4 experience, and skills of an organization's employees form human capital. An organization's formal  
5 and informal relationships with external stakeholders define the relational capital. Explicit  
6 knowledge embedded within an organization defines the structural capital. Interestingly, despite  
7 the general acceptance of the definition of IC and its relationship with performance, recent studies  
8 have started to question both the definition of IC and its impact on performance (Dumay and  
9 Garanina, 2013) even although the growth in IC research has accelerated (Serenko and Bontis,  
10 2017).

11  
12 Focusing on the definition of IC, Townley, et al. (2009) discussed the need to add cultural and social  
13 capital to IC as important domains for managing creative industries. Similarly, Sánchez-Cañizares et  
14 al. (2007, p. 409) proposed to add national and organizational culture "as the central nucleus around  
15 which the remaining integrated capitals configure." Additionally, focusing on the Arabic region,  
16 Bontis (2004) analyzed the IC of a nation as comprising human capital, process capital, market  
17 capital, and renewal capital. More recently, Pedro et al. (2018, p. 2502) outlined "the need for clear  
18 definitions of the components and measures of IC." We conclude, therefore, that different research  
19 contexts may require specific definitions of IC.

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21 Temporary teams, as well as temporary workers, represent a particular context of study in the  
22 management field (Dalal *et al.*, 2017; Foote, 2004; Maciejovsky *et al.*, 2013). According to Gersick  
23 (1988), temporary teams are "naturally occurring teams brought together for specific projects  
24 during a limited period of time." For this reason, temporary teams are "commonly used by  
25 organizations to perform tasks that are specific, important, and of short duration" (Dalal *et al.*,  
26 2017). Temporary teams challenge traditional theories by representing a new and different research  
27 context (Valentine, 2017). While members of permanent teams tend to learn from their past shared  
28 experiences, temporary teams may have little or no past shared experience but yet must be able to  
29 jointly capitalize on the skills of their members using their ability to connect and socialize with each  
30 other to successfully undertake complex tasks (Bechky, 2006).

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32 Additionally, multi-organization teams, such as joint ventures, can benefit from the knowledge of  
33 the original organization of their members (Maciejovsky *et al.*, 2013), while due to their temporary  
34 nature, knowledge embedded in organizational procedures (e.g., patents and company know how)  
35 is less important. Thus, in a temporary team, the most relevant resources are the personal talent of  
36 the members of the team and the knowledge and skills available from the member's original  
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3 organizations. These resources shape the temporary team IC providing a specific definition of IC.  
4 Thus, for the purpose of this study, IC is defined as the sum of personal talent plus the knowledge  
5 and skills available from the member's original organizations.  
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9 The relationship between IC and performance appears to be multifaceted since different contexts  
10 show peculiarities. For example, in the banking sector, Curado et al. (2014, p. 104), stated: "clearly,  
11 there is no confidence in the universality that IC has a positive influence on banking performance in  
12 all contexts." Additionally, according to Dumay et al. (2015, p. 278), the public sector has different  
13 objectives and therefore scholars "need to experiment with the concept [Intellectual Capital] in a  
14 more open-minded way." Specific organizations, such as universities and other educational  
15 institutions also exhibit peculiarities, requiring that context-specific frameworks should be applied  
16 (Secundo *et al.*, 2010, 2016). According to Kong (2008), IC is a relevant resource for non-profit  
17 organizations that need to develop specific models to gain sustained strategic advantage.  
18 Additionally, Nadeem et al. (2018) discussed the need to adapt to the understanding of the  
19 relationship between IC and performance in emerging countries compared to developed ones.  
20 Finally, while some sectors have been widely analyzed, others such as sport and football have been  
21 largely under-investigated showing room for further investigations (Ricci *et al.*, 2015; Shareef and  
22 Davey, 2005).  
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35 Temporary teams represent a specific research context to analyze the factors influencing  
36 performance for several reasons. Using the Theory of Reasoned Action, Magni et al. (2018) showed  
37 that team climate might affect individual attitudes in terms of risk assumption, proactivity, and  
38 improvisation. Using the same theoretical background, McClung and Rynarzewska (2015) discussed  
39 how identity and loyalty affect team performance. According to Magni et al. (Magni *et al.*, 2018)  
40 "Theory of Reasoned Action aims at providing a framework to understand better the process  
41 through which individuals' behaviors are formed." Temporary teams offer different forms of  
42 climate, identity, and loyalty due to their temporary nature and task orientation. Team members  
43 are strongly oriented to the task, which represents the measure of their success. Within this context,  
44 IC is strongly stressed and used to reach the goal, and therefore, we derive our first hypothesis as  
45 follows:  
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56 **HP 1.** *In temporary teams, IC has a positive association with performance.*  
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58 According to Hassan et al. (2017, p. 2), "only possession of resources does not mean that the  
59 organization will achieve superior performance ... organizations do not differ on the basis of  
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resources but differ on the basis of their ability to utilize the resources". Organizational capabilities must be developed to coordinate team member efforts and, within this context, integrative mechanisms are paramount since they provide "strategies and tools for effectively coordinating actions across teams and groups within a program" (Browning, 1998, p. 98). Within permanent teams, Johansen (2007) showed that several integrative mechanisms such as joint decision making and joint sensemaking could affect performance. Similarly, Singh (2008) shows that in R&D organizations, the absence of integrative mechanisms can increase coordinating costs and create difficulties in effectively leveraging the existing knowledge. More recently, Jiang and Chen (2018) found a significant relationship between the integrative mechanisms of leadership, norms, knowledge sharing, and performance. However, while permanent teams can build specific integrative mechanisms over time, temporary teams "must hit the ground running". Focusing on temporary teams, Dalal et al. (Dalal *et al.*, 2017) showed that team assembly decisions are of paramount importance. Therefore, in temporary teams, assembly decisions and team leader experience are important integrative mechanisms, and thus, we develop our second hypotheses as follows:

