

How complexity affects and shapes the dynamics in the football industry[♦]

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Abstract

This paper examines the complex dynamics at play within the football industry, highlighting how intricate and auto-catalytic processes impact and shape its operational landscape.

By examining the interplay and *mutual interactions in the objective functions* (1) and the *transition stages* in the *value chain* (2), the study tries to shed light on the very diverse range of interactions characterising football industry.

By examining the interplay and mutual interactions within the *objective functions system* (1), a source of complexity was found due to the impossibility of isolating the effect of a single variable on the entire structure.

Then, the study analysed the *transition stages in the value chain* (2), from lower levels to elite competitions and vice versa, revealing the complexity that impacts the organisation, strategies, and decision-making of football clubs.

[♦] *Despite being a collaborative effort, §§ 1, 3.3 and 4 are attributed to Claudio Nigro; § 3.1 to Simona Curiello; §§ 3.3.1, 3.3.2 and 3.3.3 to Enrica Iannuzzi; §§ 3.2, 3.2.1 and 3.2.2 to Enrico Lubrano; §§ 2, 3 and 5 to Vincenzo Sanguigni; § 3.4 to Raffaele Silvestri; §§ 2.1, 2.2, 2.3, 3.1.1 and 3.1.2 to Rosa Spinnato.*

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The paper aims to evaluate the contributions of different components, such as economic and financial requirements and team achievements, to the nature of the football ecosystem.

By examining these two themes, this article aims to provide a critical analysis of the intricacies of the football industry. This analysis should aid in identifying potential avenues for future research and determining the managerial frameworks and mechanisms required to navigate this complex industry.

Keywords: complexity, football value chain, transition stages, interplays in objective functions.

Sommario

L'articolo esamina le complesse dinamiche nell'industria del calcio, evidenziando come i processi complessi e autocatalitici influiscano e modellino il suo panorama operativo. In tale prospettiva, saranno esaminate le interazioni circolari e mutualmente condizionati delle funzioni obiettivo che caratterizzano i diversi *outcomes* (1), nonché le fasi di transizione nella catena del valore (2) nel sistema calcio.

Esaminando le reciproche interazioni all'interno del sistema delle funzioni obiettivo (1), è possibile evidenziare l'irrisolvibile complessità dovuta all'impossibilità di isolare l'effetto di una singola variabile sull'intera struttura degli *outcomes*.

Successivamente, lo studio ha analizzato le fasi di transizione nella catena del valore (2), dai livelli più bassi alle competizioni a quelli di élite, facendo anche qui emergere la complessità che incide sull'organizzazione, sulle strategie e sui processi decisionali delle società calcistiche.

Esaminando questi due temi, il lavoro si propone di fornire un'analisi critica delle fonti di complessità sottostanti all'industria calcistica. In tal modo, tale percorso concettuale si propone lo scopo di aiutare a determinare le traiettorie strategiche e i meccanismi gestionali necessari per affrontare tale complessità, nonché a identificare potenziali percorsi per ulteriori ricerche.

Parole chiave: complessità, catena del valore, fasi di transizione, interconnessioni tra le funzioni obiettivo.

1. Introduction

The work explores the complex dynamics of football, highlighting its intersection with economic and managerial components. It describes football as a system with causal interactions, creating a continuous feedback loop that adapts to changing circumstances.

Variables such as economic and sporting results, competition, budget, merchandising, and entertainment synergistically contribute to a convoluted

system. This system shows how changes in one component can affect others, leading to dynamic processes with inherent instability.

The correlation between sports success and economic and financial outcomes in football clubs has intrigued scholars. Numerous studies (v. Table 1) contribute to these topics, focusing on the relationship between sports performance and financial outcomes. Thus, scholars explore how market value, competitive circuits, and success in national and international leagues can influence club revenues. Otherwise, they examine player proficiency, transfers, and expenditures for their impact on revenue and commercial prosperity. Empirical studies have shown stable relationships between sporting outcomes and financial performance.

Table 1 –Football financial and sporting results’ literature

Author	Main Concept	Brief Description
Pinnuck and Potter’s (2004, 2006)	Match Attendance and Success in Football Clubs	Examines the positive relationship between match attendance and success, both short-term and long-term, and their influence on financial success off the field.
Carmichael (2011)	Direct Link Between On-Field Triumph and Commercial Prosperity	Investigates the direct link between on-field success and commercial prosperity, highlighting the importance of players’ proficiency in generating revenue.
Thrassou (2012)	Communication in football clubs	Marketing communication in football clubs
Dimitropoulos and Alexopoulos (2014)	Financial Success of Greek Super League Clubs	Focuses on the Greek Super League, investigating the financial success of clubs over a seven-year period and identifying factors contributing to their economic prosperity.
Galariotis (2018)	Football Clubs as Enterprises	Explores the realm of football clubs as enterprises, examining the intricate connections between financial, business, and sports performance in French football clubs.
Havran (2018)	Positive Rapport Between Expenditures and Augmented Revenues	Emphasizes the affirmative relationship between expenditures in transfers and salaries with increased revenues, cautioning against a drop in profits due to rising personnel expenses.
Miragaia (2019)	Correlation Between Income from Marketing and On-Field Success	Examines the correlation between income from marketing and success on the field, revealing a significant link between the two over two years.
Di Simone and Zanardi (2020)	Durability of Sporting Outcomes and Correlation to Financial Performance	Expands the analysis to investigate the durability of sporting outcomes and their secure correlation to financial performance among European football corporations.
Gonçalves (2020)	Export Markets and Impact of Player Sales Revenue on Financial Outcomes	Expands the research to Brazil, confirming the pattern of export markets and emphasizing the impact of player sales revenue on financial outcomes.
Alaminos (2020)	Neural Networks in Examining Financial Performance of European Soccer Clubs	Presents a new technique utilizing neural networks to examine the financial performance of European soccer clubs, emphasizing the determining factors of liquidity, leverage, and sporting performance.
Warias and Block (2021)	Influence of Market Value on Team’s Position in the League Standings	Highlights the influence of market value on a team’s position in the league standings, employing regression analysis to disentangle the complexities of this relationship.
Kaya (2023)	Correlation Between Athletic and Financial Performance	Uses a correlation test to investigate the relationship between athletic and financial performance utilizing weighted criteria.

Source: our elaboration

Additionally, scholars delve into the role of marketing income, match attendance, and the development of football clubs as enterprises. When investigating financial performance, there are various methodologies available, such as correlation tests and neural network analysis. By doing so, scholars gain a more comprehensive understanding of financial performance.

However, it is important to consider the challenge of models that focus on isolated pathways. Instead, we advocate for the use of multilevel models that consider interconnected variables and significant feedback in the complex football system.

In this paper, we investigate the correlation between sporting and economic results, and unique managerial strategies that influence the intricate balance within football clubs, through a series of probing research questions.

RQ1. Do the sport results impact and to what extent on the economic and financial sustainability?

This study investigates two hypotheses:

- 1a) the effect of sporting results on economic and financial sustainability;
- 1b) the impact of economic and financial parameters on sporting outcomes.

The research aims to comprehensively analyse the intricate relationship between on-field performance and the financial stability of football clubs, exploring how transitional stages shape the value chain and ultimately impact the economic landscape of these clubs.

RQ2. Are there differences between football clubs' and other businesses' contexts? Or rather: are there other business sectors that can be comparable, in terms of complexity, to that of professional football?

This analysis examines the complexity of football clubs and explores their distinctive contextual factors in comparison to other businesses. Specifically, to address HP 2, we aim to understand whether the professional football industry is unique in terms of the mechanisms through which value is created.

