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The Price of Talent: Data Driven Football Player Valuation

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Non vince il più forte,

Vince il più bravo

- *Giovanni Galeone*

THESIS OUTLINE:

ABSTRACT

Motivation: The valuation of football players represents a critical challenge at the intersection of sport economics, finance, and management. Despite the central role of transfer fees and market values in shaping club strategies and financial sustainability, literature still lacks a unified framework and consistent methodological standards. This thesis aims to bridge this gap by systematically reviewing theoretical and empirical approaches, providing insights into how player valuation can be better understood and applied in both academic and managerial contexts.

Thesis purpose: The purpose of this thesis is to critically review and analyze the theoretical and empirical approaches to football player valuation, with the aim of identifying methodological trends, limitations, and providing guidance for more consistent and practical applications

Objectives:

Objectives	Method/Tool
To provide a structured overview of the theoretical foundations of player valuation (use value, market value, transfer fee).	Literature review of economic and financial theories applied to sports.
To analyze the main empirical determinants of football players' valuation (individual, collective, external, and market factors).	Systematic literature review (PRISMA methodology).
To assess the role of market platforms and proxies (e.g., Transfermarkt) in valuation practices.	Critical analysis of secondary data and methodological critiques.
To evaluate the influence of regulatory bodies, especially UEFA and Financial Fair Play, on player valuation dynamics.	Review of institutional and regulatory literature.
To identify research gaps and propose guidelines for more consistent and applicable valuation models.	Comparative synthesis of findings across studies.

The valuation of football players remains a complex and unresolved issue within sports economics, finance, and management. As the football industry becomes increasingly financialized, understanding how player value is created and measured has become crucial for both research and managerial practice. This thesis systematically reviews the main theoretical and empirical approaches to player valuation to integrate fragmented perspectives and build a coherent framework. It examines the concepts of use value, market value, and transfer fee, linking them to economic, financial, and managerial theories such as signaling, bargaining, and business valuation. Using the PRISMA methodology, the study identifies key determinants of player valuation, including individual performance, team context, and market dynamics, and concludes by outlining major research gaps and proposing guidelines to improve the rigor and applicability of future valuation models in football.

1 | INTRODUCTION

In recent decades, football has undergone a profound transformation, evolving from a predominantly social and sporting phenomenon rooted in local communities into a fully-fledged global industry. Several factors have driven this evolution, including the growing internationalization of competitions, the entry of new financial actors, and, above all, the explosion of broadcasting rights. The advent of pay-TV and competition among private broadcasters have turned audiovisual rights into the primary source of revenue for European clubs, ensuring substantial and stable income streams while simultaneously increasing their economic dependence on such flows. At the same time, the landmark Bosman ruling of the European Court of Justice in 1995 granted players freedom of movement at the end of their contracts, revolutionizing the football labor market and significantly strengthening players' bargaining power. Together, these two developments have served as the main drivers of an industrialization process that has transformed football into a highly complex economic and financial sector.

Within this context, the transfer market has acquired unprecedented importance. Transfers are no longer occasional episodes in a club's sporting life but rather one of the cornerstones of the global football economy. According to FIFA (2023), international transfers alone generated approximately €6.5 billion in 2022, while in the top European leagues the book value of intangible assets related to players had already exceeded €10 billion by 2018 (Hoey et al., 2021). Players and their contracts have thus become the principal assets of football clubs, decisively shaping both financial accounts and sporting performance. Consequently, transfer market management must be regarded as a strategic activity comparable to capital investments in other industries.

However, the growing centrality of the transfer market is accompanied by a fundamental problem: the lack of transparency in the mechanisms used to evaluate players. Unlike other financial assets, for which regulated markets and shared valuation standards exist, the value of football players remains ambiguous and elusive. As highlighted by Franceschi et al. (2024a; 2024b), the literature generally distinguishes between at least three different dimensions: the **transfer fee**, i.e., the actual price paid in a specific negotiation; the **market value**, defined as the estimated price a player would command under standard market conditions; and the **use value**, referring to the player's direct contribution to a team's sporting performance. Although related, these three dimensions do not coincide, thereby generating significant heterogeneity in valuations.

This difficulty is further exacerbated by the proliferation of heterogeneous valuation tools. In recent years, methodologies have emerged from digital platforms such as Transfermarkt, independent observatories such as the CIES Football Observatory, and consultancy firms such as KPMG. These instruments have had the merit of making player valuations more accessible, fueling public debate and, in some cases, supporting official negotiations. Nevertheless, their methodological foundations remain controversial. The result is a fragmented landscape in which outcomes are often difficult to compare and of limited managerial applicability (Herm et al., 2014; Müller et al., 2017; Ackermann & Follert, 2018).

The lack of conceptual clarity and empirical robustness carry significant practical implications. On the one hand, clubs are compelled to make multimillion-euro strategic decisions (purchases, sales, contract renewals) based on estimates that are often unverifiable. On the other hand, regulatory bodies face challenges in ensuring transparency and competitive balance, as illustrated by the recent Italian case of "capital gains" (*plusvalenze*), where sports authorities contested alleged manipulations of transfer values for accounting purposes (Neri et al., 2021). Against this backdrop, the need for a more rigorous and standardized approach to player valuation becomes evident.

This thesis positions itself within this debate with a dual objective. First, it seeks to provide a critical synthesis of the economic and financial literature on football player valuation, comparing the main theoretical and empirical approaches as well as the tools used in both academic and professional settings. Second, it aims to identify which quantitative methodologies appear most robust and useful for decision-makers in modern football, namely analysts, scouts, coaches, and executives. By combining these two perspectives, the thesis aspires to bridge the gap between academic research and managerial practice, contributing to the development of more coherent, transparent, and comparable valuation criteria. In doing so, it seeks to provide insights not only into the scientific debate but also to the managerial and regulatory domains, in a sector where the accurate determination of player value is an essential condition for both economic sustainability and sporting competitiveness.

2 | LITERATURE REVIEW

2.1 | Origins and Developments of the Literature on Football Player Valuation

The academic study of football player valuation is relatively recent, situated at the intersection of sports economics, accounting, and corporate finance. The earliest attempts to conceptualize the economic value of players can be traced back to the framework of **Human Resource Accounting (HRA)**, developed in the 1960s and 1970s as a branch of managerial accounting. HRA arose from the need to overcome the limitations of traditional accounting, which was unable to capture and represent in financial statements the economic contribution of human resources, treated at the time merely as costs rather than assets (Flamholtz, 1974).

Within this field, Dobbins and Trussell (1975) were among the first to explore the possibility of extending HRA principles to the football industry. In their work, footballers were conceptualized as "specific" human capital, intangible resources capable of generating a stream of future economic benefits for the club. Their proposal consisted of applying valuation methods analogous to those used for tangible investments, such as historical cost or net present value, aimed at recognizing players as capitalized assets in clubs' financial statements.

A year later, Trussell (1976) advanced this paradigm further by examining the accounting treatment of registration rights, i.e., the contractual rights binding a player to a club. This contribution proved particularly significant, as it introduced a notion that would become central in later decades: the idea that a player's economic value derives not only from his sporting performance but also from the legal negotiability of his contract.

Although experimental in nature and limited by historical context, these early studies had two fundamental implications:

- **Transposition of corporate language into sport**: players began to be conceptualized as resources to be managed, evaluated, and optimized.
- **Introduction of the concept of the "sporting intangible"**: anticipating today's debates on the appropriate accounting treatment of footballers as intangible assets in club balance sheets (Pavlovic et al., 2014; Campa, 2021).

The 1970s thus represent the embryonic phase of literature on football player valuation: a time when football had not yet assumed its current industrial dimensions. The pioneering contributions of Dobbins and Trussell laid the theoretical groundwork

for a debate that would gain increasing relevance with the expansion of the transfer market and the progressive financialization of the sector.

In the 1990s, the debate received a decisive boost from two structural events: the 1995 Bosman ruling and the liberalization of broadcasting rights.

2.1.1 | The Bosman Ruling

The Union Royale Belges des Sociétés de Football Association and Others v. Bosman and Others (C-415/93) judgment, delivered by the Court of Justice of the European Union in December 1995, marked a historic turning point in the functioning of the football labor market. Prior to this decision, players,even after the expiration of their contracts with their clubs,could only transfer to a new team if a compensation fee was paid to their former club. The Bosman ruling declared this practice incompatible with the EU principle of free movement of workers, establishing that a professional footballer is free to sign with another club at the end of his contract without any form of indemnity.

The economic implications of this rule were profound. On the one hand, players gained significantly greater bargaining power, allowing them to negotiate with greater freedom and often secure higher salaries. On the other hand, clubs were forced to adapt their human resource management strategies by relying on longer-term contracts and initiating renewal negotiations well in advance, in order to avoid losing their assets on a free transfer (Buraimo et al., 2015).

Overall, the Bosman ruling has been interpreted as the starting point of a deregulation process in the football labor market, one that accelerated the international mobility of players and fostered the exponential growth of the transfer market (Brocard & Lepetit, 2018).

2.1.2 | The Growth of Broadcasting Rights and the Financialization of Football

Parallel to the Bosman ruling, a second factor that revolutionized the economics of football was the progressive commercialization and liberalization of broadcasting rights. During the 1990s, with the advent of pay-TV and increasing competition among private broadcasters, audiovisual rights became the primary source of revenue for European clubs. In leagues such as the English Premier League, the centralization of rights sales and multi-billion-dollar agreements with international broadcasters generated an

unprecedented surge in overall revenues, establishing a model later replicated across other competitions.

The role of broadcasting rights proved to be twofold. First, they provided clubs with substantial financial resources to reinvest in strengthening their squads, thereby fueling the spiral of rising wages and transfer fees. Second, they increased the clubs' economic dependence on these revenues, amplifying the sector's volatility and exposing it to external shocks, as demonstrated by the 2020 pandemic crisis, which led to a temporary collapse in broadcasting income (UEFA, 2021).

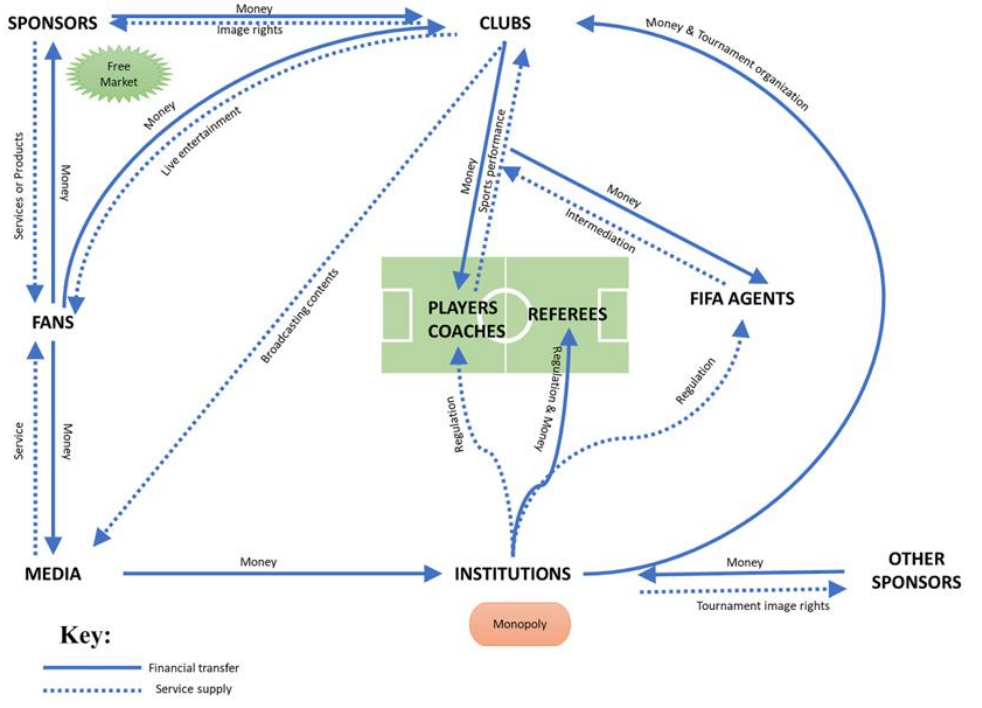


Figure 1. ***Modelling of the current European football market, Source: Ruberti (2022).***

The subsequent literature developed along two main directions. A first strand of an accounting and regulatory nature, focused on how players' multi-year contractual rights should be recorded in club financial statements, highlighting regulatory differences and issues of transparency (Pavlovic et al., 2014; Campa, 2021; Maroun et al., 2022). Within this perspective, the valuation of footballers is assimilated to that of other intangible assets, with particular attention to compliance with international accounting standards and the implications for financial accountability.

In parallel, a second, more economic-financial strand emphasized the determination of transfer prices and the factors influencing them. Beginning with the pioneering

studies of Carmichael and Thomas (1993) and Dobson et al. (2000), numerous authors have identified the econometric determinants of players' market value, analyzing variables such as age, position, performance statistics, contract length, popularity, and participation in international competitions. Over time, this literature has expanded to include more sophisticated approaches, ranging from traditional regression models to advanced machine learning techniques (Aydemir et al., 2022).

A crucial role in the development of the debate has also been played by market valuation platforms, most notably **Transfermarkt**. Originating as a community-driven website, the platform gradually established itself as one of the leading data sources for both researchers and industry practitioners, providing estimated values based on a **"wisdom of crowds"** approach (Herm et al., 2014; Coates & Parshakov, 2022). Although these estimates have often been criticized for their subjectivity and lack of methodological transparency (Ackermann & Follert, 2018), their widespread use has had the merit of stimulating broader scientific reflection on the distinction between **market value** and **use value** (Franceschi et al., 2024a).

In recent years, the literature has thus consolidated into an autonomous stream within sports economics, as evidenced by systematic reviews such as Serna Rodríguez (2019) and Franceschi (2024b). These works have highlighted the exponential growth of scientific output on the topic and the progressive diversification of methodologies, while at the same time emphasizing the absence of a unanimous consensus on the definition and measurement of football players' value.

The evolution of literature mirrors the evolution of football itself as an industry: from an initial focus on the accounting of sporting rights to a broader vision integrating economics, management, finance, and data science. Nonetheless, conceptual and methodological challenges remain unresolved, thereby justifying the need for further investigation, precisely the object of this thesis.

2.2 | Theoretical Approaches to Player Valuation

The economic valuation of football players cannot be reduced to mere empirical exercise based on econometric regressions or predictive algorithms. Rather, it is rooted in a broader theoretical debate concerning the very nature of economic value. The tradition of political economy, from the classical dualism between use value and exchange value formulated by Smith and Ricardo, to the subjective theory of value developed by the marginalist economists (Menger, Jevons, Walras), laid the foundations for understanding value not as a fixed attribute of an object, but as the outcome of perceptions, preferences, and conditions of exchange. In recent years, this theoretical framework has been revisited in an applied form within the football

context, with the aim of clarifying the dimensions that constitute player evaluation and adapting them to a global market marked by growing complexity.