**HP 2.** *In temporary teams, integrative mechanisms positively affect performance.*

Previous studies on IC have analyzed the moderating role of several variables on the relationship between IC and performance. For example, Han and Li (2015) studied the moderating role of dynamic capability on the relationship between IC and innovative performance. Similarly, Ibarra Cisneros and Hernandez-Perlines (Ibarra Cisneros and Hernandez-Perlines, 2018) studied knowledge management as a moderator between IC and performance, while Kianto et al. (2014) focused on the moderating role of knowledge strategy. While these studies focus on permanent teams, Jiang and Chen (2018) showed how integrative mechanisms moderate the relationship between knowledge and performance in temporary teams. Therefore, we derive our third hypothesis as follows:

**HP 3.** *In temporary teams, Integrative mechanisms moderate the relationship between IC and performance.*

### 3. Research methodology

#### *Research context and data collection*

The research setting for this study focuses on NTF, also known as national teams of soccer. Previous studies, such as Gerrard and Lockett (2018), focused on specific pillars of IC in the football sector studying the impact of team-specific human capital on performance. Similarly, other studies have focused on structural capital aspects such as the impact of governance mechanisms on team performance (Scafarto and Dimitropoulos, 2018) or on the role of manager changes (Hughes *et al.*, 2010). Finally, Müller *et al.* (2017) studied some aspects of relational capital, discussing the impact of crowd judging on market value. However, most of the studies on IC in the football sector have analyzed stable organizations such as club teams. For example, Gürel *et al.* (2013) focused on the club teams playing in the Turkish First Division, Shareef and Davey (2005) focused on listed clubs in the English Premier League, and Ricci *et al.* (2015) on clubs in the Italian Serie A.

NTF operate quite differently from domestic club teams and can meet the definition of temporary teams due to their characteristics (Dalal *et al.*, 2017). NTF assemble pools of players for a limited time only. Changes in the group are frequent due to different competitions, coach's selection preferences, injuries, playing styles, etc. Additionally, they are characterized by the nature of the task requiring specific and intensive coordinated efforts.

To develop our study, we analyzed data from two different sources: [www.transfermarkt.com](http://www.transfermarkt.com), which is considered a primary source of data in the football industry (Peeters, 2018), and FIFA world rankings. More precisely, we analyzed data for each NTF in January 2017. Our available dataset includes 180 NTF, but only 153 NTF could be analyzed due to missing values.

#### *Performance*

To measure NTF performance, we downloaded the FIFA world rankings as reported in January 2017. In 2018, the FIFA world ranking measure was changed, and therefore, we decided to stop our analysis in 2017 to allow for time comparisons<sup>ii</sup>. According to Bar-on and Escobedo (2016, p. 1), "FIFA was created in Zurich in 1904 in order to oversee international football competitions among eight European states." According to Karminsky and Polozov (2016, p. 161), "the FIFA/Coca-Cola World Ranking is a monthly status list of the world's current senior national teams ... [and] takes into account the results of all the international matches." Matches are weighted and therefore not all wins are weighted equal (e.g., a win against a top NTF is weighted more in FIFA ranking calculation

due to its greater difficulty). Additionally, besides weighting wins, the FIFA world ranking considers results of the previous years, providing a long-term measure of performance. To overcome the time dependency problem, we added a one-year lagged variable as discussed in the control variables section.

The FIFA world ranking is recognized as a good proxy of NTF performance and is used extensively within the football industry as well as by international and national media outlets. Indeed, as stated by Leeds and Leeds (2009, p. 372), “to quantify international soccer success ... FIFA points of each nation at one point in time, ... is the more common method in the literature”. For example, Velenti et al. (2019, p. 10) stated that the FIFA world ranking “reflects the comparative strength and success of a country in women’s football”. Similarly, Paul and Mitra (2008, p. 1171) stated that “Since 1993 the Federation of International Football Association's (FIFA) monthly world ranking system for senior national football teams has become a reliable source to judge a team's potentiality in football”. Table I reports the top teams in the FIFA world ranking.