The aim is to examine the contextual factors of football clubs that differentiate them from conventional businesses.

This requires identifying industries that exhibit comparable attributes, such as organisational structure, stakeholder relationships, financial management, and strategic decision-making. Possible sectors for comparison include the entertainment industry, event management, or other sports-related fields like NBA.

Essentially, these studies combine various theoretical approaches to achieve a comprehensive understanding of social dynamics, cascading processes, and threshold effects within complex systems, contributing to our understanding of significant events, self-reinforcing procedures, and chaotic

phenomena, thus enhancing the wider discourse on the dynamic cycle in football systems.

2. Theoretical background

Football is a multifaceted environment where economic and financial factors significantly impact the sustainability of clubs and the sport itself (Dimitropoulos, 2014). The interdependence between sporting outcomes and economic parameters shapes the landscape of football, which affects the financial well-being of clubs (Galariotis, 2017). This study investigates the intricate interplay between sporting outcomes and their extensive repercussions on economic and financial sustainability. It also scrutinises how economic and financial factors, in turn, exert a substantial influence on the sporting achievements of football clubs.

Complexity could be seen through a multi-stakeholder perspective, whereas competition takes place at several levels and involves several key players, whereas Participation in European competitions and winning the associated trophies (especially the Champions League) allows football clubs to increase the visibility and attractiveness of their brand and symbols:

1. *fans*, as the most important market segment, due to the development and growth of the life-cycle value of fans;
2. *sponsors*: by participating to the best competition circuits clubs are able to conclude contracts with well-known technical and commercial brands. We assist with co-marketing strategies, where the prestige of one party affects the image of the other;
3. *agents*, who maintain good relations with them, allowing football clubs to anticipate and select potential champions and negotiate advantageous contracts for both the clubs and the players on the agents' lists;
4. *media outlet*, a complex issue that warrants further study regarding the relationship between clubs and the media. Key aspects include the control of the media by the owners of football teams, the value of advertising purchased by football clubs or their sponsors in media channels, and the participation in qualifying competitions to gain prominence in news coverage, especially on the front pages of newspapers;
5. *relations with other national and international football clubs*, establishing lasting and positive links to facilitate joint strategies: player exchanges, player loans, friendly matches, twinning arrangements, etc.

2.1. A brief overview over complexity

The complexity stems from the existence of feedback among the variables, highlighting the dynamic interconnection of these components. In essence, the working hypothesis posits that diverse factors influence economic and financial outcomes, as well as sporting results. A thorough comprehension of the interconnections involved is essential in gaining a comprehensive and informed outlook on how these interactions shape the environment.

The study of social dynamics in football's multifaceted system is becoming increasingly significant, especially considering recent events with numerous interconnected factors. This emphasizes the mounting importance of comprehending intricate systems in conventional literature. Kominek and Scheffran investigate (2012) social diffusion and cascade processes, analysing the effects of significant events, thresholds, spillovers, tipping points, and cascade sequences using this approach. The study covers information cascades and intersystem cascades, providing a thorough comprehension of the interrelated dynamics inherent in social systems (see also Wiener, 1943; von Bertalanffy, 1967; Simon, 1985; Golinelli, 2000; Bonazzi, 2002; Barile, 2006; Morin, 2007).

Room's (2017) work emphasises the significance of self-reinforcing procedures and dynamic synergies in propelling social and economic transformation. This concept prompts an exploration of the elaborate mechanisms underlying complex transformative processes.

Petukhov's (2015) research presents a mathematical model explaining chain reactions as a form of threshold effects in complex social systems. In their study, San Miguel (2020) examined the analysis of chaotic social systems, which resulted in the introduction of bifurcation phenomena, deepening the modelling of chaos, and advancing predictability mechanisms of dynamic evolution. Technical terms have been explained when first used, and the text maintains proper vocabulary and grammatical constructs. The exploration of deterministic parameters and dynamic evolution within social chaos systems enhances comprehension of threshold effects.

2.2. Sporting results impacting economic-financial ones

The link between sporting results and a football club's financial stability is significant. The outcomes of sports affect incoming money, including merchandise, ticket sales, and broadcast rights, and also influence the image of the club. Positive results lead to greater engagement from fans and open up opportunities for sponsorship and commercial growth (Benkraiem, 2011;

Ashton, 2003). Poor performances have a chain reaction resulting in decreased revenue and fan disengagement. Sporting outcomes influence the club's economic foundation through merchandise sales and sponsorships, reinforcing the impact of sporting performance on the club's prosperity (Pinuk, 2006). The intricate relationship between sporting performance and the club's economic success underscores the strategic importance of both on- and off-field management for long-term sustainability.

Financial sustainability is fundamental for a football club's lasting survival and is intricately linked with sporting performance (Galariotis, 2017). Victories on the pitch make a significant contribution to generating economic benefits, boosting the club's overall value and attractiveness for sponsorships and investments. This symbiotic relationship reinforces a positive cycle, ultimately strengthening the overall economic health of the club (Galariotis, 2017). In contrast, financial instability has an adverse impact on player quality, coaching staff and infrastructure, resulting in decreased on-field performance (Clarkson, 2022). The interlinked nature of a club's financial wellbeing and athletic accomplishments highlights the significance of maintaining sound economic stability and tactical monetary management. Successfully managing this delicate equilibrium is not just a financial priority, but also a strategic imperative for attaining success in the cut-throat world of professional football.

2.3. Economic-financial results affecting sporting ones

The achievement of football teams in sporting events is solidly and separately linked to their economic and financial standing, which undoubtedly affects the quality of players, competitiveness of the team and overall sustained success. Factors such as salaries and transfer budgets, which are focused on players, have a direct impact on the team's skill levels. Top-class player acquisitions positively affect the overall team quality. Investments in youth development are crucial for long-term success (Kringstad, 2015). Financial stability extends beyond player-centric factors, affecting a club's ability to attract top talent and secure qualified coaches. Robust finances enable clubs to provide competitive wages, signing packages, and state-of-the-art training facilities, which directly enhance the players' preparation, recovery, and overall physical form (Wicker, 2015).

For economic sustainability, football clubs heavily depend on their fan base, and it depends on the stability of the club-fan relationship. The strength of the club-fan relationship is evidenced through the intimate link between sporting triumphs and the emotional connection of devoted fans (Vale,

2017). Positive results in sports (Yoshida, 2014) lead to augmented attendance, merchandise sales, and heightened fan loyalty, fostering a productive economic cycle. However, extended periods of poor performance erode emotional connections and put vital revenue streams that secure financial stability at risk (Allison, 2013). It is imperative to acknowledge the interrelatedness between athletic triumphs and supporter engagement for sustained economic stability in the constantly evolving world of professional football.

3. Epistemological approach

This study takes an epistemological approach to comprehensively describe and understand the complexity of the football system. Our aim is to confidently identify and qualify the main factors that contribute to this complexity. We rely on a wide range of secondary data and scientific literature to achieve this goal.

The football system could be viewed as a complex catalytic system and receives special attention. An investigation into sporting and economic-financial outcomes in football revealed a significant disparity. Prior research often neglects the integrated approach when studying complex football-related phenomena through models, thereby overlooking the system's intricacy. This has underscored the requirement for the creation of an econometric model that acknowledges and incorporates contextual and ecological variables to offer a meticulous and extensive overview of the football system.