Contemporary literature emphasizes the subjective and dynamic nature of player value. It is not a single, objective variable, but rather the product of an interpretive and negotiated process among multiple stakeholders (clubs, agents, media, fans, sponsors), each of whom assigns different weights to technical, contractual, and reputational factors. Alongside sporting performance indicators (goals, assists, minutes played), intangible elements such as media visibility, social media popularity, commercial appeal, and perceived career potential have become increasingly significant (Hofmann et al., 2021; Franck & Nüesch, 2012). This explains why two players with comparable technical-tactical attributes may be valued very differently depending on the competitive environment in which they operate and the perceptions they generate in the market (Poli, Besson & Ravenel, 2022).

A central aspect of the theoretical debate concerns the distinction between estimated value (market value) and the actual price paid (transfer fee). As highlighted by several studies, market value constitutes a forward-looking, comparative measure, useful for benchmarking and strategic planning, but it does not necessarily align with observed transaction prices (Coates & Parshakov, 2022; Pantuso & Hvattum, 2019). Transfer fees, by contrast, reflect the outcome of a negotiation shaped by contractual conditions, market timing, and the relative bargaining power of clubs, thereby underscoring the structural gap between theoretical estimates and actual exchange prices.

The existence of this gap has stimulated the emergence of hybrid approaches, which combine theoretical and methodological elements to better capture the multidimensionality of player value. Analyses inspired by the subjective theory of value, for instance, attempt to formalize the categories of use value and market value, while simultaneously questioning the validity of platforms such as Transfermarkt as universal benchmarks.

2.2.1 | Use value, Market value and Transfer fee

Use Value

The concept of use value refers to the technical, tactical, and sporting contribution that a football player provides to the team holding his contractual rights. It is an inherently internal notion, measurable through a wide range of performance indicators: goals scored, assists provided, minutes played, passing accuracy, defensive capabilities, versatility in performing multiple roles, as well as qualitative dimensions such as locker-room leadership or

impact on team cohesion. From an economic-financial perspective, use value can be interpreted as the marginal productivity of human capital (Scelles et al., 2016), namely the ability of an individual player to increase the likelihood of achieving significant sporting objectives such as qualification for European competitions (Champions League, Europa League) or the conquest of national and international titles. What makes use value peculiar is its non-transferability in market terms: a player may be crucial to a club's tactical system and sporting balance without this internal contribution being automatically reflected in a corresponding monetary valuation. In other words, use value is strictly situational and context dependent.

Market Value

The market value represents a theoretical and prospective measure, attempting to capture the price a player might reasonably reach under standard market conditions. Unlike the transfer fee, it is not the outcome of an actual transaction but a modeled estimate, derived from a mix of objective and subjective variables. It can originate from econometric models (Campa, 2022), statistical analyses of performance and contractual characteristics, or assessments provided by specialized platforms such as Transfermarkt, the CIES Football Observatory, or KPMG Football Benchmark. Market value integrates quantitative factors (age, position, contract length, technical performance) with qualitative and reputational dimensions, such as media visibility, social media following, or hype generated among fans and sponsors. In this sense, it represents a synthesis of market expectations rather than an accurate forecast of actual transfer fees. Its primary function is comparative and informative: it allows benchmarking across players, teams, and leagues, and supports strategic investment decisions. Nonetheless, it remains an "imperfect" indicator, often diverging significantly from the actual amounts paid in real transfer negotiations.

Transfer Fee

The transfer fee represents the actual exchange value, namely the amount paid by a purchasing club to a selling club to acquire the contractual rights of a player still under contract. It is therefore a concrete, historical figure reflecting the outcome of a specific negotiation, heavily shaped by contingent factors: contractual conditions (remaining duration, release clauses, bonuses or add-ons), player age, urgency of the involved parties, agents' influence, as well as supply and demand dynamics at a given market moment (Campa, 2022). Unlike use value, which measures sporting contribution, and market value,

which constitutes a theoretical estimate, the transfer fee incorporates negotiation dynamics, informational asymmetries, and even emotional elements linked to inter-club competition. This explains why transfer fees often appear disproportionate to a player's actual sporting utility. A paradigmatic case is Neymar's 2017 transfer to Paris Saint-Germain for €222 million: a figure that reflected not only his sporting value but, above all, his commercial and media potential in terms of global attractiveness, sponsor revenues, and the strengthening of the club's international brand (Hofmann et al., 2021).

Table 1. ***Conceptual distinction between use value, market value, and transfer fee in football player valuation:***

	Use Value	***Market Value***	***Transfer Fee***
Definition	On-field contribution, sporting utility	Estimated price under standard market conditions	Actual price paid in a transfer transaction
Nature	Internal, sport-based	Prospective, predictive	Historical, negotiation-driven
Key Drivers	Performance, tactics, team fit	Age, stats, contract, popularity, potential	Contract clauses, demand/supply, agents, timing
Limits	Hard to monetize, context-dependent	Diverges from real fees, influenced by hype	Often disproportionate to sporting value

The direct consequence is that the value of a football player cannot be regarded as an objective and stable quantity, but rather as the outcome of an unstable balance between sporting performance, economic-financial expectations, and market dynamics. This plurality of perspectives explains why the literature on player valuation appears highly fragmented and lacks consolidated consensus on the definition of "value" and on the most appropriate measurement tools. For clubs and regulators, this results in significant difficulties in translating academic evidence into operational practices, thereby confirming the urgency of establishing a clear and shared conceptual framework.

2.3 | Managerial and Financial Approaches

In addition to the economic tradition, the literature on player valuation has drawn upon various managerial and financial theories to interpret the dynamics of the football transfer market.

2.3.1 Signaling theory and Superstar effect

Signaling theory (Spence, 1973) originated in economics to explain how individuals or organizations transmit signals to the market in order to reduce information asymmetry. In the football context, players and their clubs employ different forms of "signals" to communicate a player's value to potential buyers. These signals may be endogenous, stemming from on-field performance (goals, assists, minutes played, international appearances), or exogenous, linked to more indirect factors such as participation in prestigious competitions (Champions League, World Cup) or recognition through individual awards (Ballon d'Or, "Best Young Player").

The strength of such signals lies in the fact that, although they do not guarantee future performance, they strongly shape market expectations, increasing the likelihood that a player will be perceived as a high-value asset. For instance, a national team call-up or a breakout performance in an international tournament can significantly raise a player's estimated market value, even if based on limited evidence (Coates & Parshakov, 2022).

Closely related to signaling theory is the concept of the **superstar effect**, introduced by Adler (1985) and later applied to football by Franck and Nüesch (2012). According to this perspective, in markets characterized by high media exposure such as football, a small number of individuals can capture a disproportionate share of attention, revenues, and thus economic value, regardless of objective differences in performance. A football "superstar" is therefore valued not only for sporting utility, but also for the ability to attract sponsors, expand the club's global following, and generate commercial revenues (merchandising, ticket sales, broadcasting audiences).

A paradigmatic example can be found in transfers involving players such as Cristiano Ronaldo, Lionel Messi, or Neymar: the economic value attributed to these athletes extends well beyond their sporting output, incorporating the global brand dimension they embody. Recent studies have shown that the market value of superstars is strongly correlated not only with their performance, but also with their number of social media followers and media impact (Hofmann et al., 2021).

Taken together, signaling theory and the superstar effect help explain two key phenomena in player valuation:

- Why market values are often shaped more by perceived or expected factors than by purely objective data.
- Why economic value tends to be concentrated on a small number of players, leading to a polarized market structure.

2.3.2 | Bargaining Theory and the Transfer Market

One of the most influential contributions in the economics of football is represented by the work of Carmichael and Thomas (1993), who introduced the perspective of **bargaining theory** to explain the formation of transfer fees. From this standpoint, the transfer fee is not the direct expression of an objective or intrinsic value of the player, but rather the outcome of a negotiation process between the selling and the buying club, mediated by contractual conditions and the relative bargaining power of the parties involved.

The model proposed by Carmichael and Thomas is based on several key assumptions:

- The player's contract constitutes the tradable asset, and its **remaining duration** is a crucial determinant of the selling club's bargaining power. The longer the contractual horizon, the stronger the club's ability to demand a higher price.
- The buying club evaluates the player not only in terms of expected sporting contribution (use value) but also according to the scarcity of alternatives on the market and the urgency to strengthen specific positions within the squad.
- The player and their agents can influence negotiations through wage demands, contractual clauses, or even the threat of refusing a transfer, thereby affecting the distribution of the surplus generated by the transaction.

From this perspective, the transfer fee reflects an equilibrium of forces shaped simultaneously by contractual constraints, market conditions, and strategic factors. Consequently, the market value, understood as a theoretical estimate of a "fair" price, does not necessarily coincide with the negotiated outcome, but rather serves as a benchmark around which both parties seek to maximize their respective interests.

This framework is particularly useful in explaining the frequent deviations between estimated values and observed transfer fees. For example:

- A player with an expiring contract will typically command a lower transfer fee than both their use value and their estimated market value, since the selling club risks losing them on free transfer.
- Conversely, a young talent under a long-term contract may be valued above their sporting metrics, given the strong bargaining position of the selling club.
- "Bidding wars" between multiple buyers often push prices well beyond ex-ante estimates.
- Bargaining theory thus introduces a dynamic and relational dimension to player valuation, highlighting how transfer fees are not merely reflections of a player's qualities, but rather the product of a strategic interaction among actors with divergent interests and asymmetric contractual resources. This perspective remains a fundamental reference for understanding the structurally imperfect and negotiation-driven nature of the football transfer market.

2.3.3 | Property Rights and Contractual Rights Theory

Another crucial theoretical approach to understanding football player valuation is grounded in property rights theory, originally introduced by Demsetz (1967) and later adapted to the sporting context by authors such as Brocard & Cavagnac (2017). According to this perspective, players are not valued as individuals in a strict sense, but rather through the registration rights that clubs hold over them.

From this standpoint, what is exchanged in the transfer market is not the player's intrinsic "human" or sporting value, but a **bundle of legal and economic rights** that grant the acquiring club the ability to exploit the player's technical, commercial, and image potential for the duration of the contract. The player's contract, often treated as an intangible asset in accounting practices (Campa, 2021; Risaliti & Verona, 2013), thus becomes the true object of valuation and transaction.

The negotiability of registration rights lies at the core of this mechanism:

- The value depends on residual contract duration, release clauses, and the degree of transfer flexibility.

- The selling club exercises its property rights by demanding compensation to relinquish them, while the buying club pays to appropriate the future opportunities tied to the athlete.
- The player, while retaining personal rights, is not directly the object of the transaction, but rather an active party within a system of transferable contractual rights.

This theoretical framework allows transfer fees to be interpreted as the exchange price of a negotiable intangible asset, not dissimilar, at least from a corporate finance perspective, to patents, licenses, or commercial exploitation rights. Nevertheless, the specificity of football lies in the high degree of uncertainty (future performance, injuries, tactical adaptation) and in the externalities related to image and marketing, which make valuation particularly complex (Brocard & Lepetit, 2018).

By shifting the focus from valuing the player as human capital to valuing the contract as an intangible asset, the property rights approach has significant implications not only for determining transfer fees but also for the financial and accounting representation of football clubs. It fuels the ongoing debate over whether players' rights should be systematically treated as intangible assets on clubs' balance sheets (Maroun et al., 2022).

2.3.4 | Business Valuation Theory

Another theoretical approach to player valuation derives from business valuation theory, systematized by Matschke & Brösel (2021). This framework transfers the principles of corporate finance to the football context, treating players as genuine investment projects capable of generating future returns. The central idea is that the acquisition of a player can be assimilated to a capital investment, whose value depends on the ability to produce both economic and sporting benefits over the contractual horizon.

From this perspective, the value of a footballer extends beyond his immediate technical and tactical contribution and unfolds across several interconnected dimensions:

- Direct sporting returns: individual performances that increase the probability of victories, qualification for international competitions, and the winning of trophies (Scelles et al., 2016).

- Indirect economic returns: growth in revenues from UEFA/FIFA prize money, higher matchday income, and broadcasting rights associated with improved sporting performance.
- Brand enhancement: the player's capacity to boost the club's commercial appeal through merchandising, sponsorships, and global fan engagement (Franck & Nüesch, 2012; Hofmann et al., 2021).
- Resale option value: the possibility that the player's market worth appreciates over time, generating an economic surplus upon a future transfer (Leifheit & Follert, 2021).

In this logic, player valuation takes on features very similar to those of corporate or project valuation: it involves estimating expected future streams of utility, discounting them, and comparing them with the costs incurred for acquisition and contractual management (salary, agent commissions, bonuses). This approach is thus linked to classical corporate finance methods such as discounted cash flow (DCF) analysis, albeit adapted to the specificities of football, where expected flows are highly uncertain and largely dependent on sporting outcomes and exogenous factors (Hill, Skinner, & Grosman, 2025).

The application of business valuation theory enables clubs to adopt a more managerial and strategic perspective. The main challenge lies in the quantification of intangible components (media visibility, brand impact, commercial returns), which are not always easily translatable into reliable estimates.

Table 2. ***Theoretical and managerial approaches to player valuation:***

Theory	Core Idea	Key References
Signaling & Superstar effect	Player value reflects performance, reputation and enhanced by visibility.	Spence (1973); Franck & Nüesch (2012)
Bargaining & transfer market	Transfer fees result from negotiation, contract terms and bargaining power.	Carmichael & Thomas (1993)
Property-contractual rights	Valuation concerns tradable registration rights rather than the player himself.	Demsetz (1967); Brocard & Cavagnac (2017)
Corporate valuation	Players are treated as investments	Matschke & Brösel (2021); Leifheit & Follert (2021)

2.4 | SINTHESYS AND RESEARCH GAPS

The review of theoretical approaches highlights how the issue of player valuation lies at the center of a broad, multifaceted, and intrinsically interdisciplinary debate, in which economic, managerial, accounting, and statistical perspectives intersect. However, despite the richness of contributions, several unresolved critical issues clearly emerge, limiting the possibility of reaching a coherent and shared methodological framework.

These research gaps manifest both on a conceptual level, with the persistent ambiguity between notions of value and price, and on an applied level, where the diversity of methods and metrics employed makes it difficult to compare studies and reduces the transferability of results to managerial practice.

This very heterogeneity explains why player valuation continues to be a complex and contested field, lacking a dominant paradigm and instead characterized by parallel approaches that struggle to engage in dialogue with one another.

2.4.1 | Confusion Between Value and Price

One of the main limitations in the literature on player valuation lies in the persistent confusion between two distinct but interconnected concepts: value and price. While in corporate finance this distinction is well established,with value representing a theoretical or estimated measure and price denoting the outcome of an actual transaction in a specific market,in football this boundary tends to blur, due to the complexity of the context and the peculiar nature of the "assets" involved.

The literature shows how this confusion leads to interpretative errors. Some studies employ transfer fees as proxies for the economic value of players, overlooking the fact that such figures may be distorted by factors exogenous to sporting performance (e.g., political pressures, marketing strategies, accounting maneuvers for capital gains). Others, conversely, treat market value as a reliable and universal indicator, ignoring that it does not necessarily reflect what a club is willing to pay in a specific negotiation (Franceschi et al., 2023).

This ambiguity generates significant consequences:

- At the scientific level, it reduces the comparability of results and hampers the development of robust predictive models.

- At the practical level, it risks leading clubs, analysts, and investors to irrational decisions, based on misleading or decontextualized metrics.