Please Insert Table I here

### *Intellectual Capital*

As previously stated, temporary groups are strongly reliant on the personal talent of their members because of their time-limited scope (Bechky, 2006). Therefore, to measure IC, we used two measures. First, we analyzed the IC of the players of each NTF as talent usable by the team. We analyzed all the data from the website transfermarkt.com for the players of each NTF, specifically focusing on players’ value as a proxy of player’s IC. According to Peeters (Peeters, 2018) “Transfermarkt valuations have recently become an important reference for practitioners in both the professional soccer and betting industries... [and] are referred to regularly both by researchers in the sports economics or management literature.” We analyzed data for 4,846 players and calculated the average IC value for each NTF. Since the average team IC values are not normally distributed, we applied a square root transformation using the following formula where  $j$  is the player of each NTF and  $n$  the number of players for each NTF selected in the year of analysis.

$$\text{NTF Players value} = \text{SQRT} \frac{\sum_{j=1}^n \text{Player Value}_j}{n}$$

Second, we focused on the knowledge acquired from the player’s club (e.g., the Italian goalkeeper Donnarumma can acquire knowledge also from his domestic team AC Milan, where he regularly

plays). Hence, we analyzed the value of all the players of the player's club where NTF players play and define the variable Club Team of Football (CTF) Players' value. For each NTF then we calculated the average value of the club teams for which the players play. Again we applied a square root transformation due to the nonnormality distribution of the data. The following formula describes the measure where the  $j$  is the NTF player (e.g., the goalkeeper Donnarumma),  $m$  the number of players for each club team (e.g., AC Milan) where the  $j$ -player plays and "Player Value" the value of each player.

$$\text{CTF Players value} = \text{SQRT} \frac{\sum_{j=1}^n \left( \frac{\sum_{z=1}^m \text{Player Value}_z}{m} \right)}{n}$$

### *Integrative mechanisms*

The paper focuses on two main integrative mechanisms. First, we focus on the coach's experience in leading an NTF. Hence, we analyzed the data of each coach of the NTF, calculating the number of matches led by the coach as a proxy of their experience in leading NTF. We focused only on NTF experience and not on the total experience (which would include club team of football) in order to include only experience relating to the specific characteristics of temporary groups. Second, we focused on the average experience of the players in working in temporary groups. We calculated the average experience as the average number of matches played by the players of each NTF by analyzing the history of each player, calculating the number of matches they played on national teams during the previous years.

### *Control variables*

To ensure the validity of the results, we introduced some control variables. More precisely, to account for the overall experience of a player, we added NTF player age as a control variable. Indeed, according to Hill and Sotiriadou (2016, p. 293) "Football is an early start sport .... [and] sport organizations deem that they are best placed to develop these players and the earlier the players are attracted to the sport, the fewer chances of them defecting to other sports". Therefore, we included a measure of Player's Age as a proxy of the overall experience of the player.

Additionally, following Gerrard and Lockett (2018) who included both player and coach characteristics to explain team performance, we also included coach age as a control variable. Finally, considering that FIFA work ranking accounts for the performance of previous years, we

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3 added a one-year lagged performance measure as a control variable. Figure 1 describes the overall  
4 model.  
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### 10 *Data analysis*

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12 To analyze the dataset we employed a PLS method using the software RStudio (RStudio Team, 2015)  
13 and the package plspm (Sanchez, 2013). PLS is a variance-based non-parametric structural equation  
14 method that works with small samples (Sarstedt *et al.*, 2014). Additionally, as a non-parametric  
15 method, PLS is “an appropriate method when the data is skewed or does not follow a multivariate  
16 normal distribution” (Khan *et al.*, 2014, p. 1066). According to Farahani *et al.* (2010, p. 1459), the  
17 “PLS model provides much more stable results than the OLS model when the sample size is small,  
18 and there are data missing values and multicollinearity.” Considering that our sample is small, and  
19 applies an interaction effect that increases multicollinearity, we decided to use first a PLS as the  
20 primary research method. To assure validity, an OLS regression approach was used to confirm  
21 results found with the PLS method.  
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31 The analysis first focuses on descriptive statistics and then on the model evaluation reporting both  
32 the measurement model and the structural model (Hair *et al.*, 2014). Additionally, to measure the  
33 moderating role of control variables, we employed a two-stage path modeling approach (Sanchez,  
34 2013). Finally, we employed an OLS regression to confirm the results of the PLS method. The  
35 following section presents the results of the analysis.  
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## 41 **4. Results**