3.1 *The complexity of the European football system value chain*

The European football system is renowned for its complexity, which is compounded by the numerous levels of progression available to clubs depending on their category. These categories include minor leagues, national higher leagues like England's *Premier League* and Italy's *Serie A*, as well as various European competitions, all of which are contingent on a club's placement in the national topflight¹.

Football's peculiarity leads to an unavoidable uncertainty in the link between *sporting results* and *economic-financial outcomes*, as we hypothesize in **RQ1**. Do the sport results impact and to what extent on the economic and financial sustainability?

¹ FIFA Club World Cup Prize Money 2023 (consulted on 08/12/2023) <https://sportsesst.com/fifa-club-world-cup-prize-money/>

For this reason, the intricate relationship between sporting results and economic-financial ones within football clubs remains a central issue in the context of the European football system (Dimitropoulos, 2021; Caglio, 2022).

Consider, for example, UEFA's selection criteria and access to the Champions League. First, the number of participants from each country in the European leagues differs based on comparative parameters calculated using the UEFA coefficient. The number of teams qualifying is then based on the ranking obtained by this method.

For the *Europa League*, the official UEFA regulations for the 2021/22 football season specify that teams behind the *Champions League* qualifiers (reserved for only the top five leagues) and the winners of the national cups of the top fifteen associations have access to qualification. Additionally, the teams that are eliminated from the second qualifying round onwards of the *Champions League*, as well as the third-placed team from the group stage of the major competition, are eligible to qualify for the *Europa League*.

Consequently, the qualification and access mechanisms for the premier sporting competitions in Europe create a discrepancy between the *athletic outcome* and the *economic-financial performance* of professional football clubs. There is no certainty for a team that invests significant funds to develop a squad capable of competing in a European tournament and ultimately outperforming their opponents to gain access to the qualifying stages. An open hierarchy creates a significant differentiation between those who are able to reach the upper levels and those who are left out. As a result, this distinction fosters an accomplished exertion that may not always align with the financial limitations of the clubs (Financial Fair Play)².

The study aims to demonstrate an inverse causal relationship: the impact of sporting outcomes on economic and financial results (Hp1a). This section presents how sporting results impact the economic-financial sustainability of a professional football team.

Advancing to a higher level of competition leads to augmented player salaries, escalation in their market worth, and necessity for insurance to back teams transitioning up in categories. This counterintuitive success mandates insurance policies for managing the financial weight of involvement in a superior league.

When a professional football team performs poorly or its players are not of a high enough standard for top-level competition, the team faces an opportunity cost. For instance, competing in esteemed European tournaments like the Champions League can potentially result in higher team salaries,

² UEFA Club Licensing and Financial Fair Play Regulations – <https://documents.uefa.com/v/u/MFxeqLNKlKlYyh5JSafuhg>

which may not be fully compensated by mere participation, particularly if the team is eliminated in the group stages. Let's get into more detail. A club's failure to qualify for the *Champions League* from the prior year leads to a negative economic impact amounting to roughly €52.2 million. The *Champions League*, much like any other European competition, entails significant expenses for clubs.

A club's failure to qualify for the *Champions League* from the prior year leads to a negative economic impact amounting to roughly €52.2 million. This negative outcome includes a sharp decrease in TV rights and commercial sales value. Moving from the *Champions League* to the *Europa League* results in a €33 million decrease in net results. After assessing the costs incurred by clubs excluded from the preceding season's competition and considering the expenses associated with entering said competition, it becomes pertinent to ascertain the value of qualifying for either the *Champions League*, the *Europa League*, or the *Conference League*. This value extends to both footballing prestige and financial gain.

Being one of the 32 teams that participate in the top club football tournaments in Europe is decidedly significant and can considerably impact the economic-financial side of the club. According to *Calcio e Finanza*, for the group stage, UEFA will distribute a total of €2.022 billion to clubs³. Starting with the *Champions League*, the net revenue available to participating clubs will be broken down as follows:

Table 2 – Net revenues for participating clubs

Champions League (Participation)	Allocated Percentage	Amount
Starting quotas	25%	€500.5 million
Fixed amounts related to benefits	30%	€600.6 million
Rankings of the ten-year coefficients of return	30%	€600.6 million
Variable portions linked to the market pool	15%	€300.3 million
	Total	€2001.9 million

Source: our elaboration

Each of the 32 clubs that qualify for the group stage will receive €15.64 million. For each match in the group stage, bonuses will be awarded based on performance: €2.8 million for each win and €930,000 for each draw. Clubs that qualify for the knockout stage will receive the following amounts:

³ The Champions League restarts: 2 billion for the clubs up for grabs (Accessed 17/02/23) <https://www.calcioefinanza.it/2022/09/06/quanto-vale-champions-league-2022-2023/>

Table 3 – Amounts for the knockout stage

Champions League	Qualification Amount (per club)
Qualification for the Round of 16	€9.6 million
Qualification for the Quarter-finals	€10.6 million
Qualification for the Semi-finals	€12.5 million
Qualification for the Final	€15.5 million
Victory in the Final	€4.5 million

Source: our elaboration

Between the initial fee and the bonus for outstanding performance, the victorious team of the *Champions League* can receive a maximum of €85.14 million. Both clubs that secure their place in the 2022 UEFA Super Cup will receive €3.5 million each, alongside an additional €1 million for the winning side. To these official sums are added further funds stemming from television rights, depending on the reference market, and the historical ranking, which takes into consideration the performance of the teams in the past decade.

In summary, winning the *Champions League* can result in direct earnings of about 170 million euros for a significant market and a renowned team, excluding sponsorships and related industries. The following table summarises the involvement and performance bonuses awarded to participating clubs in the *Champions League*.

Table 4 – Champions League participation prizes

Total Impact of the Champions League on Clubs	
Qualification	€15,25 million
Winning 6 group stage matches	€16,8 million
Round of 16 qualification	€9,6 million
Quarterfinal qualification	€10,6 million
Semi-final	€12,5 million
Final	€15,5 million
Winner	€4 million
Super Cup qualification	€3,5 million
Total	€ 87,75 million

Source: our elaboration

As far as the *Europa League* is concerned, UEFA will distribute a total of €465 million to the clubs for the group stage⁴. The net revenue available to participating clubs will be divided as follows:

⁴ Europa League 22/23 is worth €465m: club revenues (Accessed 18/02/23) – <https://www.calcioefinanza.it/2022/07/09/premi-europa-league-2022-2023-ricavi-club/>

Table 5 – Net revenues for participating club

UEFA Europa League	Allocated Percentage	Amount
Starting quotas	25%	€116 million
Fixed amounts related to benefits	30%	€140 million
Rankings of the ten-year coefficients of return	15%	€70 million
Variable amounts (market pool)	30%	€140 million
	Total	€ 465 million

Source: our elaboration

Clubs that qualify for the knockout stage will receive the following contributions:

Table 6 – Knockout Stage Contributions

UEFA Europa League	Qualification Amount (per club)
Qualification for the Play-offs (Third-placed teams vs. Europa League runners-up)	€0.5 million
Qualification for the Round of 16	€1.2 million
Qualification for the Quarter-finals	€1.8 million
Qualification for the Semi-finals	€2.8 million
Qualification for the Final	€4.6 million
Winner of the UEFA Europa League Final	€4 million

Source: our elaboration

The table below allows you to visualize the economic impact of participation in the Europa League for Serie A clubs.