The challenge for future research is therefore to operationally clarify these categories, by developing indicators that distinctly separate "estimated value" from "actual price," and by analyzing how these two dimensions interact without conflating them. Only in this way will it be possible to enhance both the methodological soundness of studies and their transferability to managerial practice.

2.4.2 | Difficulties in Applying Pure Financial Models

Another limitation in the literature concerns the application of traditional corporate finance tools to player valuation, particularly models based on the **Discounted Cash Flow (DCF)** approach. In theory, treating players as "investments" capable of generating future returns would allow their net present value to be estimated, following the same methodology used for firms or intangible assets (Leifheit & Follert, 2021). However, when this paradigm is applied to the football context, structural limitations emerge that significantly reduce its validity.

The first obstacle lies in the measurability of cash flows attributable to an individual player. Unlike an industrial project or a standalone brand, a player's economic contribution cannot be easily isolated, since sporting outcomes derive from collective interactions within the team and from the simultaneous influence of external factors (coaching staff, tactical context, league competitiveness). This makes it difficult to translate a player's marginal productivity into tangible incremental revenues.

A second issue is the high degree of uncertainty and volatility. Injuries, loss of form, changes in coaching, or transfers to different leagues can radically alter performance prospects, undermining the reliability of long-term forecasts required by DCF models (Matschke & Brösel, 2021). Added to this is the inherent randomness of football, where contingent events can strongly affect sporting outcomes and, in turn, revenue streams.

Moreover, the use of purely financial models' risks overlooking non-monetary components of player value, such as their ability to enhance the club's brand, generate fan engagement on social media, or increase media appeal, elements that are becoming central in valuation processes (Hofmann et al., 2021).

As a result, pure financial models, if applied without adaptation, prove to be of limited effectiveness in capturing the complexity of player valuation. Instead, literature increasingly points towards hybrid approaches that combine accounting and financial indicators with sporting and marketing variables, to provide a more realistic representation of a player's value and potential to generate future returns.

2.4.2 | Limitations of Transfermarkt-Based Valuations

A further weakness identified in the literature concerns the reliability of valuations produced by digital platforms such as Transfermarkt, which have gradually assumed a central role both in media debates and in empirical research. These values are based on the principle of the wisdom of crowds (Surowiecki, 2005), according to which the aggregated opinions of a heterogeneous group of individuals may generate estimates that are, in theory, more accurate than those provided by individual experts. This mechanism is intended to capture the widespread perceptions of football stakeholders, incorporating information that is often absent from official datasets.

Nevertheless, the literature has highlighted several methodological limitations that undermine the scientific validity of such estimates:

- The **crowdsourcing process** is exposed to cognitive biases: valuations may be influenced by emotional or media-related factors such as press attention, social media popularity, or the narrative surrounding a particular player (Herm et al., 2014).
- A **selection bias** occurs because the most active contributors are primarily fans and enthusiasts with specific interests, rather than independent analysts (Müller et al., 2017).

A further issue is the lack of transparency in updating criteria: the methodology behind periodic revisions of player values is not fully disclosed, which prevents replicability and verification according to scientific standards (Ackermann & Follert, 2018). Finally, as Coates & Parshakov (2022) note, Transfermarkt values often display empirical proximity to observed transfer fees, yet this correlation does not rest on a robust theoretical foundation and does not preclude systematic distortions.

As a result, although Transfermarkt is widely used due to its accessibility and global coverage, it cannot be regarded as a scientific benchmark for player valuation. Its usefulness lies rather in providing a proxy for market

perceptions, which may serve as a control variable or as a complement to other valuation methodologies. However, its uncritical use in empirical studies risks consolidating interpretative errors and further blurring the distinction between value and price.

2.4.3 | Lack of Shared Standards for Performance Metrics

Another significant limitation concerns the absence of shared standards in defining and applying performance metrics for football players. The literature has traditionally relied on "classical" and easily measurable indicators such as goals, assists, or minutes played. While straightforward to collect, these variables provide only a partial and often reductive representation of a player's actual contribution (Dobson et al., 2000).

With the advent of tracking technologies and advanced analytics, the set of available variables has expanded exponentially: expected goals (xG), expected assists (xA), pressing efficiency, distance covered, progressive passes, pass completion under pressure, and even cognitive-behavioral measures such as decision-making ability in tight spaces (Hill, Skinner & Grosman, 2025). These indicators open innovative perspectives but at the same time generate substantial methodological heterogeneity, as no consensus exists on their actual relevance to the economic valuation of players.

The result is a fragmented body of research: some studies continue to prioritize traditional variables more directly linked to immediate sporting outputs, while others focus on advanced metrics that promise greater predictive power of future performance. This misalignment hinders comparability across studies, reduces the robustness of meta-analyses, and complicates the identification of determinants with a structural and persistent impact on player valuation.

The **lack of a universally recognized minimum set of metrics** reflects a broader tension between empirical and theoretical approaches: on the one hand, the need for simplification and replicability; on the other, the desire to capture the multidimensional complexity of football performance. Without progress toward shared standards, the risk is that player valuation will remain characterized by high variability and by a constant trade-off between methodological rigor and practical relevance.

2.4.4 | The Regulatory Role of UEFA and Financial Fair Play

Another aspect often overlooked in the literature on player valuation is the role of governing bodies, particularly UEFA, which acts as one of the main agents

in the market. While most empirical studies focus on individual, collective, and market-related factors, less attention has been devoted to the impact of institutional rules and governance structures on the formation of market values and, indirectly, on transfer fees and player valuation.

According to Ruberti (2022), UEFA operates both as a regulator and as an economic actor, exerting a dual form of power: on the one hand, it organizes the main international competitions; on the other, it maintains a monopoly over the sale and redistribution of broadcasting rights. This position allows UEFA to significantly shape the revenue structure of European clubs, which in 2019 derived almost half (48.2%) of their income from centrally managed media rights. Such dependence increases the pressure on clubs to achieve sporting success, as UEFA's revenue distribution is heavily performance-based, fueling a vicious cycle of rising expenditures on wages and transfers.

Within this framework, **Financial Fair Play (FFP)** was introduced with the stated aim of promoting financial sustainability and reducing competitive imbalances. In practice, FFP requires clubs to comply with the break-even rule, limiting spending to the revenues they generate. However, several scholars have highlighted the ambiguous effects of these regulations: while they have improved financial transparency, they have also reinforced the dominance of already established clubs, penalizing emerging ones lacking solid financial foundations (Peeters & Szymanski, 2014).

Ruberti (2022) further shows that UEFA, through its control of media rights and the selective enforcement of FFP, has contributed to entrenching a skewed market model in which the risks are borne by clubs, while the main benefits are retained by the governing body. This imbalance fueled the discontent that culminated in the attempted formation of the European Super League in April 2021, widely interpreted as a move by top clubs to escape a system perceived as inefficient and biased.

From the perspective of player valuation, the regulatory framework influences at least three dimensions:

- Indirect financial determinants. Since club revenues depend on UEFA results and FFP compliance, investment strategies in players are constrained by regulatory boundaries. This explains the growing focus on the sustainability of transfer spending and the use of quantitative models to assess investment efficiency (Pantuso & Hvattum, 2019).

- Impact on transfer fees. The urgency of meeting FFP thresholds has led some clubs to resort to artificial capital gains or market transactions motivated primarily by accounting purposes (Neri et al., 2021). This practice distorts the relationship between sporting value and transfer price, producing fluctuations not aligned with players' actual marginal productivity.
- Systemic stability. The unequal distribution of broadcasting revenues and the rigidity of FFP restrictions have made the market less open to innovative shocks, reducing mobility between tiers of clubs and consolidating the financial gap between elite and mid-sized teams. Overall, while literature has made significant progress, it remains fragmented and lacks a unified methodological framework. The main gap is the absence of an integrated model capable of coherently combining sporting, economic, and managerial dimensions. Addressing these shortcomings represents one of the key challenges for future research and constitutes the starting point of this thesis, which aims to systematize existing contributions and identify the most robust tools for the economic-financial valuation of players.

Table 3. ***Summary of the main conceptual and methodological issues identified in the literature on football player valuation.***

Conceptual Areas	Core Issues
Value vs. Price (incl. Transfermarkt)	Confusion between market value and transfer fee; reliance on Transfermarkt's biased, non-transparent estimates.
Financial Models	DCF and similar tools fail due to non-isolable cash flows, high uncertainty, and volatility.
Performance Metrics	Lack of standard indicators; mix of traditional stats and advanced analytics.
Regulation (UEFA/FFP)	Media rights monopoly and FFP rules distort fees, reinforce inequalities, and shape valuations.

To move beyond this fragmentation, the following chapters will adopt the **PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-**

Analyses) to conduct a systematic review of the literature on player valuation. This approach will enable the thesis to:

- Identify which methodologies, and consequently which variables,are most applied.
- Quantify how many studies conflate value and price, using the terms interchangeably without conceptual distinction.
- Determine how many works fail to account for UEFA and the regulatory framework as valuation determinants.
- Assess the extent to which Transfermarkt is employed as a proxy, despite the methodological concerns highlighted in the literature.

In this way, the thesis will not only systematize the existing body of research but also provide a mapping of research trends and gaps, offering an original contribution both theoretically and practically.

3 | RESEARCH METHODOLOGY

3.1 | Overview

This chapter outlines the methodological framework adopted to conduct systematic literature review on the economic and financial valuation of football players (player valuation). The objective is to ensure a rigorous, transparent, and replicable approach, capable of critically synthesizing the state of the art and identifying key trends, gaps, and research perspectives within this multidisciplinary field.

The decision to adopt a systematic review stem from the need to overcome the limitations of traditional narrative reviews, which are often characterized by a subjective selection of sources and a low degree of replicability. In a context such as player valuation,where the literature is fragmented across economic, managerial, accounting, and statistical domains,it is essential to employ a method that enables an objective mapping of existing evidence.

To this end, the **PRISMA protocol** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was selected as the methodological standard. PRISMA is widely recognized as an international benchmark for conducting systematic reviews across multiple disciplines. It allows for the organization of the research and selection process according to explicit, verifiable, and transparent criteria, thereby reducing the risk of bias and ensuring the traceability of each methodological step.

The application of the PRISMA framework in this thesis pursues three main objectives:

- **To map and classify** the existing literature on player valuation, identifying the main theoretical and methodological approaches.
- **To critically analyze** the variables, models, and metrics used to estimate player value, with particular attention to the distinctions between *transfer fee*, *market value*, and *use value*.
- **To identify research gaps** that hinder the development of a coherent and shared methodological framework, especially concerning regulatory factors (e.g., UEFA and Financial Fair Play) and the use of digital tools such as Transfermarkt.

Within this framework, the systematic review goes beyond a simple collection of articles: it serves as an analytical and comparative tool aimed at understanding how academic research has interpreted the phenomenon of player valuation over time, and which models appear to be the most robust and applicable to managerial practice.

From an operational standpoint, the PRISMA methodology enables the researcher to:

1. Define explicit inclusion and exclusion criteria, ensuring that only relevant studies are selected.
2. Ensure internal consistency between research objectives, keywords, and the selection strategy.
3. Build a structured database that allows for both qualitative (by themes and approaches) and quantitative (by frequency of variables and methods) analysis.

The adoption of a systematic protocol such as PRISMA adds scientific rigor and replicability to the research, essential features for any academic work that aims to produce valid and comparable results over time.

Ultimately, the methodology should not be viewed merely as a technical tool for data collection, but as a broader epistemological framework that allows for a coherent and structured interpretation of the evolution of the economic and financial literature on modern football.

3.2 | Origins and Development

PRISMA methodology (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) was originally conceived as a framework to standardize the conduct and reporting of systematic reviews in the medical and scientific domains. Its first

formulation dates to 2009, when a group of scholars led by David Moher published the official guidelines of the protocol in *PLoS Medicine*, as an update to the earlier QUOROM Statement (*Quality of Reporting of Meta-Analyses*, 1999). The core objective of PRISMA was to enhance transparency, replicability, and methodological rigor in systematic reviews, by reducing bias and ambiguity in the processes of study selection and synthesis. From its inception, the protocol introduced a structured 27-item checklist and a flow diagram designed to visually represent each stage of the review process, from the initial identification of records to the final inclusion of eligible studies.

With the progressive expansion of systematic reviews beyond the medical sciences, the protocol underwent a substantial revision in 2020, published jointly in *BMJ* and *PLoS Medicine*, in order to reflect the increasing complexity of interdisciplinary research. This updated version, known as the PRISMA 2020 Statement, introduced greater flexibility and adaptability, making it suitable for diverse research contexts and incorporating digital tools for automated bibliographic management. The revised guidelines emphasize the need for comprehensive documentation of each procedural phase, from inclusion and exclusion criteria to the assessment of study quality and promote the integration of quantitative (meta-analytic) and qualitative (thematic or narrative) approaches according to the nature and objectives of the review.

In recent years, the PRISMA methodology has found growing resonance within the social, economic, and managerial sciences, where scientific production is often marked by considerable methodological and conceptual heterogeneity. In these domains, PRISMA serves as a systematic framework for mapping, synthesizing, and critically assessing existing literature, thereby ensuring methodological rigor, consistency, and transparency throughout the selection and evaluation processes.

Within the field of sports economics, and more specifically in research on player valuation, the PRISMA framework provides a powerful tool to systematically analyze and classify academic contributions, identifying recurrent trends, methodological shortcomings, and conceptual divergences. These elements are crucial for building a coherent theoretical foundation and a robust empirical base upon which to develop future research and foster greater standardization in the study of player valuation.

3.3 | Procedure applied to the thesis

The application of the PRISMA protocol in this research aims to ensure a systematic, transparent, and replicable approach to the analysis of the literature on the economic valuation of football players. The process will be structured into four main phases,

consistent with the canonical framework of the PRISMA model: identification, screening, eligibility assessment, and final inclusion.

3.3.1 | Phase 1 – Identification

The identification phase represents the starting point of the entire PRISMA process, as it aims to systematically and transparently identify the comprehensive set of studies potentially relevant to the research question. In this thesis, the primary objective of this phase was to collect all academic contributions that address, either directly or indirectly, the topic of player valuation in professional football, understood as the economic and financial process of determining players' value.

To ensure comprehensiveness and methodological rigor, the research was conducted using two of the main international bibliographic databases, **Scopus** and **Web of Science (WoS)**, both recognized for the breadth and reliability of their scientific coverage. These databases allow the application of advanced filters and the export of complete records (including abstracts, keywords, and bibliographic references), thereby facilitating the subsequent phases of screening and coding.

The search strategy combined keywords representing the main theoretical and operational dimensions of football player valuation, employing Boolean operators to broaden the scope of coverage. The keywords used included:

"football player valuation", "transfer fee", "market value", "player price determinants", "football economics", and "sports finance".

Articles published between **1988 and 2025** were included to ensure an up-to-date overview consistent with the most recent developments in literature, which has increasingly incorporated big data, advanced metrics, and machine learning methodologies.

The initial search yielded **301 records**, which were subsequently subjected to a duplication check to eliminate studies appearing in both databases. After the removal of duplicates, the number of unique records amounted to **265**. All metadata (title, abstract, keywords, and source) were exported to an Excel file to enable efficient preliminary analysis without the need to manually consult each paper at this stage. The identification phase is described in Appendix A, point 1.