### 42 *Descriptive statistics*

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45 Our findings show that Performance for the 153 NTF varies from a minimum of 12 to a maximum of  
46 1,634 with a standard deviation of 348, showing a relative standard deviation of 67%. NTF and CTF  
47 players value show an average value respectively of 1,327 and 1,090. Average coach experience was  
48 24 matches from a minimum of 0 to a maximum 127 with a coach age that ranges from 29 to 78.  
49 Average player experience is 7 games with an average age of 27. All the measures depicted  
50 represent the average value, while minimum and maximum values refer to the average value of  
51 each NTF. Table II depicts the main statistics for the manifest variables used.  
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Please Insert Table II Here

### *Measurement model*

According to Hair et al. (2014), measurement models provide evidence of the quality of the measures used in the analysis. In our model, IC is depicted as a reflective model<sup>iii</sup>. Among the most accepted measures used for reflective models, Hair et al. (2014) proposed: item indicator loadings (that should be higher of 0.5), Cronbach's  $\alpha$  and Dillon-Goldstein's *rho* coefficient as a measure of composite reliability (both should be higher of 0.7) and the average variance extracted (AVE) (that should be above 0.5). Table III depicts the findings of our analysis showing how all items have loadings higher than 0.5, Cronbach's  $\alpha$  coefficient higher than 0.7 and AVE above the suggested limit of 0.5.

Additionally, integrative mechanisms are developed as a formative construct<sup>iv</sup>. According to Andreev et al. (2009, p. 6), in formative cases, "coefficients from the indicators to the construct should be statistically significant under a t-test". Our findings show significant coefficients with p-values of less than 0.01. Hence, for both reflective and formative constructs, we claim that our model meets the criteria to prove to construct reliability.

Please Insert Table III Here

To test discriminant variability, the square root of AVE was compared with the latent variable correlations. Findings show that the AVE square root of every construct is higher than the correlations with the other latent variables in the model (Sanchez, 2013). Additionally, the cross-loadings of each indicator with the rest of the latent variables show the adequacy of discriminate validity (Hair *et al.*, 2017). Table IV and Table V report the results of this analysis.

Please Insert Table IV and V Here

### *Structural model and moderating interaction*

The structural model analysis focuses on the underlying theory that supports the path model and allows, therefore, the hypotheses to be tested (Hair *et al.*, 2014). The overall structural model is assessed using a PLS bootstrapping function (5,000 runs) using a two-stage path modeling approach to account for the interaction term. According to Sanchez (2013), this approach requires at the first stage to focus on the main effects without the interaction terms. The second stage requires another PLS analysis with the interaction term included. Latent variable scores from the first stage are used to create the interaction term.

Findings show a high  $R^2$  value of 0.89<sup>v</sup>, indicating that the exogenous variables explain almost 90% of the variance of the endogenous variable. Additionally, our findings support **HP 1**, showing that IC has a positive and significant influence on performance in temporary groups ( $\beta=0.154$ ,  $SE=0.062$ ,  $t\text{-value}=2.496$ ). Additionally, our results support **HP 2**, showing how integrative mechanisms impact on performance ( $\beta=0.168$ ,  $Se=0.040$ ,  $t\text{-value}=4.151$ ). Finally, the interaction term confirms that integrative mechanisms moderate the relationship between IC and performance confirming **HP 3** ( $\beta=0.113$ ,  $Se=0.034$ ,  $t\text{-value}=3.275$ ). It should be noted that NFT Player Age has a significant and slightly negative effect, while NFT Coach Age is not significant. The lagged performance variable is highly significant due to the calculation method used for the FIFA rankings. Table VI reports the main results.

Please Insert Table VI Here

### *Regression model test*

To confirm our results, we employed an OLS regression analysis developing four different models. The first model reports only the control variables. The results show that the model has an R squared of 85% due to the significant explanatory role of the lagged performance variable. In Model 2, due to the high correlation among CTF Players Value and NFT Players Value, we created the variable IC multiplying the two measures. Our results show that the variable IC has a coefficient of 0.059 with a p-value of less than 0.01. These results confirm **HP 1**, showing that IC has a positive and significant influence on performance in temporary groups. Additionally, in Model 2 we separately tested the effect of NTF Player Experience and NTF Coach Experience. Both variables show a significant effect on performance, confirming e our **HP 2**, and showing how integrative mechanisms impact performance. The overall R squared increases to 88%. In Models 3 and 4 we added the interaction effect. However, these results only partially confirm our **HP 3**, since the interaction between NTP Coach Experience and IC appears to be insignificant. The overall R squared is 89%. Table VII reports the main results.