Table 7 – Europa League Participation Prizes

Total impact of the Europa League on clubs*	
Qualification for play-offs**	0,5 million
Round of 16 qualification	1,2 million
Quarterfinal qualification	1,8 million
Semifinal	2,8 million
Final	4,6 million
Winner	4 million
Total	14,9 million

** where the third-placed teams in the Champions League groups play against the second-placed teams in the Europa League

Source: our elaboration

Finally, with regard to the last of the European club competitions, the *Conference League*, the values due to the participating teams are reported below. For the clubs that qualify for the group stage, UEFA will distribute a total of €235 million. The net amount available to participating clubs will be divided as follows:

Table 8 – Net revenues for participating clubs

UEFA Conference League Group Stage Distribution	Allocated Percentage	Amount
Registration fees	40%	€94 million
Performance-related fixed tranches	40%	€94 million
Coefficient amounts	10%	€23.5 million
Variable portions linked to the market pool	10%	€23.5 million
	Total	€235 million
Down payment		€2.8 million
Balance		€140.000

Source: our elaboration

Table 9 – Conference League Bonuses

UEFA Conference League Group Stage Match Bonuses	Bonus Amount (per match)
Win	€ 500,000
Draw	€ 166,000
UEFA Conference League Group Stage Winners and Runners-up Prizes	Prize Amount (per club)
Group Winners	€ 650,000
Group Runners-up	€ 325,000

Source: our elaboration

Table 10 – Knockout Stage Contributions

Total impact of the Conference League on clubs	Qualification Amount (per club)
Qualification for Knockout Play-offs	€ 300,00
Qualification for the Round of 16	€ 600,00
Qualification for the Quarter-finals	€1 million
Qualification for the Semi-finals	€2 million
Qualification for the Final	€3 million

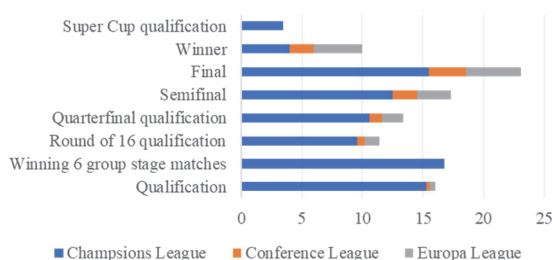
Source: our elaboration

The chart presented below provides both numerical and visual representations, with values expressed in millions of euros, of the monetary rewards received for participating in the three European competitions. This includes the qualifying phase and concludes at the end of the competition. The aim is to demonstrate the impact of each competition on financial gain (Urdaneta, 2021).

Turning to Italian football, it becomes apparent that Italian clubs compete for a prize purse worth 35.4 million euros. It is crucial, for the purposes of

the present work, to compute the percentage of impact that these competitions have on clubs. In particular, we will focus our attention on the seven leading teams in the Italian Series A, often referred to as the “7 sisters”, whose generated revenues are particularly significant. The seven main Series A teams – Milan, Inter, Roma, Juventus, Atalanta, Napoli, and Lazio – registered the following revenues during the 2020/21 season:

Figure 1 – Total impact of the European competitions on clubs



Source: our elaboration

Table 11 – Serie A Revenues

Clubs	Total Revenues
Milan	€232,6 million
Inter	€356,4 million
Roma	€194,8 million
Juventus	€437,5 million
Atalanta	€189 million
Napoli	€174,5 million
Lazio	€164,74 million

Source: our elaboration

On the total value of the revenues of professional clubs, it is interesting to consider how much impact an amount of, for example, 85 million euros (estimated value of impact of the *Champions League* based on starting fee and performance bonus).

By way of example, for a team as emblazoned as Real Madrid (whose total revenue for the 2021/22 season amounted to €641.8 million)⁵, the *Champions League* impacts 13.24% of the team’s total budget revenue.

⁵ <https://www.calciofinanza.it/2022/04/16/big-confronto-serie-l-mld-dalla-liga-e-doppiata-dalla-premier/>

Table 12 analyses the impact, in percentage terms, that access to the qualifying phase for the quarter-finals has on the teams under analysis. As was to be expected, qualification for the *Champions League* plays a significant role in terms of revenue percentage, especially for underperforming clubs. This also applies, albeit to a lesser extent, to the other two European competitions, *Europa* and *Conference League*.

Table 12 – Impact of European competitions (quarter-finals)

Percentage impact of qualifying for the quarterfinals in the three European competitions on the total revenues of the '7 Sisters' of Serie A

Clubs	Total Revenues*	Champions League (quarterfinal qualification = 52,25m)	Europa League (quarterfinal qualification = 3,5m)	Conference League (quarterfinal qualification = 1,9m)
Milan	232,6	22,46%	1,50%	0,82%
Inter	356,4	14,66%	0,98%	0,53%
Roma	194,8	26,82%	1,80%	0,98%
Juventus	437,5	11,94%	0,80%	0,43%
Atalanta	189	27,65%	1,85%	1,01%
Napoli	174,5	29,94%	2,01%	1,09%
Lazio	106,3	49,15%	3,29%	1,79%

*values are expressed in millions of euros

Source: our elaboration

Table 13 analyses the impact produced by the overall victory of one of the above-mentioned competitions on the revenues of the teams under analysis.

Table 13 – Impact of European competitions (win)

Percentage impact of winning the three European competitions on the total revenues of the "7 Sisters" of Serie A

Clubs	Total Revenues *	Champions League	Europa League	Conference League
Milan	232,6	37,73%	6,41%	3,83%
Inter	356,4	24,62%	4,18%	2,50%
Roma	194,8	45,05%	7,65%	4,57%
Juventus	437,5	20,06%	3,41%	2,03%
Atalanta	189	46,43%	7,88%	4,71%
Napoli	174,5	50,29%	8,54%	5,10%
Lazio	106,3	82,55%	14,02%	8,37%

*values are expressed in millions of euros

Source: our elaboration

An important goal of this study is to comprehend the economic impact of a football team's victory or high position in the standings of the Series A championship. To illustrate the value of the revenues to be distributed based

on the standings for the 2022/23 season, certain figures are worth considering. Still considering the same sample of teams, the table below shows the percentage values and extent of championship victory in *Lega Calcio Serie A*. To perform this calculation, we need some information. Firstly, the expected revenues for the top three ranked teams are: €17.6 million for the first; €14.8 million for the second; and €12.7 million for the third⁶.

Table 14 – *Serie A impact on clubs*

Clubs	Total Revenues*	1st place	2nd place	3rd place
Milan	232,6	7,57%	6,36%	5,46%
Inter	356,4	4,94%	4,15%	3,56%
Roma	194,8	9,03%	7,60%	6,52%
Juventus	437,5	4,02%	3,38%	2,90%
Atalanta	189	9,31%	7,83%	6,72%
Napoli	174,5	10,09%	8,48%	7,28%
Lazio	106,3	16,56%	13,92%	11,95%

* values are expressed in millions of euros

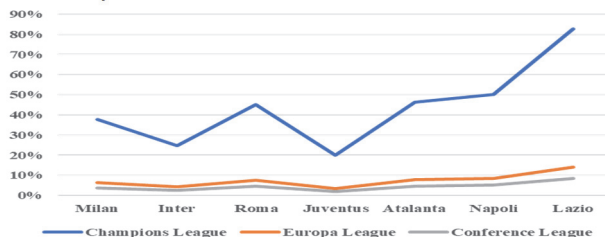
Source: our elaboration

In conclusion, the previous discussion of the economic effects of European and Italian football tournaments aimed to comprehend the competitive nature of football clubs. Despite the current structure of European football, where access to sports competitions is highly dependent on team performances rather than budget and economic management, this analysis remains impartial and factual. The diagram provided below illustrates the percentage impact of winning the three European football competitions discussed so far on the total revenues of the prominent Serie A clubs, collectively known as the “7 Sisters”. The percentages represent the proportion of the clubs’ total revenues attributed to each specific competition.