The identification phase thus made it possible to construct a broad and coherent corpus of studies, ensuring transparency, replicability, and traceability, which are fundamental elements of the PRISMA methodology. This step laid the foundation for the subsequent screening and selection phases, during which the quality and relevance of the studies would be assessed in greater depth.

3.3.2 | Phase 2 – Screening

Following the removal of duplicate records, the remaining studies were subjected to a preliminary screening phase. This process involved the systematic review of titles and abstracts, with the objective of excluding contributions not directly relevant to the topic of player valuation. Studies addressing broader issues in sports economics, research in sports marketing not specifically focused on football players, or works lacking an explicit valuation perspective were therefore removed from the dataset.

Relevance Score

To enhance the rigor and replicability of this step, an automatic **relevance score** was computed for each record. This quantitative indicator was designed to measure the degree of thematic correspondence between each study and the research objective.

The calculation of the relevance score was based on the presence of specific keywords representative of the topic under investigation. A predefined list of eight terms was compiled to capture the most recurrent expressions related to the economic and financial valuation of football players. These terms were:

player valuation, *transfer fee*, *market value*, *football player*, *player worth*, *player pricing*, *player value*, and *football valuation*.

For each paper, the textual content, composed of the title, abstract, and author keywords, was scanned for the occurrence of these eight terms. The number of detected keywords was then divided by the total number of keywords in the list, producing a value between 0 and 1 that expresses the paper's degree of thematic alignment. The "min" function was used to ensure that the value would not exceed 1, even if some keywords appeared multiple times in the same document.

The relevance score was calculated using the following formula:

$$\boldsymbol{RelevanceScore = min\left(1, \frac{No.\,of\ detected\ keywords}{Tot.no.of\ keywords\ in\ the\ list}\right)}$$

The operational implementation of this procedure was carried out in Microsoft Excel, which enabled the automated computation of the relevance score for all records in the dataset.
For each paper, the text fields containing the title, abstract, and author keywords were concatenated into a single string of text.

The calculation was performed using a logical function that searched for the presence of each keyword within the concatenated text, counted how many of them were detected, divided this number by the total number of reference keywords (eight), and finally normalized the result to a maximum value of 1. This process was implemented in Excel through the following formula:

$$= \boldsymbol{min\left(1, \frac{SUMPRODUCT\left(--ISNUMBER\left(SEARCH\left(LOWER(Tot.no.of\ keywords),\ LOWER(Title\ \&\ Abstract\ \&\ Author\ Keywords)\right)\right)\right)}{Tot.no.of\ keywords}\right)}$$

This formula operationalizes the logic described above by combining the textual content of each paper with the predefined list of reference keywords. Specifically, the **SUMPRODUCT** function counts how many of the target keywords (stored in the predefined list) are detected within the concatenation of the paper's *Title*, *Abstract*, and *Author Keywords*.

The **SEARCH** function scans the combined text for the presence of each keyword, while **ISNUMBER** converts the output into logical values, returning *TRUE* when a keyword is found and *FALSE* otherwise. The double negative (--) transforms these logical values into numeric ones, so that *TRUE* becomes 1 and *FALSE* becomes 0.

The numerator of the fraction therefore represents the total number of detected keywords, while the denominator corresponds to the total number of keywords in the predefined list (eight in this case). **MIN (1, …)** function ensures normalization of the result, capping the score at 1 even if a keyword appears multiple times in the same text field.

Consequently, the *relevance score* takes values between **0** and **1**, where:

- a value close to **0** indicates that few or none of the reference terms are present in the document, suggesting low thematic correspondence.

- a value close to **1** denotes a high concentration of relevant terms, indicating strong thematic alignment with the topic of football player valuation.

This automated approach allowed for a consistent and replicable assessment of thematic relevance across all records, providing an objective quantitative basis for the subsequent inclusion and exclusion phase.

Table 4. ***Summary of the Excel functions used to compute the Relevance Score, illustrating the role of each component in detecting predefined keywords and normalizing the final value between 0 and 1.***

Element	*Function*
Title, Abstract, Author Keywords	Text fields combined into a single searchable string.
Keyword list	Eight predefined terms related to player valuation.
SEARCH( )	Look for each keyword within the combined text.
ISNUMBER( )	Converts search results into logical values (1 = found, 0 = not found).
SUMPRODUCT( )	Counts detected keywords and divided by total keywords.
MIN(1, …)	Caps the score at 1, ensuring normalization.

Inclusion–Exclusion Condition

After the relevance score was computed for each record, an inclusion–exclusion rule was applied to classify the studies according to their degree of thematic alignment.
This rule introduced a quantitative threshold that determined whether a paper was sufficiently relevant to be retained for further analysis, ensuring methodological consistency and objectivity in the screening process. Conceptually, the rule can be expressed as:

$$\boldsymbol{Decision} = \begin{cases} \boldsymbol{Include, if\ Relevance\ Score} \geq \mathbf{0.22} \\ \boldsymbol{Exclude, otherwise} \end{cases}$$

The threshold of **0.22** corresponds approximately to the presence of at least two relevant keywords out of the eight predefined ones. This value was chosen to strike a balance between inclusiveness and thematic precision, excluding

marginally related works while retaining those with clear conceptual and methodological relevance to football player valuation.

In Microsoft Excel, this classification was implemented through a simple logical function that automatically assigned the corresponding label to each record based on its relevance score:

$$= \boldsymbol{IF}(\boldsymbol{Relevance\ Score} \geq \mathbf{0.22},\ "\boldsymbol{Include}",\ "\boldsymbol{Exclude}")$$

This formula instructs the spreadsheet to assign the label "Include" when the relevance score of a record equals or exceeds 0.22, and "Exclude" otherwise. The application of this rule provided a transparent and reproducible criterion for dataset reduction, resulting in a **final subset of 52 records** to be evaluated in the eligibility phase.

Table 5. ***Summary of the logical condition used to classify records as "Include" or "Exclude" based on their Relevance Score threshold.***

Element	Function
Relevance Score	Quantitative measure of thematic alignment, ranging from 0 to 1.
Threshold (0.22)	Minimum value required to include a paper (≈ two keywords detected).
IF( ) function	Logical test comparing each record's score to the threshold.
Include	Assigned when *Relevance Score* ≥ 0.22.
Exclude	Assigned when *Relevance Score* < 0.22.
Spreadsheet implementation	Ensures automatic, transparent, and replicable classification.

The detailed overview of the screening process, including the relevance score calculation, threshold-based classification, and the final list of included and excluded papers, is reported in **Appendix A, point2**, which contains the full spreadsheet used for this stage of the analysis.

3.3.3 | Phase 3 – Eligibility Assessment

The articles selected after the preliminary screening were subjected to a full and detailed reading to verify their consistency with the research objectives and their actual relevance to the topic of football player economic valuation. This phase represents a crucial step within the PRISMA methodology, as it marks the transition from a selection based on superficial indicators (title and

abstract) to a qualitative and content-based assessment of the scientific material. The objective at this stage was not only to exclude non-relevant studies but also to identify the degree of methodological rigor and conceptual clarity with which different authors approached the topic of player valuation.

The inclusion criteria, defined in advance to ensure consistency and transparency in the selection process, were as follows:

- **Thematic relevance:** the study must explicitly address the determination of the value or price of football players, thereby excluding broader works on sports economics, sports marketing, or club management that do not specifically focus on individual player valuation.
- **Methodological robustness:** the study must employ quantitative or econometric methods such as linear or nonlinear regressions, pricing and elasticity models, neural networks, predictive machine learning models, or hybrid approaches integrating statistical and financial techniques.
- **Identification of key determinants:** the paper must explicitly present and discuss the main variables influencing player valuation, including both sporting indicators (goals, assists, appearances, position, age, individual performance) and contractual (contract duration, clauses, constraints) and intangible factors (popularity, media visibility, brand value, social media following).
- **Use of recognized market proxies:** the study must utilize or analyze established empirical sources such as the Transfermarkt database, CIES Football Observatory, KPMG Football Benchmark, or official UEFA and FIFA data, allowing verification and replicability of the results.
- **Transparency and replicability:** the authors must clearly report data sources, estimation methods, employed variables, and declared study limitations, thereby ensuring reliability and comparability across research works.

Table 6. ***Eligibility Assessment Criteria (Phase 3)***

Criterion	Description	Purpose
Thematic relevance	The study explicitly addresses the valuation or pricing of football players.	Ensure focus on player valuation research.
Methodological rigor	Adoption of quantitative or econometric methods (e.g., regressions, price models, machine learning).	Guarantee empirical robustness and comparability.
Variables identified	Clear inclusion of determinants of value (performance, age, position, contract length, visibility).	Enable structured comparison across studies.
Market proxies used	Use of recognized data sources (Transfermarkt, CIES, KPMG, UEFA/FIFA).	Ensure reliability and replicability.
Transparency and replicability	Explicit reporting of data sources, estimation methods, and study limitations.	Support transparency and methodological consistency.

To ensure methodological consistency, the eligibility assessment was conducted manually by carefully reviewing the full text of all 52 papers that passed the preliminary screening phase. Each study was examined in detail to verify its compliance with the five inclusion criteria previously defined.

For every record, a binary value (TRUE/FALSE) was assigned to each criterion, indicating whether the corresponding requirement was met. These evaluations were entered into a spreadsheet to facilitate systematic comparison and to maintain full traceability of the assessment process.

Although the spreadsheet environment was used to organize and summarize the results, including the computation of the Eligibility Score (the total number of satisfied criteria), the assignment of TRUE or FALSE values was entirely based on manual judgment after thorough reading of each article. This approach ensured that the final selection reflected a qualitative and reasoned interpretation of the studies, rather than a purely automated classification.

To define inclusion decisions in a consistent and transparent way, a simple rule was applied: only studies satisfying at least three out of five inclusion criteria were considered eligible, if they also met the thematic relevance condition (i.e., the study explicitly addressed the valuation or pricing of football players).

Formally, the decision rule can be expressed as:

$$\boldsymbol{Decision} = \begin{cases} \boldsymbol{Include, if\ Eligibility\ Score} \geq \boldsymbol{3\ and\ Thematic\ relevance\ =\ TRUE} \\ \boldsymbol{Exclude, otherwise} \end{cases}$$

In the spreadsheet, this logic was implemented using the following formula:

$$= \boldsymbol{IF}(\boldsymbol{AND}(\boldsymbol{Eligibility\ Score} \geq \boldsymbol{3},\ \boldsymbol{Thematic\ relevance} = \boldsymbol{TRUE}),\ "\boldsymbol{Include}",\ "\boldsymbol{Exclude}")$$

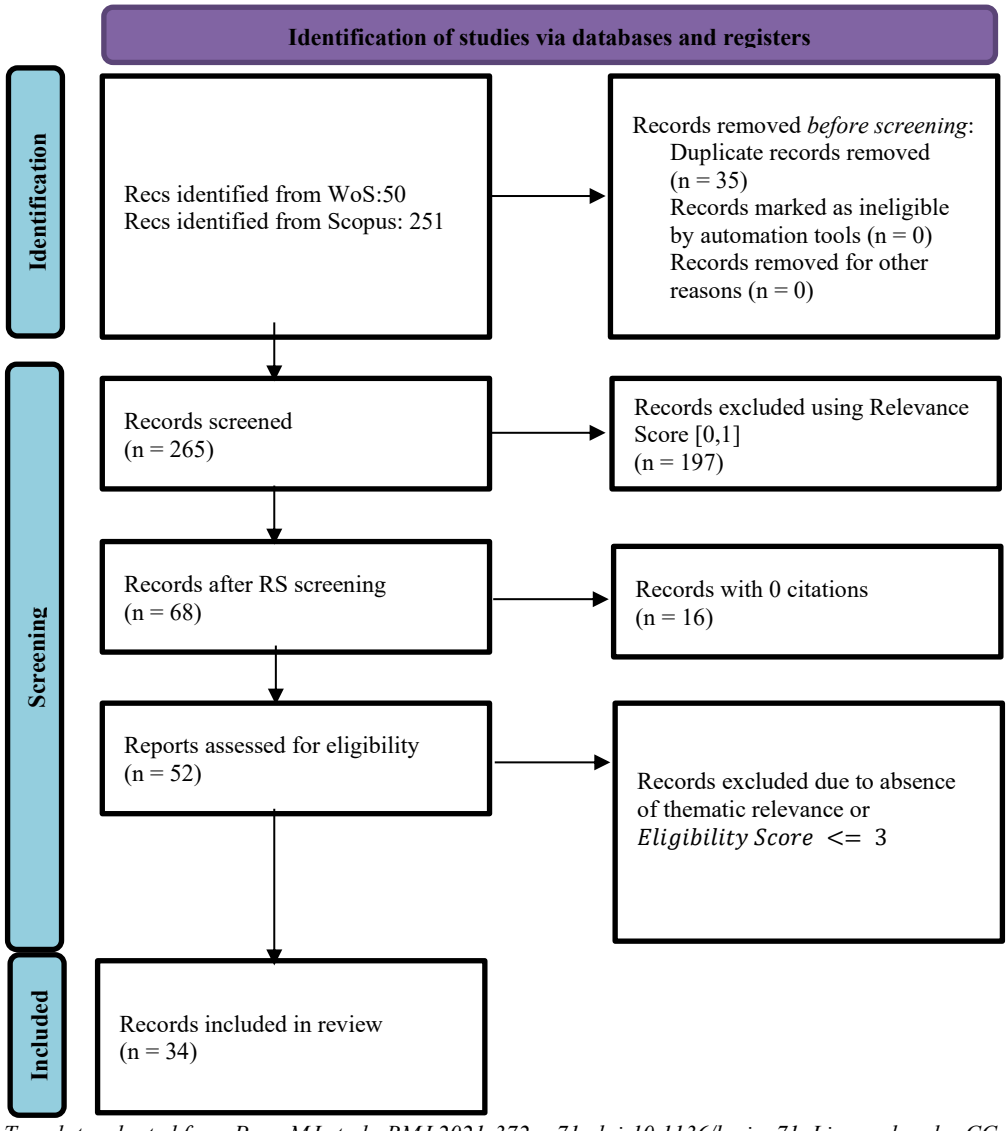
This condition ensured that borderline cases, papers showing partial methodological rigor but a clear thematic alignment, were retained, while conceptually unrelated or methodologically weak studies were excluded. The resulting classification provided a coherent and well-justified foundation for the final set of eligible papers.

Upon completion of the evaluation, it was therefore possible to define a consistent, homogeneous, and methodologically robust collection of studies forming the eligible sample for the subsequent phase of qualitative and comparative analysis. This procedure ensured that the evidence included in the review constituted a reliable and scientifically grounded body of research, capable of effectively addressing the thesis objectives and supporting the investigation of football player valuation from an economic and financial perspective.

The complete list of eligible studies identified after the full-text assessment is provided in Appendix A, point 3. For each study, the file reports the main bibliographic information (title, authors, year, and source), together with a concise summary of the methodological approach and the key variables considered in the analysis. This dataset offers a transparent and verifiable overview of the final sample used in the qualitative and comparative stages of the review. This condition ensured that borderline cases, papers with partial methodological rigor but clear thematic alignment, were included, while conceptually unrelated or methodologically weak studies were excluded.