Please Insert Table VII Here

## 5. Discussion

This study's results contribute to the existing literature on IC in several ways. Overall, RBV theory is evolving, and the midrange theory of IC is gaining momentum. According to Dumay and Garanina (2013) the IC literature is evolving in stages showing different paradigms. While the first two stages

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3 were focused on the understanding of the concept of IC, the third stage has focused on the  
4 managerial implications of IC (Guthrie *et al.*, 2012). The fourth stage discusses the concept of IC,  
5 extending its borders beyond the organization by incorporating other stakeholders. Focusing on the  
6 university sector, for example, Secundo *et al.* (2018, p. 158) stated that “Incorporating external  
7 stakeholders is important for developing strategic plans that combine performance measures with  
8 governance and accountability.”  
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15 However, by enlarging the boundaries of the IC, scholars have started to question its definition. Our  
16 findings contribute to this line of research by showing how IC is a situational concept. Different  
17 organizations may use different aspects of the IC definition. Temporary teams are a specific research  
18 context involving a group of people being put together to quickly solve specific complex problems  
19 with little or no prior shared experience as well as little or no time to build that shared experience.  
20 In this specific context, the talent of the persons in the group and the knowledge that they bring  
21 from their original organizations represent the cumulative IC available to the team.  
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29 Additionally, these results re-enforce the prevailing proposition that human capital is positively  
30 associated with team performance. The literature available to support this notion is extensive with  
31 studies utilizing a wide range of different research contexts including Curado *et al.* (Curado *et al.*,  
32 2014) in the banking sector, Secundo *et al.* (Secundo *et al.*, 2010, 2016) in the university sector, and  
33 Kong (Kong, 2008) in the non-profit sector. Our results derived from the specific context of  
34 temporary teams contribute to the overall development of the midrange theory of IC (Reed *et al.*,  
35 2006) focusing on the role of human capital.  
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43 The findings of this study also integrate the IC theory with other theories within the RBV. As  
44 previously suggested the existence of talented people is not sufficient to ensure high performance.  
45 Organizations need to develop specific capabilities to effectively use their IC (Hassan *et al.*, 2017).  
46 Integrative mechanisms play an important role in coordinating people, especially in temporary  
47 teams. Importantly, our results show how integrative mechanisms can play a moderating role in IC,  
48 thereby extending previous studies in the field. For example, Han and Li (2015) focused on the  
49 moderating role of dynamic capabilities while Kianto *et al.* (2014) and Ibarra-Cisneros and  
50 Hernandez-Perlines (2018) showed how knowledge strategies and knowledge management  
51 practices moderate the relationship between IC and performance. Our findings extend this research  
52 stream focusing on the moderating role of player and coach experience as integrative mechanisms.  
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3 The role of experience as an integrative mechanism in a specific team/organization has been widely  
4 analyzed in the literature, with contradictory results. For example, focusing on permanent  
5 organizations in different sectors, Grinza and Quatraro (2019) studied the effect of worker  
6 replacement on organizational innovation capability. Results of this study show that “workers’  
7 replacements significantly dampen innovation performance, coherently with the idea that they  
8 generate losses in the tacit knowledge base of the firm” (Grinza and Quatraro, 2019, p. 1). Similarly,  
9 focusing on football club teams, Gerrard and Lockett (2018) found that experience in playing with a  
10 specific club positively influences club team performance. But Hughes *et al.* (2010) found that top  
11 management club team replacements produce performance benefits in the short term.  
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20 Results of this study contribute to this research line showing a more complex picture. Indeed, the  
21 overall player experience measured through the variable of Age (Hill and Sotiriadou, 2016) showed  
22 a negative and statistically significant relationship with performance, while the NTF player  
23 experience showed a statistically significant positive relationship with performance. We argue that  
24 as temporary teams NTF must be agile and “learning within the organization follows a cyclical  
25 pattern involving the individual, the team and the organizational levels” (Annosi *et al.*, 2018).  
26 However, when the team club experience exceeds that NTF experience, it might lead players to  
27 adopt club team routines, making it more difficult the application of NTF routines. For example,  
28 Annosi *et al.* (2018, p. 5), in studying agile organizations, reported that “Several team members in  
29 ...[their] sample voiced continuing concern about their difficulty of transcending the learning-by-  
30 doing approach, given the established working conditions derived from Agile”. We argue that more  
31 experienced players might have difficulties in changing and adapting to the new routines using in  
32 their temporary teams.  
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45 The results of this study also extend the importance of temporary teams as a unique research  
46 setting. As previously noted, temporary teams are a specific research context that challenges  
47 traditional theories (Valentine, 2017) and provides a unique context to test existing theories such  
48 as the Theory of Reasoned Action which is deserving of further attention (Maciejovsky *et al.*, 2013).  
49 Temporary teams need to be coordinated to achieve their goals, but the finite time available  
50 challenges traditional coordination mechanisms (Dalal *et al.*, 2017). Members of a temporary team  
51 need to quickly learn how to work together (Tannenbaum *et al.*, 2012), placing a higher level of  
52 stress on the organization and the team members (Chae *et al.*, 2015). Our findings show how specific  
53 integrative mechanisms such as assembly decisions and team leader experience might have an  
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3 important role in supporting team performance, particularly by creating an interaction effect with  
4 existing IC.  
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7 Finally, these results contribute to the specific literature on sports organizations. Focusing on human  
8 capital, Gerrard and Lockett (2018) found that team-specific human capital derived from the shared  
9 team experience of players and the coach has limited transferability between teams and has a  
10 significant influence on team performance. Focusing on coordination mechanisms, Roach (2016, p.  
11 198) investigated the role of coach experience in national football leagues and found that “team  
12 performance is significantly worse beyond a given coach’s initial head-coaching spell.” Similarly,  
13 Hughes et al. (2010) discussed how managerial changes could affect sports’ team performance. All  
14 of these studies focus on permanent teams. However, NTF context deserves specific attention due  
15 to their unique sensitivities and their important economic impact, especially on the stock market  
16 (Ashton *et al.*, 2011). As Rockerbie (2016, p. 21) stated: “For many countries, failing to qualify for  
17 the World Cup tournament is a national disgrace, while for others, qualifying is a hopeful dream.”  
18 Findings of this study contribute to extending previous studies on sport organizations focusing on  
19 NTF defined as temporary teams.  
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## 31 32 **6. Conclusion** 33