Sports outcomes do not merely measure success on the field but are a driving force for major impacts on various aspects of the economic and financial sectors, as emphasized by Yoshida (2014). The proposed model aims to elucidate these complex relationships, illustrating how victories or losses on the pitch directly affect the economic and fiscal well-being of football clubs. The intricacy of the European football system is apparent with the plethora of competition levels accessible to clubs, ranging from small leagues to illustrious national leagues and European tournaments. This type of competition offers possibilities for achievement and, concurrently, subject teams to advantageous and disadvantageous perils (Table 15).

⁶ The Serie A 2022/23 season kicks off: here's the value of the standings (accessed on 18/02/23) – <https://www.calciofinanza.it/2022/08/13/quanto-vale-classifica-serie-a-ricavi-piazzamento/>

Figure 2 – Percentage impact of winning the three European competitions on the total revenues of the “7 Sisters” of Serie A



Source: our elaboration

3.1.1. Positive results

The complexity of the European football system is apparent through the various levels of competition accessible to clubs, from minor to prestigious national leagues and European competitions. This assortment of tournaments presents both opportunities for success and the possibility of favorable or unfavorable outcomes.

- *Championship Success*: the most highly sought-after achievement is winning the championship, which bestows prestige and honour to the club and may also result in significant financial gains, including direct entry to exclusive European competitions.
- *Participation in European Competitions*: qualifying for European competitions is also a positive outcome. Participation in UEFA Champions League or Europa League offers not just global exposure but also ensures significant financial gain from prizes and television broadcasting rights.
- *Increase in Brand Value*: a strong performance in domestic and European competitions can enhance the club’s brand value.

3.1.2. Negative Results

- *Relegation*: this may lure higher-paying sponsorships and create further revenue through the merchandising and image rights sales. This represents not only a decline in status and prestige, but also carries significant financial consequences, resulting in a decrease in income derived from television rights and sponsorships. Relegation to lower leagues is among the most severe unfavorable results.
- *Failure to Qualify for European Competitions*: not qualifying for European competitions can cause financial losses and reduced international

visibility, negatively affecting a club’s ability to attract talented players and sponsors. Thus, it is crucial for clubs to perform well in domestic leagues to secure a place in these competitions. Loss of brand value: A prolonged run of poor performance could diminish the club’s reputation. This may create obstacles in maintaining current sponsorship deals and attracting new investors.

- *Escape of footballers to higher-performing teams*: the movement of footballers to high-performing teams, commonly known as “player transfers” or “transfers,” is a widespread occurrence in the football world. It occurs when players switch from one club to another, often with the aim of improving their playing opportunities, competitiveness, financial benefits, or a combination of these factors. Transfers play a crucial role in the ever-evolving football scenario, affecting team dynamics, league competitiveness, and the global football landscape. The choices made by players to switch to higher-performing teams are influenced by career aspirations, championship ambitions, monetary rewards, and the drive to compete at the highest level, exposing the intricate relationship between individual goals and team accomplishments in the sport.

The European football ecosystem presents exclusive prospects and difficulties to each club. Successful outcomes bring prestige and financial gains, whereas unfavorable ones can have ramifications on and off the field, affecting the economic stability and overall worth of the club.

Table 15 – Positive and negative results from on-pitch wins and losses

Positive Results	Negative Results
Different levels of competition accessible to clubs, from minor leagues to prestigious national leagues and European competitions	Relegation: Decline in status, prestige, and significant financial consequences, including decreased income from television rights and sponsorships
Championship Success: Winning the championship brings prestige, honor, and significant financial gains, with direct entry to exclusive European competitions	Failure to Qualify for European Competitions: Financial losses and reduced international visibility, impacting the ability to attract talented players and sponsors
Increased awareness of the football club’s potential has led to a rise in potential sponsorship agreements.	Increased awareness of the football club’s potential has led to a rise in potential sponsorship agreements.
Participation in European Competitions: Qualifying for UEFA Champions League or Europa League offers global exposure and significant financial gains	Loss of Brand Value: Prolonged poor performance diminishes the club’s reputation, creating obstacles in maintaining current sponsorships and attracting new investors
Increase in Brand Value: Strong performances enhance the club’s brand value	Escape of footballers to higher-performing teams: Player transfers influence team dynamics, league competitiveness, and the global football landscape, driven by career aspirations, championship ambitions, and financial rewards
Improvement of the players’ self-confidence and their perception of their own safety on the pitch.	Reduced self-confidence among players, who feel less confident on the pitch.

Source: our elaborations

Table 16 – UEFA circuit revenues estimation

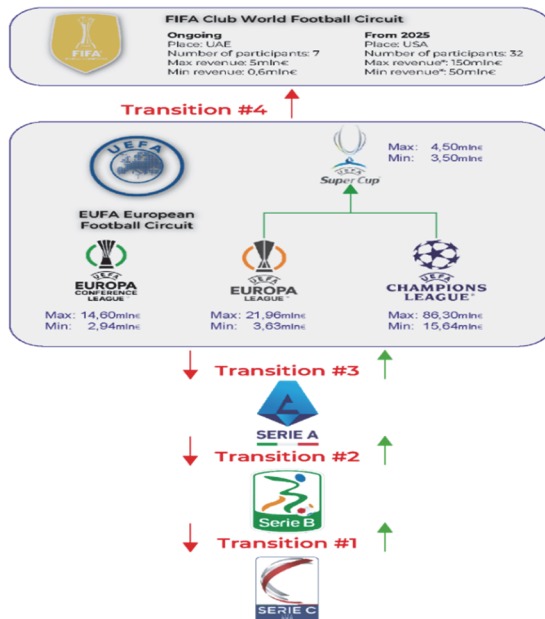
Circuit	Minimum	Maximum	
Conference UEFA League	2,94	14,6	Without considering the Play-off: 6 round of 16 matches; 6 games until the final
Europa UEFA League	3,63	21,96	Without considering the Play-off: 6 round of 16 matches; 6 games until the final
Champions' UEFA League	15,64	86,3	
UEFA Super Cup	3,5	4,5	

Source: our elaboration

3.2. Transition stages

The football industry undergoes a series of distinct transition stages and is significantly shaped by its value chain. The transition stages range from the inception of a club or league to its growth, maturity, and potential decline, each presenting unique challenges and opportunities that impact the competitiveness and sustainability of entities within the football ecosystem (Nadvi, 2011). Figure 3 summarizes the data reported in previous paragraphs, also presenting the different transitions that exist between the different circuits.

Figure 3 – Italian and European Football System Value Chain



Source: our elaboration

The value chain in football, which extends from youth development to commercial partnerships, plays a crucial role in determining success. The efficient and strategic management of this value chain affects a club's capacity to assemble competitive teams, secure sponsorships, and navigate the complexities of the contemporary football landscape (Grundy, 1998; Dolles, 2005).

Understanding the manifestation of complexity during transition stages and the intricacies of the value chain is essential for stakeholders to develop strategies that guarantee continued success and growth in the fast-paced football industry. Through this concept we analyse Hp2 of RQ1: Economic and financial parameters affect sporting results.