The resulting classification provided a coherent and justifiable foundation for the final set of eligible papers. At the end of the evaluation, it was thus possible to define a coherent, homogeneous, and methodologically robust set of eligible

studies on which to conduct the subsequent phase of qualitative and comparative analysis. This ensured that the evidence included in the review represented a reliable and scientifically grounded body of work capable of effectively addressing the thesis research questions. The complete list of the studies deemed eligible after the full-text assessment is available in **Appendix A, point 3**. For each study, the file reports the main bibliographic information (title, authors, year, and source), together with a summary of the methodological approach. The diagram below summarizes the selection and analysis process carried out so far. The PRISMA 2020 template, completed and adapted for the thesis.



Template adapted from Page MJ et al., BMJ 2021;372: n71. doi:10.1136/bmj. n71. Licensed under CC BY 4.0 (https://creativecommons.org/licenses/by/4.0/).

3.3.4 | Phase 4 – Synthesis and Critical Analysis of Included Studies

At the end of the identification, screening, and evaluation phases, the total number of studies deemed suitable was progressively reduced from the initial **301 records to 34** articles ultimately included in the systematic review. These works represent the most solid and methodologically consistent core of the recent literature on the economic valuation of football players.

Once the selection was completed, each article was examined in depth with the aim of extracting relevant information according to a structured coding protocol. In particular, the studies were classified based on the methodological approach adopted (traditional econometric models, machine learning techniques, multiple regressions, factor analyses, etc.) and on the variables used for player value estimation. Furthermore, the presence or absence of a conceptual distinction between value and price was verified, together with the consideration of the regulatory role of UEFA and the Financial Fair Play, as well as the potential use of Transfermarkt as a proxy for market values.

This phase did not merely involve counting or grouping studies but entailed a qualitative analysis aimed at understanding how and why certain methodologies or determinants appear more frequently than others. The goal was to identify common patterns, emerging trends, and areas of misalignment between economic-financial theory and managerial practice.

The results of this systematic analysis constitute the core of **Chapter 4**, where the main trends in literature, the most frequently employed methodologies, and the remaining gaps will be presented. Attention will be drawn to the extent to which studies still conflate value and price, the limited consideration given to institutional factors, and how the widespread yet often uncritical use of Transfermarkt contributes to perpetuating methodological and conceptual limitations.

4 | ANALYSIS

This chapter introduces and develops the analytical phase of the systematic review, during which the results of the selection process are examined in a structured manner and critically interpreted. After identifying and assessing the 34 studies deemed eligible, the objective of this section is to understand how scientific literature has addressed the topic of the economic valuation of football players, with particular

attention to the methodologies employed, the factors considered, and the temporal evolution of the academic debate.

The analysis aims not only to describe the main characteristics of the included studies but also to highlight the differences and convergences among the various approaches, identifying emerging trends, methodological gaps, and innovative elements that characterize the most recent scientific production. In this sense, the chapter serves as a bridge between data collection and interpretative phases, allowing a heterogeneous set of contributions to be transformed into a coherent and informative framework.

The first part presents a **bibliometric and descriptive analysis** of the entire sample, with the aim of outlining the main quantitative features of the studies, such as their chronological distribution, publication type, indexing source, and citation impact. These elements provide an overall picture of the growth and dissemination of scientific interest in player valuation, while also offering preliminary insights into the relevance of different research strands.

Subsequently, the chapter focuses on **methodological aspects**, analyzing the research strategies, quantitative techniques, and analytical tools employed by the authors. Particular attention is devoted to the use of econometric and machine learning models, the employment of consolidated databases such as Transfermarkt or CIES, and the ability of the studies to integrate sporting, financial, and contractual dimensions within a unified valuation framework.

The following sections examine the **determinants of player valuation**, emphasizing the variables most frequently considered in empirical models and the extent to which intangible components such as popularity, media visibility, or brand value are considered. Finally, the analysis explores the **conceptual dimensions** of literature, investigating the presence of a theoretical distinction between value and price and the degree of attention given to institutional and regulatory factors, particularly the role of Financial Fair Play in shaping market dynamics.

Overall, the chapter provides a comprehensive overview of the academic literature on the economic valuation of football players, combining a quantitative descriptive assessment with a qualitative reflection on the content, methodologies, and implications of the different studies. This integrated approach makes it possible to highlight not only the diversity of perspectives adopted but also the progressive evolution of a research field that, although relatively recent, is consolidating as one of the central topics within contemporary sports economics.

4.1 | Descriptive-Bibliometric Analysis

This section aims to provide a quantitative and structural overview of the sample studies included in the review, with the purpose of outlining the overall profile of the scientific production dedicated to the economic valuation of football players. Before proceeding to a more detailed methodological or conceptual examination, it is useful to describe the main bibliometric characteristics of the selected corpus, to understand how and to what extent the topic has been addressed over time and across different academic contexts.

The descriptive bibliometric analysis represents an essential preliminary step, designed to "photograph" the available literature and to highlight potential growth trends, areas of concentration, and possible imbalances in the distribution of publications. This approach allows for interpreting research not only in terms of content but also as an evolving phenomenon, reflecting shifts in scientific interest, methodological progress, and the increasing attention devoted to measuring value in professional football.

To this end, several descriptive indicators were calculated and analyzed. First, the **temporal distribution of publications**, which makes it possible to observe the trend in the number of studies over the reference period, providing insights into the maturity and consolidation of the topic within the economic and managerial literature. Second, the **type of publication**, distinguishing between journal articles, review papers, conference contributions, and other academic formats, useful for assessing the nature and depth of the research output.

Another element concerns the **origin of the works** from the main academic databases, namely Scopus and Web of Science (WoS), which represent the two most widely used and reliable sources for indexing international scientific literature. This comparison allows the verification of the coverage and consistency of the sample analyzed, as well as the identification of any differences in the distribution of publications between the two platforms.

The analysis also includes the identification of the **most frequent journals or publication sources**, which helps to determine the editorial venues that most actively contribute to the academic debate on this topic. Finally, some basic **citation metrics** are considered, including the total number of citations and the average number of citations per article, as indirect indicators of impact and academic recognition. Within this context, the most cited study is also highlighted as a benchmark for identifying the contributions that have had a significant influence on the development of reference literature.

Overall, this analysis provides a concise yet informative representation of the scientific landscape on football player valuation. It helps to understand the scope and distribution of published research and sets the groundwork for the subsequent sections devoted to methodological classification (Section 4.2) and conceptual and qualitative examination (Section 4.4), allowing for a more comprehensive and integrated interpretation of the phenomenon under study.

4.1.1 | Temporal Trends

The analysis of temporal trends represents a fundamental starting point for understanding the evolution of the literature on football player valuation models. Through the **annual distribution of publications**, it is possible to outline the degree of continuity, the pace of development, and the potential maturation of this research field over time. The study of temporal dynamics also makes it possible to formulate preliminary hypotheses regarding the evolution of academic interest, which may be linked to exogenous factors such as the increasing availability of data, the spread of more advanced quantitative methodologies, or the growing attention of the academic and economic spheres toward the football industry.

From this perspective, the distribution of publications not only reflects the evolution of the scientific debate, but can also be interpreted as an **indirect indicator of the consolidation** of the topic within the economic and managerial disciplines. The objective of this section is therefore to identify potential patterns of growth or discontinuity over time, providing a descriptive basis upon which to build, in the following sections, a more in-depth analysis of the methodologies and variables employed in the studies.

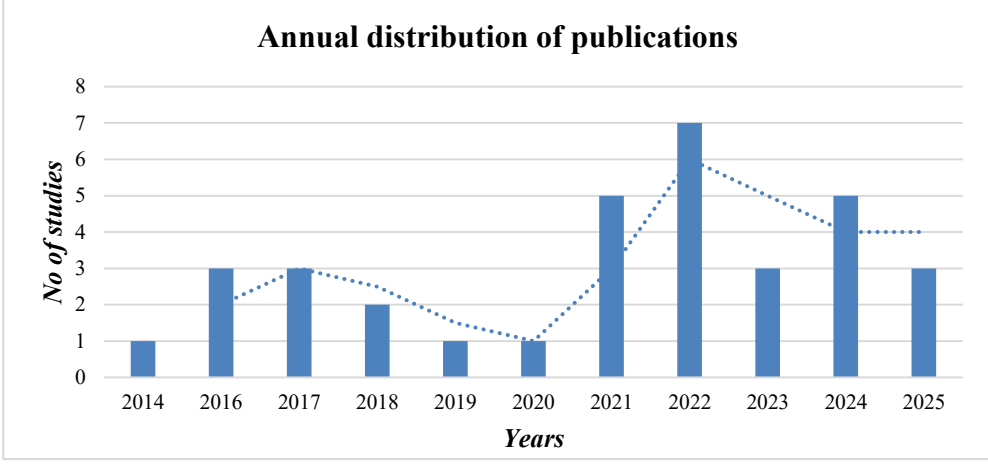


Figure 2. *Number of studies in dataset for each year*

The trend of publications shows a non-uniform distribution over time. Between 2014 and 2020, scientific production remains limited and sporadic, suggesting an initial phase of exploration of the topic. Starting from 2021, a significant increase can be observed, culminating in 2022 with seven studies, the highest value in the entire time span. In the following years, although a slight contraction is recorded, the number of publications remains higher than in the previous period, indicating a possible stabilization of academic interest. This trend may reflect a growing attention toward the quantification of the factors influencing player value, as well as the expansion of databases and analytical tools that have made the phenomenon more accessible to empirical investigation.

The observation of temporal trends therefore represents a first indication of a structural evolution in the research field, from a collection of episodic contributions to a line of inquiry showing signs of consolidation. However, to fully assess the maturity of the scientific domain, it is also necessary to consider the **nature and form of the works produced**, since the type of publication often serves as an indicator of methodological soundness and the degree of knowledge dissemination.

In particular, the prevalence of peer-reviewed articles may suggest a more advanced stage of formalization of the debate, while the presence of conference papers or review articles may respectively indicate a phase of methodological experimentation or theoretical reflection.

For these reasons, **Figure 3** analyzes the evolution of different types of publications (journal articles, conference papers, and reviews) over the period from 2014 to 2025, allowing observation of how scientific production has developed over time in relation to the channels of academic knowledge dissemination. This analysis provides a perspective that complements the

quantitative one, helping to understand the extent to which the topic has gained legitimacy within the most authoritative editorial venues.

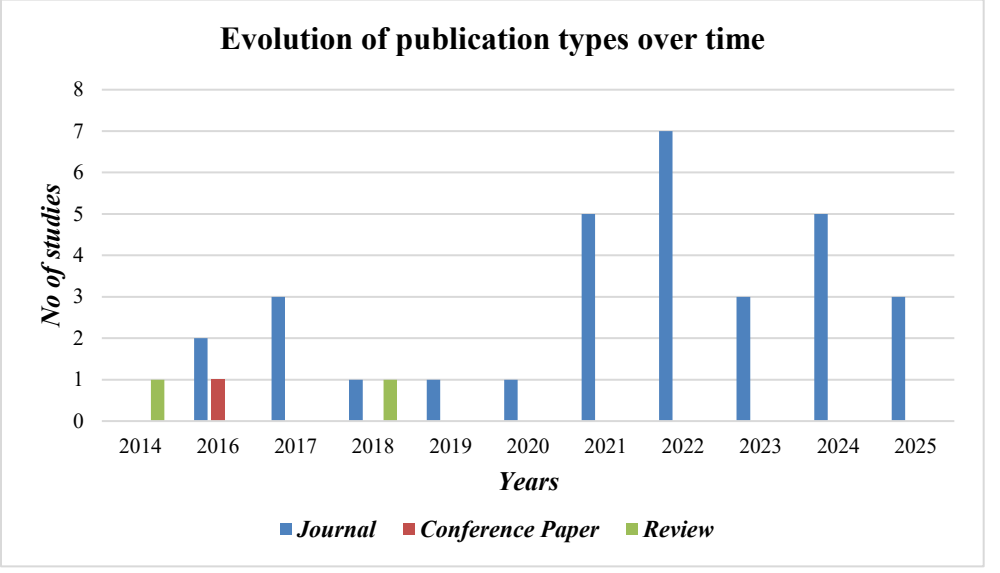


Figure 3. ***Annual distribution of publication types (journals, conference papers, and reviews)***

The investigation in **Figure 3** makes it possible to examine the composition of the corpus of studies not only in quantitative terms, but also with respect to the type of scientific contributions produced during the period under consideration. Observing the distribution of the various publication formats over time allows for meaningful insights into the degree of consolidation and formalization of the topic within academic literature.

What emerges most clearly is the predominance of journal papers, which represent by far the most prevalent form of dissemination throughout the entire period analyzed. The consistent and growing presence of this type indicates that the topic of football player valuation has gradually gained relevance and scientific recognition, finding its place in peer-reviewed outlets characterized by more rigorous methodological standards. In other words, the prevalence of journal publications suggests that the field has moved beyond the initial exploratory phase and has assumed the characteristics of a structured research domain capable of producing methodologically sound and theoretically grounded contributions.

Conference papers, on the other hand, occupy a marginal position, limited to the early years of the period (particularly 2016). This scarcity of conference presentations may be interpreted as an indicator of a rapid consolidation of the

debate: rather than favoring preliminary or non-peer-reviewed dissemination channels, authors tend to publish directly in academic journals, a sign of greater maturity and a clearer definition of the research focus. From this perspective, it can be inferred that the topic did not go through a prolonged phase of informal experimentation, but instead developed quite directly within an academic context already receptive to quantitative methodologies applied to sports.
Review articles, present only in two years (2014 and 2018), play a conceptual bridging role. Their function at this stage is likely to systematize the emerging debate, outlining the first attempts to classify the models, variables, and data sources employed. Although numerically limited, they are strategically important, as they represent an effort of theoretical reflection and knowledge organization useful for guiding subsequent empirical investigations.

The temporal and typological distribution of publications reflects a process of progressive maturation of the literature on this topic. From the early, occasional, and fragmented contributions, beginning in 2020 the field transitions into a phase of greater methodological cohesion and editorial recognition, in which journal articles constitute the main vehicle for disseminating results. This development suggests that the valuation of football players has now become a stable and recognized topic within management and economic sciences, integrated into broader debates on value, performance, and the measurement of intangible assets in professional sports.

4.1.2 | Citations' Patterns

Citations' assessment represents an essential step in appraising the impact and relevance of scientific production in the field of football player valuation. While temporal trends indicate the extent of research output, the study of citations allows for an **understanding of the value that the academic community has attributed to these contributions**, in terms of recognition, influence, and their capacity to shape subsequent research.

Through the observation of citation patterns, it is possible to capture the degree of maturity and consolidation of the topic, identifying possible phases of growth, stagnation, or renewed interest. The distribution of citations often reflects the evolution of the scientific debate: in emerging fields, citations tend to concentrate around a few pioneering reference studies, whereas in more established areas they are typically distributed more evenly across methodological and applied contributions.

This section therefore aims to outline the main dynamics of the academic impact of the analyzed literature, examining the distribution of citations over time, the types of publications that have received the greatest attention, and the presence of central contributions that have fostered the diffusion and legitimization of the topic. In this way, the analysis provides not only a quantitative measure of the scientific relevance of the field, but also a qualitative indication of its capacity to attract interest and generate continuity within the research community.