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35 In concluding this study, we return to its aims. We proposed three main research questions on  
36 deepening the role of IC, the impact of integrative mechanisms on performance, and testing for the  
37 existence of an interaction effect between IC and the integrative mechanisms. Our results show how  
38 IC contributes to performance, extending the findings of previous studies to the context of  
39 temporary teams. Additionally, our results show how some integrative mechanisms such as  
40 assembly decisions and team leader experience influence temporary team performance creating an  
41 interaction effect with existing IC. All three research hypotheses have statistical support.  
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49 IC is a developing research field. The findings of this study allow us to understand better that IC is a  
50 situational concept that is not generalizable for every organization regardless of size, industry, or  
51 geography. We focus on NTF as temporary teams showing how within this context IC should be  
52 considered as the sum of the existing knowledge of the team in addition to the acquired knowledge  
53 from the organizations to which the members belong. Our findings contribute to bringing new light  
54 on the topic contributing to what it is called the fourth stage of IC research. Additionally, our results  
55 contribute to a better understanding of integrative mechanisms in temporary teams showing how  
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3 they impact on team performance and moderate the effect of existing IC. Hence, our findings  
4 contribute to RBV theory, in general, integrating the midrange IC theory with organizational  
5 capabilities such as integrative mechanisms.  
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9 Despite our best endeavors, this study has some limitations. First, the study could be extended by  
10 enlarging the period used for the analysis or keeping the same period but using a match by match  
11 approach (although the data collection would be massive). Additionally, the study focused only on  
12 two integrative mechanisms. Other integrative mechanisms may have a role in enhancing the  
13 performance of temporary teams. We also used only FIFA world ranking as a performance measure;  
14 alternative team performance measures could be investigated. Finally, NTFs represent a peculiar  
15 type of temporary team. Players might be familiar with each other and may have played on teams  
16 together in the past. This type of team member familiarity might also occur in other types of  
17 temporary team (e.g. at NASA as well as in consultancy firms). We believe that the limitations of this  
18 study might be used to develop further our understanding of IC and temporary teams.  
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15 <sup>i</sup> According to Reed et al. (Reed *et al.*, 2006) "We say 'mid-range' because, following Pinder and Moore's (1979) definition  
16 of mid-range theories, ICV [Intellectual Capital View] represents one specific aspect of the more general resource-based  
17 view, in that it more narrowly considers three resources that have been theoretically linked to a firm's competitive  
18 advantage."

19 <sup>ii</sup>. See: <https://www.fifa.com/fifa-world-ranking/procedure/men> (accessed May, 5<sup>th</sup> 2019).

20 <sup>iii</sup> According to Hair et al (2014, p. 165) "Reflective measurement models are based on a measurement model  
21 specification in which it is assumed that the indicators are caused by the underlying construct"

22 <sup>iv</sup> According to Hair et al (2014, p.164) "Formative measurement models are based on a measurement model  
23 specification in which it is assumed that the construct is caused by the assigned indicators"  
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25 Hair Jr., Joseph F.. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (p.164). SAGE Publications.  
26 Edizione del Kindle.

27 <sup>v</sup> According to Sanchez (Sanchez, 2013) values for the R-squared can be classified in three categories: low <0.30,  
28 moderate between 0.30 and 0.60; high over 0.60  
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Table I – Excerpt from the Fifa World Ranking as on January, 12<sup>th</sup> 2017

#	National Team	Confederation	Points
1	Argentina	CONMEBOL	1634
2	Brazil	CONMEBOL	1544
3	Germany	UEFA	1433
4	Chile	CONMEBOL	1404
5	Belgium	UEFA	1368
6	Colombia	CONMEBOL	1345
7	France	UEFA	1305
8	Portugal	UEFA	1229
9	Uruguay	CONMEBOL	1187
10	Spain	UEFA	1166
...			
13	England	UEFA	1114
...			
16	Italy	UEFA	1083
...			
120	Canada	CONCACAF	282
...			