3.2.1. Ascending transition

When a football team competes in a championship, the results can be either victory or defeat. If the team succeeds and advances to a higher league with a victory, there is a positive onset of events that follow. These successes generate a multitude of benefits for the club. Benefits include elevated player ratings, enhanced ticket prices, improved rankings, players voluntarily surrendering their contractual benefits for the team's greater good, amplified royalties from television broadcasts and a surge in sponsor count.

Nevertheless, it is crucial to weigh the downsides, which encompass escalated expenses for managing the stadium and the team. This complex dynamic illustrates the challenges facing football transitions and the importance of responsible financial management.

3.2.2. Descending transition and parachute effect

If a club is relegated from a higher to a lower league, it experiences a period of decline characterized by various detrimental consequences. These include a decrease in operational costs, less income from stadium ticket sales, a lower ranking, a devaluation of player worth, a drop in television rights revenue, and a possible loss or reduction in sponsors. Nevertheless, it should be pointed out that this situation also brings some unforeseen advantages. Each reduction in the diverse revenue sources leads to a proportional cut in operating costs, thus enabling the enterprise to stabilize the budget and uphold balanced financial administration amidst the demotion challenge.

The phenomenon known as the *parachute effect* holds considerable significance in the realm of football, especially for teams that endure a demotion

from a higher to a lower league. This term describes the situation wherein such teams, despite underperforming, continue to reap financial benefits from television contracts and commercial agreements made during their stint in the top league. After being relegated, teams often benefit from a “financial parachute”, providing economic assistance during their transition to a lower league (Cerqua, 2014).

However, this benefit is often temporary, and it is crucial to manage this funding wisely to ensure sustainable progress and financial stability in the future. By doing so, the negative impacts of relegation on a club’s overall financial health can be avoided.

3.3. *The three catalytic mechanisms in Football System Value chain*

Catalytic mechanisms pertain to the processes or situations where an element or an event initiates a sequence of reactions that intensify the initial outcome, resulting in a feedback loop that could either be positive or negative. This notion applies to various non-scientific or economic contexts and may lead to desirable or undesirable outcomes. Negative spirals could transpire when an unfavourable occurrence sets off a series of self-sustaining adverse outcomes (Grehaigne, 1997; Deneubourg, 1989). For instance, unfavourable news that harms a firm’s standing may cause negative repercussions, including losing clients and reduced revenue, resulting in a detrimental cycle that is challenging to rectify (Hordijk, 2013; Lawton, 1979).

High-level competitions can trigger feedback loops, wherein success in one league leads to further opportunities or challenges for the team and other participants. Such systems generate positive outcomes, including financial enhancements, increased international visibility, and the attraction of talent (Vrooman, 2007; Fort, 1995).

However, the same systems can also result in negative repercussions, such as the deterioration of less competitive teams or imbalances in resource and talent distribution (Jessop, 2006).

Catalytic mechanisms are clearly visible within the football system, where various elements – including the *economic-financial stock*, *budget for team shaping*, *competitive context* and *sports team results* – interact in a cyclical manner, resulting in both positive and negative feedback:

1. *The economic-financial stock of a team represent a crucial basis.* Ample economic capital enables investment in top-notch players, cutting-edge amenities, and proficient administration. Sporting performance has a direct impact on the stock, as victories often generate revenue through prizes, sponsorships, and television rights.

2. *The budget for team shaping is closely linked to the economic-financial stock, and an increase in financial resources enables investment in top-level players and youth development programs.* A competent team can enhance the club's public image, increasing its monetary prospects through sponsorships and other revenue streams.
3. *The competitive context is crucial to the development of the other elements.* A team with ample funds can strive towards high-level competition, amplifying visibility and financial opportunities. The outcomes of these competitions affect both stocks and budgets.
4. *Sports' team results: the club's perceived value and fan engagement are directly impacted by its sporting results.* Winning consistently can establish a positive trend, attracting skilled players, bolstering commercial revenue and strengthening the club's financial position. Reverse, a string of defeats can initiate a negative cycle, resulting in decreased sponsorships and revenue.

3.3.1. The first catalytic process: from the economic-financial stock to sports results

In a football club, the economic-financial stocks represent the core of an autocatalytic mechanism that has both positive and negative cyclical effects on team shaping, competition, and sporting results (Figure 4 - sub a).

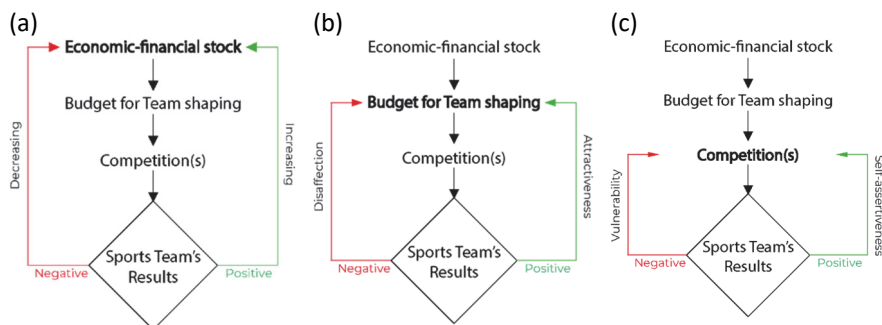
A high economic and financial stock has a mutual positive impact on the budget earmarked for team training, providing a sturdy foundation for team shaping. A greater budget facilitates specific investments in acquiring high-quality players, improving facilities and promoting youth development programmes. These investments subsequently enhance the competitiveness of the team. Additionally, a strong economic-financial foundation contributes to competitive participation in high-level competitions. Winning in such competitions boosts the club's visibility, attracts sponsors and opens new revenue opportunities. This achievement further augments the economic and financial portfolio with supplementary income.

A favourable outcome establishes a virtuous cycle: heightened visibility, fresh sponsors, and prizes in tournaments collectively contribute to an additional escalation in the economic-financial stock. Conversely, it adversely impacts the budget for team shaping.

Sport' team results' positive impact on Economic-Financial Stock (green side): positive sporting outcomes, such as championship victories or prestigious competition success, enhance the club's visibility. This visibility attracts generous sponsorships and allows the club to negotiate more advantageous television contracts. Thus, increasing revenue and contributing positively to

the club's economic-financial stock. This success also leads to more significant funds being available for team shaping, enabling the club to attract and retain high-quality players.

Figure 4 – The “Three Catalytic Processes”



Source: our elaboration

However, poor sporting results (red side) like demotion or dismal performances can reduce the club's visibility and negatively impact their economic and financial standing. This could lead to a reduction in sponsorships and a decline in television rights, which would reduce overall revenue and have a negative impact on the club's financial condition.

The Rohde & Breuer (2016)'s econometric model shows such aspect and, in particular, the National League success, international sporting success, and brand value have a highly significant and positive influence on revenues. National cup success also showed a weakly significant positive impact on revenue, thus providing an interpretation of the importance of participation in European circuits, primarily in the Champions' League.

3.3.2. The second catalytic process: from the budget for team shaping to sports results

The budget for team shaping at a football club results in a cycle of mutual reinforcement, affecting both the economic-financial stock of team performance either positively or negatively (Figure 4 - sub b).

Sports team results positively influence the budget team (green side): success on the pitch can lead to substantial prizes and a larger share of television rights. This additional revenue can be utilised to enhance the team shaping budget, allowing the club to attract or maintain high-calibre players in order to elevate the team's overall competitiveness.

Furthermore, failures on the pitch may result in the loss of prizes and lower television rights, limiting the budget for team development. This may make it difficult for the club to attract or retain high-level players, negatively impacting their competitive position. Negative sporting results have a significant impact on the budget set aside for developing a team, resulting in a feeling of disillusionment.