The following figures and tables illustrate these dynamics from complementary perspectives, distinguishing between individual and aggregate analyses of publications, thereby offering a comprehensive overview of the evolution of citation impact during the period under consideration.

Individual Analysis

In this section, a micro-level perspective is adopted, aimed at examining the behavior of the individual contributions that make up the sample of analyzed studies. This approach, referred to as *Individual Analysis*, makes it possible to observe the **specific distribution of citations** received by each publication, highlighting the variability of scientific impact and the possible presence of particularly influential contributions. The focus is therefore placed on individual observations, with the objective of capturing qualitative differences among publications rather than summarizing the results in average or aggregate values.

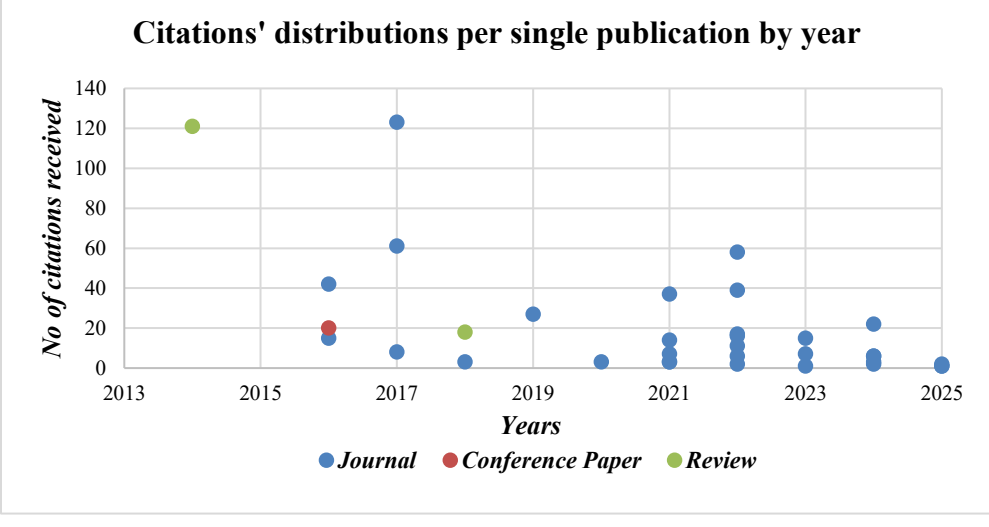


Figure 4. ***Citations received per publication by year and publication type (journal, conference paper, and review).***

This chart provides a detailed representation of the distribution of citations received by the individual publications included in the sample, allowing for an in-depth analysis of the variability of scientific impact over time. Each point on the chart corresponds to a single contribution, whether it is a journal article, a review, or a conference paper, positioned according to its year of publication on the horizontal axis and the total number of citations received on the vertical axis. The color of the points distinguishes the type of publication: blue for journal articles, red for conference papers, and green for reviews.

The distribution of points reveals a clear predominance of scientific articles, which are present throughout the entire time span considered. However, their vertical dispersion is quite wide: some publications display a substantial number of citations, while others are only marginally cited. This variability suggests a heterogeneous landscape, in which scientific productivity is widespread, but impact remains uneven. Journal articles, while representing the largest portion of the sample, reach an average of **18.1 citations per study**, indicating an overall solid but non-uniform capacity for scientific dissemination.

Conference papers and reviews, although numerically rarer, in some cases show citation levels higher than the overall average. Conference papers record an **average value of 20 citations**, indicating that, despite being occasional contributions, some of them have exerted a significant influence on the consolidation of the academic debate.

Reviews, on the other hand, stand out for their remarkably high average number of citations (**69.5**), confirming the central role that synthesis papers play in the theoretical systematization and dissemination of the topic.

From a temporal perspective, the higher density of points between 2016 and 2022 highlights a period of intense scientific activity, coinciding with a phase of expansion in the literature on the subject. During these years, several publications with exceptionally high citation values can also be observed, which may be interpreted as outliers capable of influencing subsequent research. These contributions, often characterized by innovative methodological approaches or greater availability of empirical data, likely served as key references for the development of the research stream. Overall, the figure presents a highly heterogeneous picture: the number of citations varies widely not only among different publication types but also within the same category. **This heterogeneity reflects a research field still**

in the process of consolidation, in which a few high-impact studies coexist with numerous works of more limited dissemination. The presence of such disparities suggests that academic recognition in the field is not yet fully stabilized but is instead influenced by contingent factors such as methodological innovation, data quality, and the visibility of publication outlets.

To analyze this variability more accurately and reduce distortions related to the temporal factor, it was necessary to introduce a **citation normalization procedure**. Comparing the absolute number of citations across studies published in different years can be misleading, since **older publications have had more time to accumulate academic recognition**. This phenomenon, known as *citation time bias*, risks distorting the perception of the actual scientific impact of each contribution, structurally favoring older studies.

Citation normalization overcomes this limitation by dividing the total number of citations of each work by the number of years since its publication. The resulting value, expressed as normalized citations per year, thus represents a measure of the average annual impact of each publication. In this way, a comparable indicator is obtained, reflecting not the longevity of the study but rather its ability to generate interest and scientific influence over time. The application of this method allows for a more precise identification of academic attention dynamics, showing which years produced the most influential studies and which, conversely, recorded a lower average impact.

To translate this methodological approach, normalization was carried out in two successive steps, with the aim of obtaining a synthetic yet comparable indicator of the scientific impact of the different studies over time. In the **first step**, for each article, the ratio between the total number of accumulated citations (C_i) and the number of years elapsed since its publication was calculated, taking the year 2025 as the temporal reference. The formula adopted is therefore as follows:
For each record i:

$$\boldsymbol{NC_i = \frac{C_i}{(2025 - Y_i + 1)}}$$

- NC_i= normalized citations (citations per year) of paper *i*
- C_i= total number of citations (“Cited by” in Excel file)
- Y_i= publication year of paper *i*
- 2025 = reference year of the analysis

This first step makes it possible to obtain an individual indicator of the average annual impact of each study, accounting for the different ages of the publications and correcting their inherent temporal asymmetry.
In the **second step**, the normalized values of individual works were aggregated by year of publication, to estimate the average impact of the research produced in each period. The formula used is as follows:
Thus, for each year *t*:

$$\overline{NC_t} = \frac{1}{n_t} \sum_{i \in t} NC_i$$

- $\overline{NC_t}$ = average of normalized citations for papers published in year *t*
- n_t= number of papers published in year *t*

Through this second level of processing, it was possible to construct a synthetic temporal indicator capable of measuring the evolution of scientific impact over time, eliminating the effects associated with the citation life cycle and the unequal accumulation of references across years. This measure therefore allows for a consistent comparison between different periods, offering a more balanced and realistic view of how academic recognition has developed within the field of study. By removing temporal distortions, the indicator captures the genuine dynamics of scientific attention, making it possible to distinguish between temporary peaks in visibility and more sustained, structural forms of impact.

The analysis of normalized citations makes it possible to observe **how the interest in and scientific impact of the topic have evolved over time**, independently of the chronological effect linked to the publication date. This approach highlights whether certain periods have been particularly fertile in generating influential research or, conversely, whether the field has experienced phases of relative stagnation. Unlike absolute citation counts, which tend to privilege older studies simply due to the time available for citation accumulation, the normalized indicator offers a fairer and more comparable measure of each year's ability to produce academically relevant contributions.

Figure 5 thus illustrates the annual average trend of normalized citations over the period 2014–2025, providing a concise yet comprehensive overview of the evolution of scientific relevance over time. The resulting trend can be

interpreted as a proxy for the vitality of the research domain, revealing how the topic has progressively consolidated its presence within the academic discourse and how its capacity to attract scholarly attention has changed throughout the years.

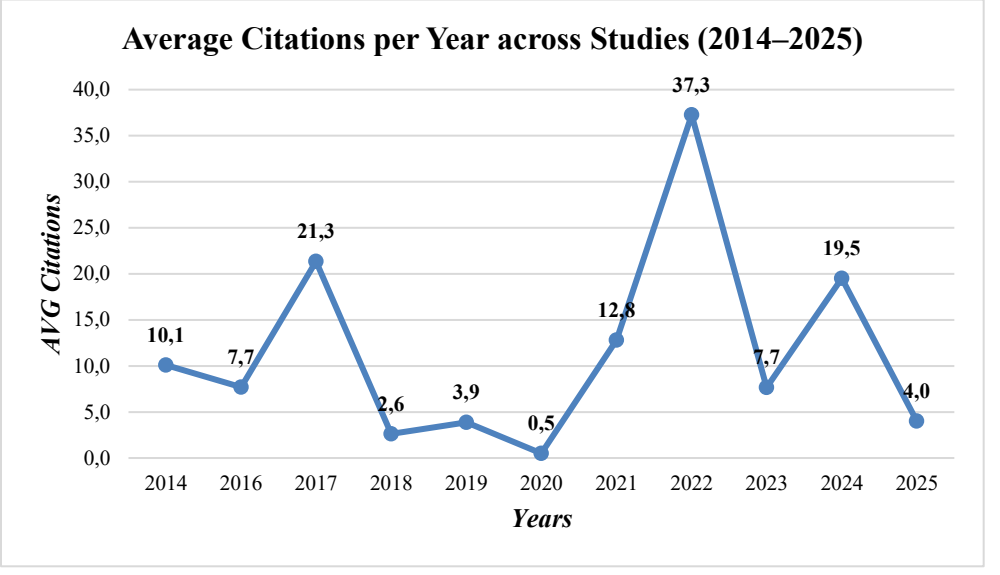


Figure 5. ***The figure shows the evolution of average normalized citations over time, calculated as the total number of citations divided by the years since publication and then averaged by publication year.***

The chart shows the trend of average normalized citations per year over the period 2014–2025, offering a concise yet meaningful view of the evolution of academic interest over time. The pattern displayed by the graph is far from linear, characterized instead by marked fluctuations that reflect the discontinuous and still-developing nature of this field of study. In the early years considered (2014–2016), the average impact of publications remains modest, with values slightly above ten citations per year. This finding is consistent with what is observed in **Figure 2**, where scientific production appears still limited and fragmented, indicating an exploratory phase in which contributions on the topic were sporadic and predominantly descriptive in nature. It is likely that during this stage, research focused more on theoretical framing than on the construction of quantitative models, thereby limiting the potential for citation.

Starting from 2017, a sharp increase in the average impact can be observed, reaching the first significant peak (**21.3 normalized citations**). This growth coincides with a phase of editorial expansion, as also highlighted in **Figure 3**,

where an increase in journal publications is recorded, a channel that, by its nature, ensures greater visibility and dissemination of results. Furthermore, the data analyzed in **Figure 4** shows that in that same year, several particularly influential contributions were published, capable of attracting a higher-than-average number of citations. It is therefore plausible to interpret 2017 as an initial turning point, when research began to develop its own methodological language and gain greater recognition from the academic community.

In the following three-year period (2018–2020), the trend shows a clear decline, with values progressively decreasing until reaching a minimum in 2020 (**0.5 normalized citations**). This contract can be interpreted as the result of a temporary slowdown in research production and dissemination, as shown in **Figure 2**, but also as an effect of the natural delay with which more recent publications accumulate citations. In other words, the downturn observed during these years does not necessarily reflect a loss of scientific quality, but rather a transitional phase in which attention shifted toward new directions of analysis that had not yet been fully absorbed by literature.

From 2021 onward, the trend changes significantly. The average value of normalized citations rises rapidly, reaching in 2022 the highest point of the entire time span (**37.3 normalized citations per year**). When considered alongside the sharp increase in the number of studies published in the same year (as shown in **Figure 2**), this finding suggests that 2022 represents a moment of full maturity for the research stream. In this period, publications increase not only in quantity but also in quality and capacity to attract attention, likely due to the introduction of more sophisticated methodologies and a greater availability of analytical data. This peak can therefore be interpreted as the reflection of a true scaling-up in research, in which contributions begin to interconnect and generate a more evident cumulative impact.

In the most recent years (2023–2025), a new decline is observed, with average values stabilizing between four and eight normalized citations per year. However, unlike the contraction phase of 2018–2020, the average level remains higher than in the early years of the analyzed period, suggesting that the discipline has reached a certain degree of consolidation. It can be hypothesized that the lower citation intensity is not due to a reduction in interest, but rather to the limited time recent publications have had to be acknowledged and cited.

Figure 5 thus depicts a cyclical pattern in the evolution of scientific impact, in which phases of expansion and greater visibility alternate with moments of consolidation and stabilization. The presence of isolated peaks, such as those in 2017 and especially 2022, indicates that academic interest in the topic has been driven by key reference works, likely pioneering or methodologically innovative studies, capable of shaping subsequent research. At the same time, the consistency observed between publication patterns (Figures 2 and 3) and impact patterns (Figure 5) confirms the **existence of a direct relationship between the quantity and quality of scientific production**: periods of editorial growth coincide with moments of greater resonance, signaling a field of study which, despite experiencing phases of irregularity, shows an underlying tendency toward consolidation and maturity.

Aggregate Analysis

The aggregated analysis of citations broadens the perspective offered by annual normalization, allowing for the evaluation not only of the average intensity of impact but also of **the overall distribution of citations** accumulated over time by different types of publications. This approach makes it possible to understand the extent to which the academic visibility of the topic stems from specific channels of scientific dissemination and whether there is a relationship between the editorial form of the contributions and their ability to generate recognition

Figure 6, which reports the total number of citations per year and by type of publication, allows observation of how the overall scientific impact has evolved over the period 2014–2025, offering a complementary interpretation with respect to **Figure 5**.