Source: [www.fifa.com/fifa-world-ranking/](http://www.fifa.com/fifa-world-ranking/)

Table II – Descriptive statistics

Variable	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max	Relative St.Dev
NTF Performance	153	519.542	348.612	12	263	687	1,634	67%
NTF Players value	153	1,327.085	1,156.227	18.257	453.179	1,869.114	5,160.998	87%
CTF Players value	153	1,090.280	730.163	213.812	542.465	1,460.538	3,933.043	67%
NTF Player experience	153	7.765	2.955	2.650	5.380	9.630	17.280	38%
NTF Coach experience	153	23.935	22.996	0	7	33	127	96%
NTF Player age	153	27.211	1.673	21.640	26.300	28.240	32.950	6%
NTF Coach age	153	51.837	9.096	29	45	58	78	18%
Lagged NTF Performance	153	504.954	346.137	0	266	745	1,494	69%

Table III – Indicator loadings and reliability statistics of reflective and formative variables

Construct	Scale	Variable	Loading	Other measures
IC	Reflective	NTF Players value	0.984	Cronbach's $\alpha$ = 0.967 Dillon-Goldstein's rho = 0.984 AVE= 0.968
		CTF Players value	0.983	
IM	Formative	NTF Coach experience	0.986	Std error= 0.0167 P-value= <0.001 Std error= 0.0897 P-value= <0.001
		NFT Player experience	0.674	

IC = Intellectual Capital; IM = Integrative Mechanism

Table IV – Discriminant validity of research constructs

Constructs	PF	IC	IM	PA	CA
NTF Performance(PF)*	<i>1.000</i>				
Intellectual Capital (IC)	0.863	<i>0.968</i>			
Integrative Mechanism (IM)*	0.713	0.602	<i>0.714</i>		
NTF Player Age (PA)*	-0.075	-0.135	0.054	<i>1.000</i>	
NTF Coach Age( CA)*	0.212	0.165	0.249	-0.045	<i>1.000</i>
Lagged NTF Performance (LP)*	0.921	0.857	0.698	0.008	0.176

Legend: \* Formative constructs; Diagonal (italic face) represents the square root of the AVE while other entries represent the correlations matrix

Table V – Cross loadings

Construct	Variable	PF	IC	IM	PA	CA	LP
PF	NTF Performance	1.00	0.86	0.71	(0.08)	0.21	0.92
IC	NTF Players value	0.84	0.98	0.57	(0.12)	0.18	0.84
	CTF Players Value	0.85	0.98	0.62	(0.15)	0.14	0.85
IM	NTF Players Experience	0.70	0.60	0.99	0.05	0.22	0.70
	NTF Coach Experience	0.48	0.39	0.67	0.03	0.26	0.41
PA	NTF Player Age	(0.08)	(0.14)	0.05	1.00	(0.05)	0.01
CA	NTF Coach Age	0.21	0.17	0.25	(0.05)	1.00	0.18
LP	Lagged NTF Performance	0.92	0.86	0.70	0.01	0.18	1.00

Note: Findings in brackets indicate negative cross loadings.

Table VI – Hypotheses testing

Hypotheses	Variable	Path coefficient	SE	t-value	Significance
Hp 1	IC → PF	0.154	0.062	2.496	0.013**
Hp 2	IM → PF	0.168	0.040	4.151	<0.001***
Hp 3	IC*IM → PF	0.113	0.034	3.275	0.001***
Control Variables					
	PA → PF	-0.054	0.028	-1.859	0.065*
	CA → PF	0.028	0.025	1.005	0.316
	LP → PF	0.624	0.060	10.29	<0.001***