Mainly, unsatisfactory on-field outcomes can reduce the team's attractiveness to both fans and sponsors. A decrease in fan enthusiasm typically leads to reduced revenue streams, including ticket sales, merchandise and television rights. Simultaneously, a decline in the team's visibility may impact sponsor interest, as sponsors are often drawn to thriving clubs with fervent fan bases.

Still, unfavourable sporting outcomes can undermine the market value of players. Successful footballers and winning teams generally command higher market values, but a string of lacklustre performances can reduce the players' worth, with consequential impacts on the club's ability to participate in market transactions. Such transactions might include acquiring fresh talent or selling players for supplementary revenue.

Moreover, unfavourable sporting results can present difficulties when attracting top-calibre players. Elite athletes are typically driven by the opportunity to compete within successful teams and partake in esteemed competitions. Teams undergoing a period of sporting decline may experience complications when attempting to entice top-tier players to join their club.

Referencing Barajas *et al.* (2005), it is evident that the formation and structure of the team group are significantly correlated with the competitive circuit in which they operate. Consequently, as demonstrated by the authors, while sporting results positively impact *revenue*, their influence on the *overall economic outcome* is comparatively weak.

3.3.3. The third catalytic process: the competition and the effect of victories and defeats

Positive sporting results can have a significant impact on team dynamics by promoting self-confidence and enthusiasm among players, thereby contributing to a positive competitive environment. Success on the field frequently translates into increased morale, a strong belief in their abilities, and a heightened eagerness to compete in top-level tournaments.

The affirmative influence that success has on an athlete's mindset is vital for maintaining a competitive edge. Winning outcomes enhance players' self-confidence, promoting trust in their abilities and enabling them to make

bold decisions during matches. This augmented self-belief frequently results in a more assertive and proactive playing style, which positively impacts both individual and team performance.

Additionally, the positive emotions derived from achieving good results create a reinforcing feedback loop. Players who experience success are more inclined to approach their training and preparation with enthusiasm. This increased motivation can lead to better physical fitness, sharper concentration, and a willingness to put in extra effort to maintain success.

Players who have achieved positive outcomes take pride and excitement in participating in high-level competitions. Challenging top-tier opponents is met with anticipation rather than apprehension, as the team is bolstered by a sense of achievement. Adopting a constructive attitude can augment the team's general competitiveness and propensity to take prudent risks, resulting in a more dynamic and efficient performance.

Positive outcomes from such a good disposition can influence team dynamics beyond the field of play and promote collaboration and mutual support. Enhanced morale frequently boosts *camaraderie* among teammates, facilitating effective communication. A group that collectively achieves success is more inclined to form a unified whole, a crucial aspect for sustained competitiveness.

Coaches and support personnel perform a pivotal function in maximising positive outcomes to enhance the team's overall performance. They can strategically utilise triumphs as a motivating force, cementing positive actions and fostering a growth mindset within the players. This approach fosters the creation of a durable team culture capable of overcoming challenges and sustaining a competitive edge.

Poor sports results can seriously harm team confidence and performance in competitions. If players are confronted with a sequence of unsuccessful outcomes, it usually leads to a lowering of their self-confidence and morale. Such a psychological factor can create an environment that profoundly impacts the team's competitive edge.

Confidence constitutes an essential element in sports, as it affects decision-making, the execution of skills, and the team's dynamics overall. When athletes encounter a lack of success, uncertainty may enter their thoughts and influence their perception of their capabilities and the team's potential. This reduced self-assurance can lead to indecision, unwillingness to take chances, and an overall feeling of insecurity on the pitch.

3.4. *The uniqueness of the football system*

Now, let us focus on investigating **RQ2**: *are there distinguishable differences between the operational contexts of football clubs and those of other businesses?* Our study aims to determine if there are comparable industries of similar complexity to professional football in order to gain insight into the distinctiveness of football clubs. In exploring this issue, we examine the distinct features that differentiate the professional football industry, analysing the means through which it produces value.

Hypothesis 2 (Hp2) proposes that the professional football sector represents a unique entity, featuring value-generating mechanisms that differentiate it from other commercial fields. This hypothesis requires a critical analysis and exposition of the distinct similarities and differences between the professional football industry and an established counterpart, such as the National Basketball Association (NBA).

The proposed European Super League and the NBA have been extensively debated since the league's announcement. Both supporters and opponents make connections between the two, with some viewing the NBA as a model for the developing football competition. Juventus President Andrea Agnelli and Real Madrid's Florentino Pérez have cited the NBA as an example, while others emphasize the difficulties of applying the same approach to European football.

The core similarity lies in a closed-circuit sporting competition, where profits are optimized through predetermined participation that delivers exceptional entertainment. Although the NBA and Super League share resemblances, some sporting and economic factors make it difficult to compare them in detail. The potential increase in economic inequality in the Super League opposes the NBA's attempts to tackle this problem with strategies that advantage all thirty contending teams.

From a sporting perspective, the NBA's Draft mechanism operates as a market, facilitating lesser teams' ability to acquire skilled players. This draft system is supported by the financial strategy of the salary cap, an annual maximum on team salaries that promotes equity. Participating in competitions, especially those of significant stature such as UEFA, presents distinctive challenges for football teams. These encompass increased player salaries, rising market values, and the need to secure against favorable occurrences. Notably, teams frequently seek insurance contracts to minimize risks and ensure beneficial outcomes associated with higher-level competitions.

In the context of Italian football, where seven top-tier teams compete for the championship title, the likelihood of winning is approximately 14%, which is comparatively high. In anticipation of potential victories, teams may

pay significant insurance premiums, up to 20% of the theoretical player salary cost, to protect themselves against financial implications. This approach reflects the teams' willingness to invest in risk management, given their lower probability of success within the Italian football landscape.

To summarize, while similarities exist between the proposed Super League and the NBA, a nuanced understanding is required due to the distinct sporting and economic differences between each system. The unique challenges and operational processes of the Super League, particularly in relation to the economic disparities and risk management strategies (de Falco, 2012), underscore the necessity of a thorough assessment of the envisaged football tournament.

4. Findings

The study utilizes a mixed research methodology both by analyzing complexity-related literature, with specific emphasis on the football system as a complex catalytic system, and by elaborating the value chain and the extent of the most significant transition stages. The research assesses sporting and economic-financial outcomes in football, highlighting a significant lack of literature in this area. Previous studies examining complex phenomena through models have frequently disregarded the integrated approach. This has resulted in the failure to recognise the unity of the intrinsic complexity of the football system.

Indeed, if possible, it would be mandatory to develop an econometric model that considers both positional and situational elements. This could provide a more comprehensive perspective over the complexity of the football system in its entirety. Let's have a try.

The econometric model could be organized as a system of "Multiple structure objective functions", where the objective functions are interconnected, reflecting the complex interplayed relationships in the football context.

The sports results, marketing, merchandising, player trading, sponsorship, broadcasting, and ranking objectives are closely related to the economic-financial objectives [1]. Similarly, sporting objectives [2] depend on economic-financial, player trading, and ranking objectives. The sport's ranking, broadcasting, and sports results significantly influence merchandising and sponsorship objectives [3], [4]. The ranking is intrinsically connected to the objective function of sports results [5], while sports results and ranking crucially impact broadcasting objectives [6]. Such an interconnected model comprehensively depicts the dynamics' complexity that characterizes the football system (Figure 5).