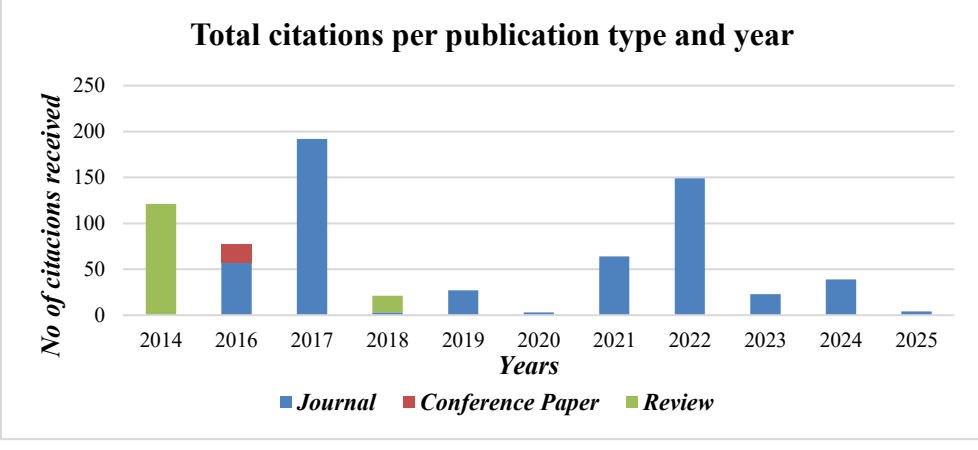


Figure 6. ***Total citations per publication type and year, showing the yearly distribution of citations across journals, conference papers, and reviews.***

Figure 6 provides an overall view of the evolution of scientific impact over time, distinguishing the total citations received by journal articles, conference papers, and reviews. Unlike the previous analyses, the focus here shifts to an aggregated perspective, which makes it possible to understand the role played by different publication channels in the dissemination of knowledge.
The graph highlights the predominance of journal publications, which account for almost all citations throughout the entire period considered. The blue bars, overwhelmingly dominant, indicate that journal articles represent the primary venue through which the topic of football player valuation has achieved scientific consolidation. This finding is consistent with **Figures 3 and 5**, where the growth in both the number and average impact of publications coincides with the expansion of academic output in journals.
Two years stand out, 2017 and 2022, which record the highest peaks in total citations, around **200** and over **150** respectively. The first marks a phase of expansion in the debate, associated with the publication of pioneering and methodologically innovative studies, while the second reflects the maturity of the research stream, when a larger number of contributions adopt advanced analytical approaches, generating a widespread scientific impact.
Review articles, although numerically limited, display episodes of strong influence, especially in 2014, when a single review gathered more than **100** citations. This suggests that, in the early stages, reviews played a key role in systematizing existing knowledge before giving way to more targeted empirical studies. Conference papers, on the other hand, remain marginal, with a visible contribution only in certain years, such as 2016, and an overall limited impact, consistent with the more exploratory nature of works presented at conferences.
Figure 6 draws attention to a strong polarization of scientific impact, concentrated mainly in journal publications. This configuration reflects the **progressive institutionalization of the field**, which has evolved from an embryonic phase, dominated by a few isolated contributions, to a more stable and academically recognized context. At the same time, the presence of isolated peaks, such as that of 2014 for reviews, shows how the development of the research stream has been driven by moments of theoretical and methodological breakthrough capable of guiding the subsequent evolution of the debate.
The data confirm that research on football **player valuation is built around a small core of highly influential studies**, published mainly in scientific

journals, which over time have contributed to consolidating the theoretical and methodological foundations of the field.

Citation Concentration (Lorenz-like curve)

After examining the temporal distribution and composition of citations by type of publication, it is useful to explore the extent to which scientific impact is concentrated or distributed within the sample of analyzed studies. In other words, the aim is to determine whether citations are evenly distributed among different publications or whether, on the contrary, a limited number of them attract most of the academic attention.

This analysis makes it possible to assess the **degree of concentration of impact** and, consequently, to draw inferences about the level of maturity of the research field. A more balanced distribution of citations tends to reflect a consolidated domain, characterized by widespread recognition of diverse contributions, whereas a high concentration suggests the presence of a few key reference studies that have strongly influenced the theoretical and methodological development of the field.

To graphically indicate this relationship, a Lorenz-type curve is used, comparing the cumulative share of publications with the cumulative share of citations they have received. This tool, frequently employed in the social sciences to describe inequality phenomena, highlighting any imbalances or polarizations among the various publications.

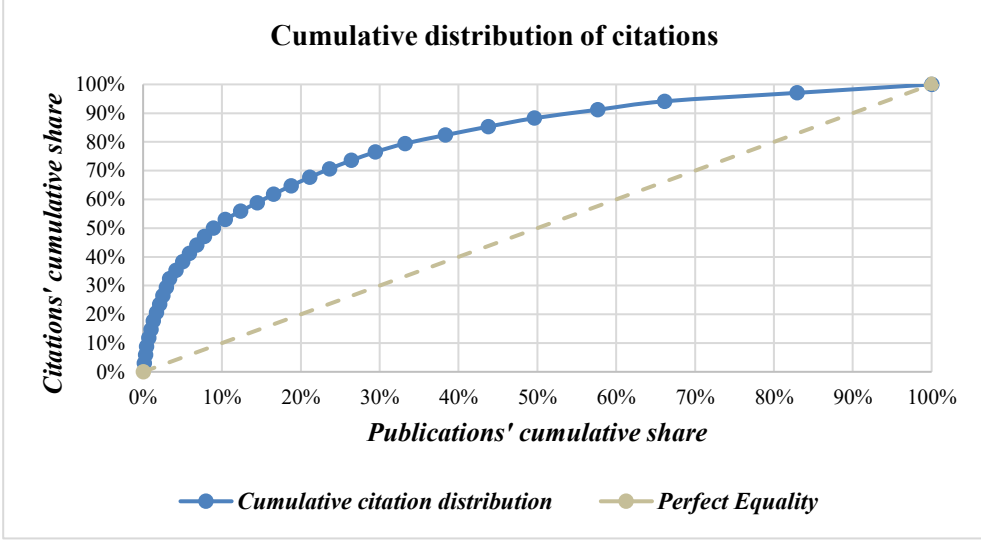


Figure 7. ***Cumulative distribution of citations, comparing the cumulative share of citations across publications with the line of perfect equality.***

The cumulative distribution appraisal of citations emphasizes a strong concentration of scientific impact within the sample. The curve illustrates this distribution deviates significantly from the line of perfect equality, indicating that citations are not evenly distributed but **tend to cluster around a limited number of publications**. This configuration shows that a small portion of the analyzed studies captures the majority of academic attention, while most of the research receives a relatively low number of citations. More specifically, **just over 20% of the publications account for approximately 70% of total citations.**

Such evidence points to the existence of a *high-impact minority*, consisting of studies that, due to their methodological innovation or conceptual relevance, have become key reference points in the literature on football player valuation. This structure is typical of research fields in the process of consolidation, where a few pioneering contributions establish the theoretical and operational guidelines that shape subsequent scientific production.

This tendency toward polarization is further confirmed by the examination of the core publications reported in **Table 8**, which lists the most cited studies within the sample. Two key reference works stand out in particular: the review by Herm et al. (2014), which represents a starting point for the systematization of initial knowledge on the topic, and the article by Müller et al. (2017), which marks a methodological turning point by introducing a data-driven approach to the estimation of player value. These works have had a lasting impact not only because of their number of citations but also due to their ability to structure the field: the former by establishing its theoretical foundations, the latter by opening the way to a new phase of quantitative and predictive studies.

Alongside these, other articles contribute to consolidating and diversifying the research perspective. The study by Lardo et al. (2017) highlights the role of social media in communicating the intellectual capital of football clubs, while that by Al-Asadi and Taşdemir (2022) introduces the use of data from the FIFA video game to estimate market values through machine learning techniques. These are complemented by the works of Majewski (2016), which investigates the determinants of player value, and Coates and Parshakov (2022), which explores the principle of the wisdom of crowds in market valuations.

This small group of studies forms the foundational core of the literature on the economic valuation of football players. They outline the methodological trajectories that have guided the evolution of the field, from conceptual

consolidation to early empirical applications and, more recently, to the integration of artificial intelligence techniques. The observed asymmetry in citation distribution therefore does not reflect a weakness of the field but rather the physiological process through which an emerging area becomes structured around a few central references destined to shape subsequent research.

Table 8. ***Core publications with the highest citation counts, detailing type, authors, title, year, and total citations.***

Type	Authors	Title	Year	Citations
Journal	O., Müller, Oliver; A., Simons, Alexander; M., Weinmann, Markus	Beyond crowd judgments: Data-driven estimation of market value in association football	2017	123
Review	S., Herm, Steffen; H.M., Callsen-Bracker, Hans Markus; H., Kreis, Henning	When the crowd evaluates soccer players' market values: Accuracy and evaluation attributes of an online community	2014	121
Journal	A., Lardo, Alessandra; J., Dumay, John; R., Trequattrini, Raffaele; G., Russo, Giuseppe	Social media networks as drivers for intellectual capital disclosure: Evidence from professional football clubs	2017	61
Journal	M.A., Al-Asadi, Mustafa A.; Ş., Taşdemir, Şakir	Predict the Value of Football Players Using FIFA Video Game Data and Machine Learning Techniques	2022	58
Journal	S., Majewski, Sebastian	Identification of factors determining market value of the most valuable football players	2016	42
Journal	D.C., Coates, Dennis C.; P., Parshakov, Petr	The wisdom of crowds and transfer market values	2022	39
Journal	I., Behravan, Iman; S.M., Razavi, S. Mohammad	A novel machine learning method for estimating football players' value in the transfer market	2021	37

The citation analysis reveals a research field characterized by a strong heterogeneity of contributions and a high concentration of scientific impact.

A minority of studies, published in leading academic journals, has played a decisive duty in defining the theoretical and methodological foundations of player valuation, while a broader set of works, although less visible, contributes to expanding and diversifying the research landscape. This asymmetric distribution is typical of fields in the process of consolidation, where a few foundational articles act as catalysts for the debate, guiding subsequent conceptual and empirical developments. The evidence of these dynamics suggests that the dissemination and recognition of contributions do not depend solely on their scientific content but also on the publication channel through which the research is disseminated. In an increasingly competitive academic environment, the **choice of publication venue affects visibility**, perceived authority, and ultimately, the degree to which a study is cited.

4.1.3 | Publication Outlets

The investigation of publication outlets represents a crucial step in understanding where and how the scientific debate on football player valuation has developed, as well as which channels have contributed most to its dissemination. Publication venues, whether academic journals, conferences, or collective volumes, are not merely instruments for the dissemination of knowledge but also reflect the **degree of institutional recognition** that a particular research topic has achieved within the scientific community.

Examining the distribution of publications across different types of outlets therefore makes it possible to assess the level of maturity and institutionalization of the field. A concentration of studies within a small number of specialized journals, for instance, tends to suggest the existence of a well-established and recognized research stream, characterized by shared methodological standards and a clearly defined academic audience. Conversely, a heterogeneous dissemination of publications across venues belonging to different disciplines, such as economics, management, sport science, or computer science, may reflect an interdisciplinary and still exploratory approach, typical of the early stages of a research area's development.

In the case of football player valuation, the diversity of publication channels represents a particularly meaningful indicator. It makes it possible to understand how the topic has gradually spanned and connected multiple disciplinary domains, moving from an initial focus confined mainly to sport sciences to an increasingly broad engagement of the economic, managerial, financial, and data analysis fields. This evolution suggests a process of progressive academic integration, in which player valuation is no longer considered a niche subject but rather a complex object of inquiry capable of generating significant contributions across multiple areas of knowledge.

The analysis of publication venues goes beyond a mere description of the editorial distribution of works and takes on a broader interpretive value. It enables the tracing of the field's trajectory toward scientific legitimacy, highlighting the disciplinary contexts in which it has taken root and the channels through which it has gained recognition and dissemination.

This conceptual perspective finds empirical reflection in the distribution of studies across publication sources. **Figure 8** illustrates how research on

football player valuation has developed within a variety of disciplinary and editorial contexts, indicating both the field's interdisciplinary character and its gradual consolidation within academic literature. The mapping of publication venues therefore serves as a descriptive tool and as an indicator of the maturation of this research domain and of the academic communities that have contributed to shaping its evolution.

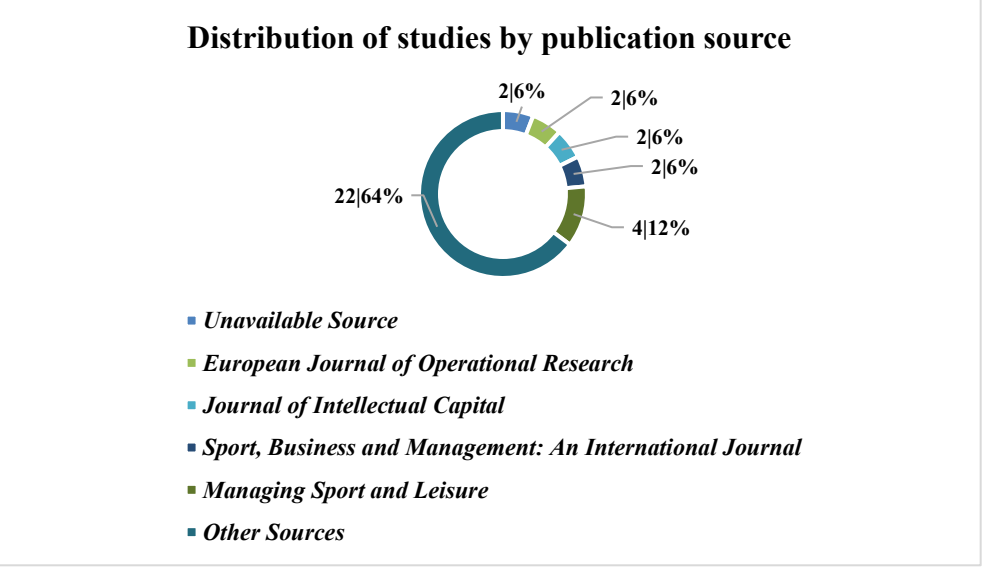


Figure 8. ***Distribution of studies by publication source***
Note: ***Each slice shows the number of publications and the corresponding percentage (N = 34).***

The dissection reveals a moderately concentrated yet non-monolithic landscape, characterized by the presence of a few journals that stand out for their continuity and relevance alongside a constellation of more occasional outlets. The largest share of publications (**64%**) falls under the category *Other Sources*, which includes journals or conference proceedings where each contribution represents an isolated case. This finding reflects the disciplinary cross-cutting nature of the topic, addressed by authors from various fields, economics, management, sport science, and computer science, and published in venues that, although not exclusively dedicated to player valuation, show interest in its economic and methodological implications.

Among the journals appearing more than once, several noteworthy outlets in the managerial and sports domains stand out. In particular, *Sport, Business and Management: An International Journal* and *Managing Sport and Leisure* represent the most frequent channels, accounting respectively for **12%** and **6%** of the publications. Their presence signals the progressive legitimization

of the topic within the sport management disciplines, where player valuation is analyzed not only in terms of athletic performance but also as an economic asset and a strategic lever for club management.

Alongside these, the *Journal of Intellectual Capital* and the *European Journal of Operational Research* (each representing **6%**) also stand out, illustrating the field's openness to more analytical and quantitative approaches. The presence of the latter indicates a growing convergence between sports research and the optimization and modeling methods typical of operational research, consistent with the methodological evolution described in the previous sections.

The distribution of publication sources underscores a **balance between specialization and interdisciplinarity**: several recurring journals define a consolidating disciplinary core and variety of outlets confirms that the topic still retains a cross-disciplinary nature, capable of attracting the interest of scholars from diverse academic areas.

This combination suggests that football player valuation is currently in an intermediate stage of maturation, developed enough to rely on recognized publication venues, yet still sufficiently open to encourage methodological and conceptual cross-fertilization.

4.2 | Methodological Overview

After examining the evolution of literature in terms of scientific productivity, impact, and publication venues, attention now shifts to the analysis of the methodological principles that characterize the studies under review. Understanding the analytical choices adopted in the valuation of football players is a crucial step in outlining both the maturity of the field and the direction in which it is evolving.
The methodological dimension represents **the core through which research transforms theoretical interest into empirical knowledge**. In the context of football player valuation, it reveals how different approaches, such as econometric, statistical, or those based on artificial intelligence, have been employed to model an inherently complex phenomenon in which sporting, economic, and contractual variables interact dynamically. Analyzing these methodologies therefore makes it possible to identify not only the dominant trends but also the conceptual transitions that have marked the shift from descriptive models to increasingly sophisticated predictive tools.