Overall R2 = 0.89; significance: 0.1\*; 0.05\*\*, 0.01\*\*\*

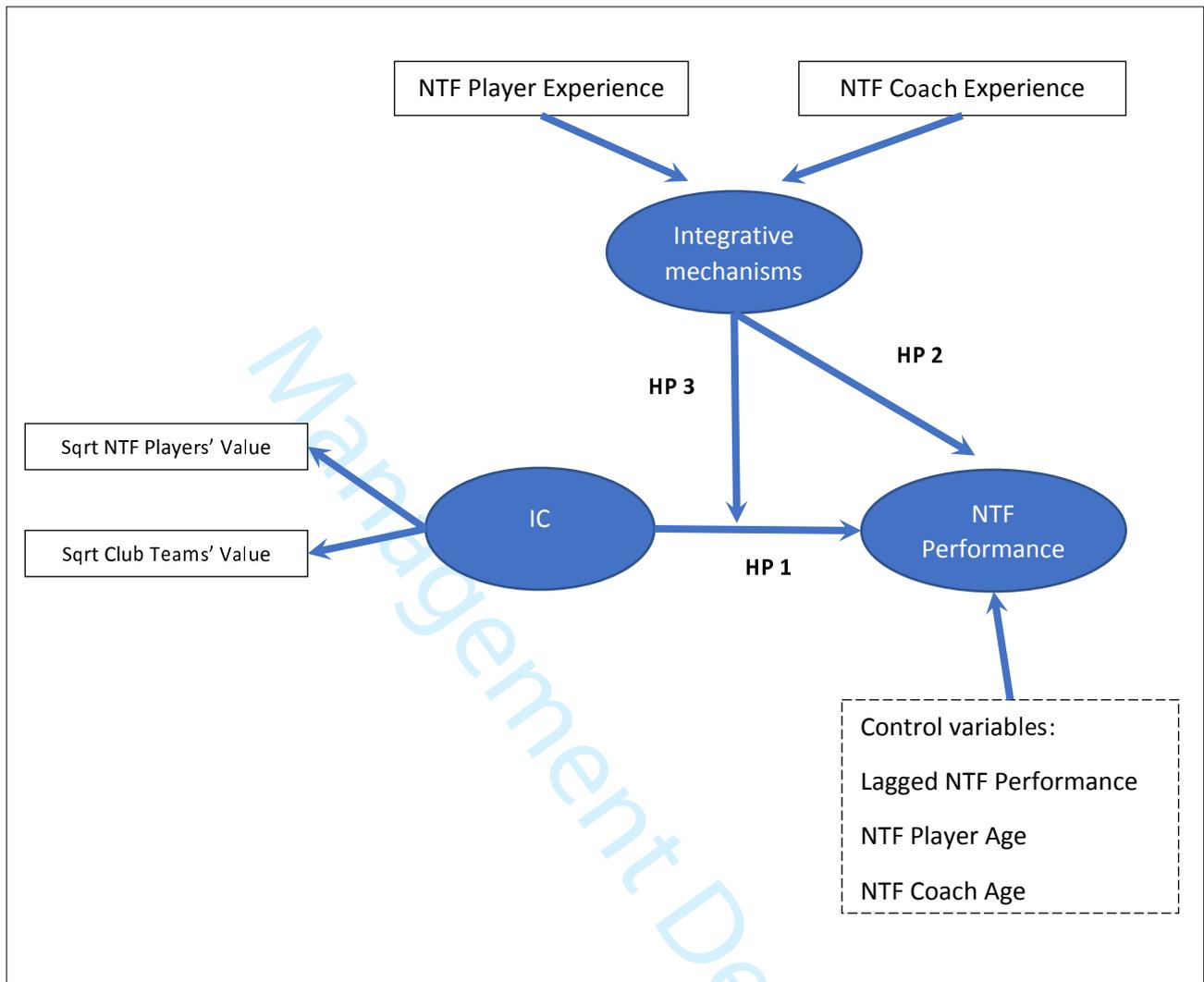
PF = NTF Performance; IC = Intellectual Capital; IM = Integrative Mechanism; PA = NTF Player Age, CA = NTF Coach Age; LP = 1 year lagged NTF Performance

Table VII – OLS regression analysis: Dependent variable PF

	Model Comparison			
	Model 1 (1)	Model 2 (2)	Model 3 (3)	Model 4 (4)
Intercept	422.986** (188.878)	279.573 (179.265)	384.994** (177.636)	384.570** (179.282)
NTF Player Age	-16.976*** (6.450)	-11.921* (6.137)	-11.972** (5.967)	-11.966** (5.993)
NTF Coach Age	1.812 (1.205)	0.696 (1.130)	0.857 (1.100)	0.858 (1.104)
Lag NTF Performance	0.920*** (0.032)	0.638*** (0.063)	0.647*** (0.062)	0.647*** (0.062)
IC		0.059*** (0.015)	-0.045 (0.037)	-0.044 (0.038)
NTF Player Experience		9.368* (5.107)	-2.860 (6.363)	-2.771 (7.546)
NTF Coach Experience		1.291** (0.521)	1.174** (0.508)	1.157 (0.922)
IC * NTP Player Experience			0.010*** (0.003)	0.010*** (0.004)
IC * NTP Coach Experience				0.00001 (0.0003)
Observations	153	153	153	153
R <sup>2</sup>	0.858	0.884	0.891	0.891
Adjusted R <sup>2</sup>	0.855	0.879	0.885	0.885
Residual Std. Error	132.896 (df = 149)	121.396 (df = 146)	118.030 (df = 145)	118.439 (df = 144)
F Statistic	298.979*** (df = 3; 149)	184.580*** (df = 6; 146)	168.715*** (df = 7; 145)	146.608*** (df = 8; 144)

Note: significance: 0.1\*; 0.05\*\*, 0.01\*\*\*

Figure 1 – Theoretical model



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