Figure 5 – Multiple Structure Objective Functions (MSOF) of a Professional Football System

$$\begin{aligned}
 [1] \quad & O_{eff} = f(O_s W_s; O_m W_m; O_{pt} W_{pt}; O_{sp} W_{sp}; O_{br} W_{br}; R_t W_{rt}; \varepsilon_1) \\
 [2] \quad & O_s = f(O_{eff} W_{eff}; O_{pt} W_{pt}; R_t W_{rt}; \varepsilon_1; \varepsilon_2) \\
 [3] \quad & O_m = f(O_s W_s; R_t W_{rt}; O_{br} W_{br}) \\
 [4] \quad & O_{sp} = f(O_s W_s; R_t W_{rt}; O_{br} W_{br}) \\
 [5] \quad & O_{br} = f(O_s W_s; R_t W_{rt}) \\
 [6] \quad & R_t = f(O_s W_s)
 \end{aligned}$$

Legend

O_{eff} = Objective function for economic and financial results	$O_m W_m$ = Weighted Merchandising
O_s = Objective function for sporting results	$O_{pt} W_{pt}$ = Weighted Player trading
O_m = Objective function for merchandising	$O_{sp} W_{sp}$ = Weighted Sponsorship
O_{sp} = Objective function for sponsorship	$O_{br} W_{br}$ = Weighted Broadcasting rights
O_{br} = Objective function for broadcasting	ε_1 = Positional Errors (evaluable in mid-long terms)
R_t = Objective function for ranking	ε_2 = Situational Error (evaluable in short terms)
$O_s W_s$ = Weighted Sporting Results	

Source: our elaboration

The econometric model should utilize *Multiple system objective functions*, to adopt an integrated approach that represents the specific goals of the football system. These functions would be interconnected within a complex network, to demonstrate the interplayed nature of relationships present within the Football context.

The economic and financial objectives are, in fact, pivotal and directly influenced by sporting, marketing, merchandising, player trading, sponsorship, broadcasting, and ranking. This connection means that achieving economic and financial goals requires successful sport performances, media spotlight, fan participation, and ranking placement.

Similarly, sporting objectives are affected by economic and financial objectives, player trading, and ranking. The club’s overall objectives rely on the critical factors of achieving sporting goals, effective player trading and ranking positioning.

The dynamics of merchandising and sponsorship are linked to sporting objectives, ranking and broadcasting. The club’s ability to attract sponsors and generate revenue through merchandising depends on global visibility, popularity and success on the pitch as key factors.

Broadcasting is influenced by sports results and ranking, which in turn are determined by the objective function of sporting performances. This interconnected cycle highlights how sporting performances impact media visibility and positioning in the rankings. This fuels a virtuous circle or conversely, a potential cycle of disadvantage.

In the context of this analysis, the primary error, named the ε_1 *Systematic*

or *Positional Errors* (evaluable in mid-long terms), can be classified as inaccuracy that emerges from coincidental factors and control variables. This kind of errors are inherently associated with evaluation processes that, when put into action, produce diverse outcomes. Factors like corporate governance and organizational structure can be attributed to this variation. The ϵ_1 error refers to the difference between expected outcomes and projected objectives, aiding the understanding of the basic forces that affect the accuracy of evaluations and findings.

The ϵ_2 , *Situational Error* (evaluable in short terms) covers mistakes occurring during the sporting event, including mistakes made by referees and players. Reflecting on this process highlights the significance of recording such events in detail, through note-taking, as a vital step in subsequent analysis. However, a noteworthy issue arises in football: sporting outcomes are interdependent, creating a crossover that reflects mutual conditioning between economic and sporting objectives.

5. Discussion and conclusion

Unravelling the intricate workings of the football system, our analysis has identified complexity as a principal and prevalent theme. The interplay of diverse elements in the football value chain results in a nuanced and multifaceted setting. In navigating this elaborate landscape, both Kahneman & Tversky's *Prospect Theory* and Ashby's Law of *Requisite Variety* emerge as two profound lenses of analysis and comprehension of the dynamics of the football system.

The depth of Kahneman & Tversky's (2013) *Prospect Theory* can be seen through the presentation of the following scenario: twenty teams participate in a tournament, for which only four will win important prizes (for instance, to participate to the UEFA Champion's League). Thus, the teams equip themselves to win (for example, purchasing the strongest and most expensive players, asking for further funding to set up the team) but only 7 of the 20 manage to recover sufficient resources to be able to aspire to receive one of the four prizes. Let's also assume that, in addition to playing matches according to the rules of fair play and correctness, the teams can resort to illicit behaviour (i.e., such as paying the referees or selling the results).

The case above mentioned can be understood through the lens of *behavioural economics* and the principles of *Prospect Theory*.

Prospect Theory posits that individuals evaluate potential outcomes relative to a reference point (usually the status quo) and make decisions based

on *psychologic perceived gains and losses* rather than final outcomes. The theory introduces the concepts of “*loss aversion*” and the “*value function*,” which describe how individuals weigh potential losses more heavily than equivalent gains.

Football clubs, especially those with significant financial stakes in competitions like the UEFA Champions League, may exhibit asymmetric risk perception. The fear of not qualifying for such prestigious tournaments and the associated financial losses could be more pronounced than the potential gains from participating. Thus, Clubs often face immense financial pressure to remain competitive and financially sustainable: *not qualifying for major tournaments can be perceived as a significant loss*. In the face of this loss aversion, clubs might be more inclined to take risks, even resorting to illicit activities, to secure participation.

Furthermore, the potential immediate gains from participating in high-profile tournaments might be prioritized over the long-term risks associated with legal consequences. *The allure of short-term success and financial rewards can lead clubs to take actions that, in the long run, may have severe consequences*.

Finally: 1. the economic structure of football, where revenue from tournaments like the Champions League significantly impacts a club’s financial health; 2. the competitive pressures, with clubs vying for limited spots in elite tournaments; 3. and any regulatory gaps *may lead clubs to resort to illicit behavior in order to eliminate any probability of not acquiring the available prizes*.

The second observation refers to Ashby’s principle (Ashby, 2006): it highlights the crucial role of individuals with a wide range of responsibility and power in managing and unifying complicated systems. When we applied this principle to the football industry, we identified a particular complexity that emerged from the interactions between variability, volatility, and diversification. These concepts, which can be used interchangeably, emphasise the diverse and intricate nature of the football sector. It is crucial to be able to adapt to the ever-changing challenges and opportunities within the football ecosystem to foster resilience and sustainability.

The principle of Ashby’s *Requisite Variety* underscores the requirement for suitable cognitive and informational variety and, schemas to handle complexity effectively. Put differently, as complexity rises, so too does the need for greater cognitive diversity (Barile, 2006).

This cognitive diversity is determined in operational and management contexts by hierarchies and roles, while in the technical-sports domain it is influenced by the presence of leadership. A subsequent study might help to

hypothesize that the organizational structure employed by professional football clubs have implications that diverge from traditional models, maybe resulting in a new ideal type of organizational structure.

Prospect Theory and Ashby's law of "requisite variety" can be confidently used to bring together elements that have a significant impact on Corporate Governance and Management of soccer companies.

The proposed observations and Corporate Governance have significant points of contact. Managing complexity requires considering various factors, such as ownership structure (familial or impersonal, with investment funds involvement) to ensure corporate sustainability and compliance with institutional regulations; organizational structure, which shows a significant complexity gap between technical-sports and administrative areas, and the leadership role in structuring and managing dynamics in the technical sports domain.

The research group is confidently studying these aspects. The themes are discussed in training courses for the preparation of Sports Directors of Italian football clubs as well.

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