The following section explores the variety of methods employed, their degree of rigor, and the empirical foundations on which they rely, with the aim of constructing a

coherent overview of the methodological landscape. The objective is to identify the lines of continuity and discontinuity among the various research frameworks, assessing how the progressive availability of data, the refinement of statistical techniques, and the introduction of data analytics tools have contributed to redefining the scientific approach to player valuation.

This part of thesis seeks to reveal the evolutionary trajectory of the literature, emphasizing how methodology represents not merely a set of technical instruments but a true reflection of the epistemological evolution of the field, demonstrating the extent to which football player valuation is consolidating as an autonomous, rigorous, and interdisciplinary area of study.

4.2.1 | Classification Framework and Analytical Methods

The analysis of the methods employed represents an essential step in understanding the scientific evolution of the field of studies devoted to football player valuation. The variety of approaches identified in the literature reflects the intrinsic complexity of the phenomenon under examination, which lies at the intersection of economics, statistics, management, and data science. Each methodological strand adopts different tools and logics to address the problem of estimating a player's value, placing emphasis on specific dimensions, from the theoretical explanation of economic relationships to the quantitative prediction of market performance.

To construct a coherent view of this landscape, the analyzed studies were classified according to the nature of the analytical approach adopted and the cognitive function it performs. From this classification emerges a distinction between traditional methodologies, based on classical econometric models, and more recent approaches founded on machine learning and artificial intelligence techniques, often combined in hybrid configurations. To these are added conceptual or bibliometric contributions, which do not develop empirical models but instead provide a theoretical or systematic framework for the topic.

Table 9 summarizes this classification, illustrating for each methodological category the inclusion criteria and the techniques most commonly employed in the analyzed studies. It serves as the interpretative basis for understanding the differences and complementarities among the various approaches, as well as the evolutionary trends that have guided research in this field.

Table 9. ***Classification of analytical approaches, including method types, inclusion criteria, and typical techniques applied in the reviewed studies.***

Method Type	Inclusion Criteria	Typical Methods
Econometric	Parametric models explaining variable relationships.	Regression, panel data, logit/probit, VAR
Machine Learning-AI	Data-driven, non-linear models focused on prediction.	Random forest, SVM, neural nets, XGBoost
Hybrid	Combine econometric interpretability with ML accuracy.	OLS + RF, SVR + PSO, ensemble models
Conceptual-Bibliometric	Theoretical or review-based analyses.	Frameworks, literature reviews, bibliometrics

After outlining the main methodological approaches identified in the literature, it is useful to quantify their diffusion to understand which orientation prevails within the research field. Analyzing the distribution of the methodologies employed makes it possible to delineate its evolution over time, showing whether scientific production tends to concentrate on established tools or, conversely, to experiment with new analytical perspectives.

The following chart summarizes the composition of the sample of studies according to the methodological category adopted, providing an overview of the proportion between models

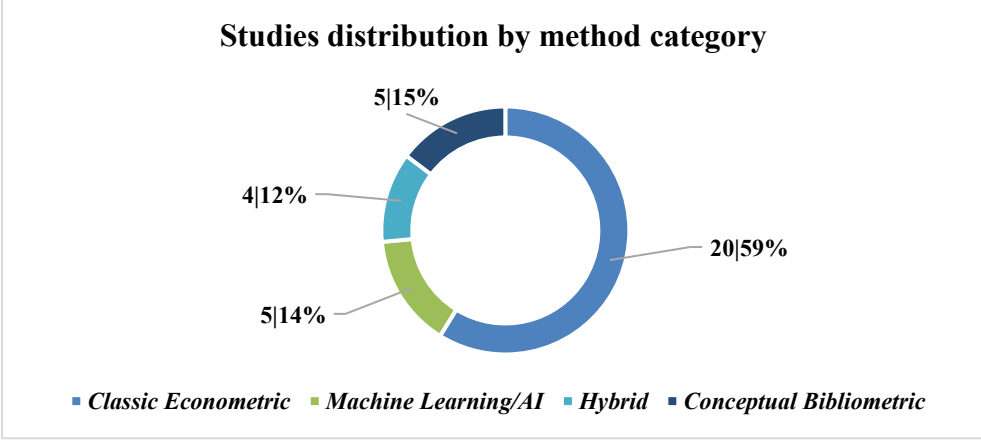


Figure 9. ***Distribution of studies by method use in the publication***
Note: ***Each slice shows the number of methods used publications and the corresponding percentage (N = 34).***

The distribution brings to light a clear predominance of classical econometric models, which represent about **59%** of the total. This result confirms the centrality of the econometric tradition in the study of football player valuation, especially in the early stages of the academic debate, when the main objective was to explain economic and sporting relationships through linear and statistically interpretable models.

Alongside this dominant component, a growing methodological diversification emerges: studies based on machine learning and artificial intelligence techniques account for **14%** of the sample, indicating the field's openness to more flexible and data-driven predictive tools. Hybrid approaches (**12%**) represent an intermediate stage in which an attempt is made to combine the theoretical robustness of econometrics with the automated learning capacity of new-generation models.

Finally, conceptual or bibliometric contributions, equal to **15%**, play a theoretical and systematizing role: although they do not provide empirical models, they contribute to the disciplinary consolidation of the field and to the definition of shared interpretative frameworks.

The distribution suggests that research on football player valuation is in a phase of methodological maturation, in which the **econometric tradition coexists with a progressive orientation toward more predictive and interdisciplinary approaches**. This dynamic reflects the evolution of the field from an explanatory perspective, centered on the testing of theoretical hypotheses, toward a more applied and data-oriented perspective, consistent with the transformations currently taking place in quantitative research within the sports and economic domains.

The evolutionary trajectory of research in the field of football player valuation should be analyzed in order to understand how methodological aspects have been distributed over time. The following chart (**Figure 10**) shows the trend of the different categories of methods in the period 2014–2025, distinguishing between classical econometric models, machine learning and artificial intelligence techniques, hybrid approaches, and conceptual or bibliometric contributions. This representation makes it possible to identify periods of greater scientific production and to capture the signals of transition toward more advanced and interdisciplinary approaches.

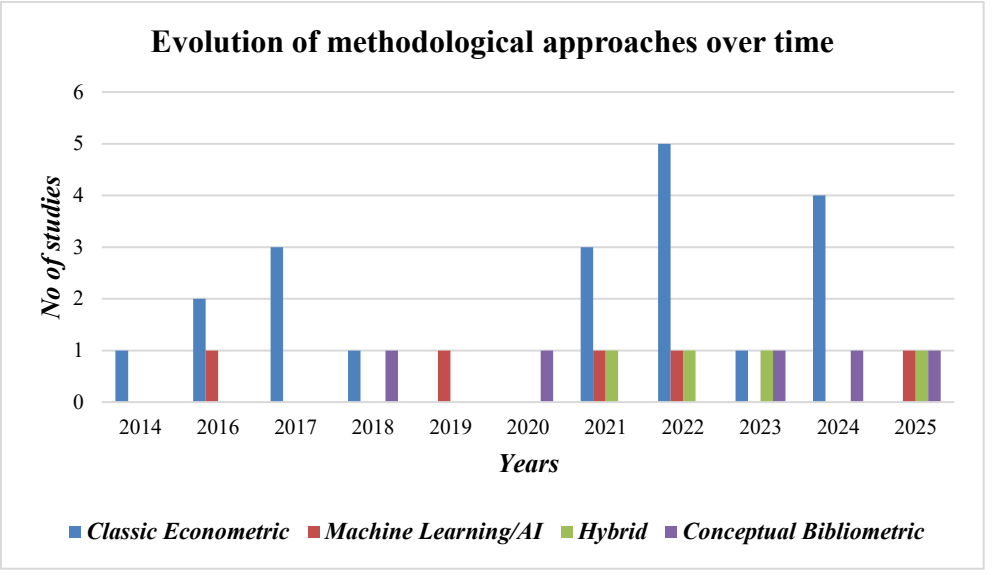


Figure 10. ***Evolution of methodological approaches over time, showing the yearly distribution of studies employing econometric, machine learning, hybrid, and conceptual/bibliometric methods.***

The trend shown in the chart makes it possible to observe the number of studies published each year and the **gradual transformation of the methodologies** employed, identifying the transition from more traditional approaches to more innovative and data-oriented techniques.

In the first period analyzed, from 2014 to 2017, the literature is dominated by classical econometric models, which constitute the analytical foundation of research on the topic. These models, based on linear regressions, panel analyses, and parametric estimations, are primarily aimed at explaining the relationships between economic and sporting variables, such as individual performance, contractual characteristics, and players' market value. Years 2016 and 2017 represent an initial phase of consolidation of the econometric line of research, with a peak of three publications in 2017, revealing the dominant approach of those years, focused on testing theoretical hypotheses and constructing interpretative rather than predictive models.

Starting from 2018, a slight reduction in overall production can be observed, accompanied by the first signs of methodological diversification. Alongside econometric studies, the first work applying machine learning and artificial intelligence techniques begin to appear, still in an experimental form. This trend becomes more evident from 2020 onward, a year marked by growing interest in methods capable of capturing complex and non-linear relationships among variables, thus overcoming the limitations of traditional parametric

models.
Between 2021 and 2022, the field experiences its most dynamic phase: the total number of studies increases significantly, reaching its peak in 2022 with five publications. During this two-year period, econometric models remain predominant, yet the presence of alternative approaches becomes more substantial. It is in these years that hybrid approaches become consolidated, combining econometrics and machine learning to leverage the strengths of both methodologies. These models aim to preserve the interpretative transparency typical of econometric methods while integrating the enhanced predictive and adaptive capacity of artificial intelligence algorithms. At the same time, a certain continuity can be observed in the production of conceptual or bibliometric studies which, although representing a minority share of the total, play an important role in outlining the theoretical framework and systematizing the existing literature. Such contributions help to understand how the field of football player valuation has evolved over time and to identify the main schools of thought and emerging lines of research.
In the most recent years considered, from 2023 to 2025, methodological distribution appears more balanced than in the past. Although econometric models continue to be widely employed, machine learning techniques and hybrid approaches maintain a stable presence, indicating a progressive integration between explanatory and predictive paradigms. **This coexistence suggests that the field is undergoing a phase of methodological maturation**, in which the theoretical robustness and interpretative capacity of econometric models are being progressively enriched by more flexible tools, capable of adapting to the increasing complexity and quantity of data available in the football context.

The temporal analysis of the evolution of methodological approaches can be further deepened by observing not only the frequency of each method over the years but also the overall degree of heterogeneity characterizing scientific production. In other words, it is useful to understand whether, over time, studies tend to concentrate around a single dominant paradigm or whether a greater variety of analytical approaches emerges.

It is not sufficient to observe how many studies are published each year or which approach prevails: it is equally important to understand how much the methodological composition varies from one period to another. For this purpose, it is useful to introduce the **heterogeneity index *H***, which measures the **distribution of the different methods used each year**:

$$\boldsymbol{H = 1 - \sum_{i} (\frac{n_i}{N})^2}$$

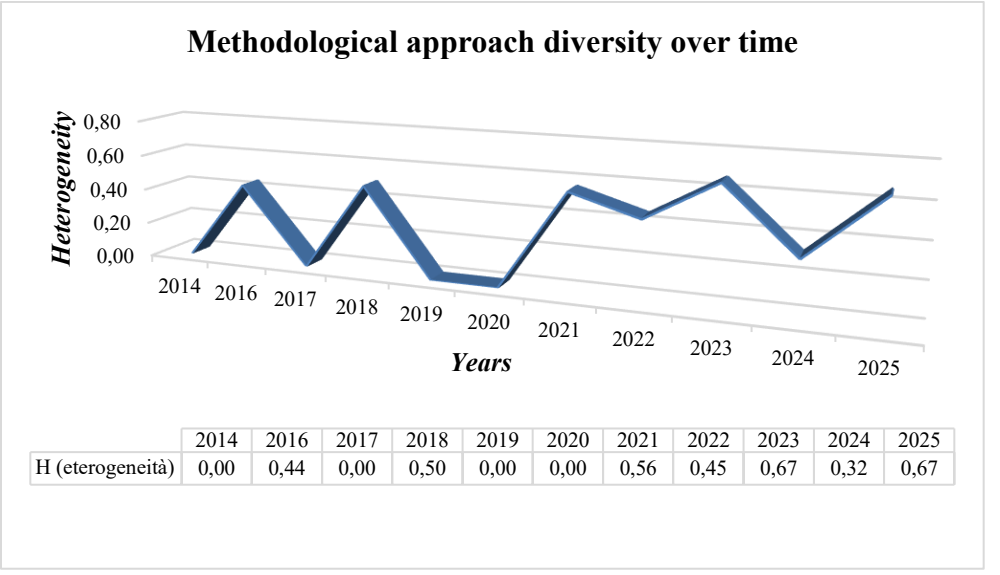
- $i = Method\ type$
- $n_i = Number\ of\ studies\ that\ use\ method\ type\ i$
- $N = Total\ number\ of\ studies\ published\ in\ that\ year$

Table 10. ***Interpretation of heterogeneity index (H) values, illustrating the level of diversity in data sources used across studies.***

H	Interpretation	Example
0	All studies in the same year rely on a single source	e.g., in 2018 all studies used *Transfermarkt*
≈ 0.5	Moderate diversity of sources	e.g., some studies used *Market-based* and others *Manual* data
≥ 0.75	High diversity of sources	e.g., studies combined *Market-based*, *Performance-based*, and *Institutional* data

The use of this indicator makes it possible to quantify methodological variety and to identify the moments in which research on football player valuation has been most **open to innovation and to the experimentation** of new analytical techniques. In this way, the heterogeneity index provides a perspective that complements the simple count of publications, offering a synthetic measure of the maturity and interdisciplinarity of the field.

Figure 11 shows the trend of H over the period 2014–2025, illustrating how methodological variety has changed over time and how phases of concentration on established approaches have alternated with periods of greater openness toward new analytical perspectives.



	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
H (eterogeneità)	0,00	0,44	0,00	0,50	0,00	0,00	0,56	0,45	0,67	0,32	0,67

Figure 11. ***Methodological approach diversity over time, showing the yearly heterogeneity of methods used across studies.***

The trend of the heterogeneity index in the early years considered, between 2014 and 2016, shows a gradual increase, rising from values close to zero to about **0.44**. This growth suggests that, even from the initial stages, research began to complement traditional econometric models with contributions of a different nature, such as conceptual studies or the first applications of data-driven methods. In essence, this was a moment of experimentation and exploratory curiosity, in which the economic tradition remained the main point of reference but slowly began to open up to new analytical perspectives. This initial expansion demonstrates the field's **willingness to move beyond rigid frameworks and to broaden the range of analytical tools** available to researchers.

In the following years, between 2017 and 2020, the behavior of the index becomes more irregular. After a peak in 2017, with a value of **0.50**, heterogeneity undergoes a sharp decline, reaching **0.00** for two consecutive years. This represents a period of methodological recentralization, during which scientific production once again tends to concentrate on classical econometric approaches, leaving less room for alternative methodologies. This phase can be interpreted as a moment of consolidation: after the initial enthusiasm for innovation, the scientific community appears to return to prioritizing theoretical coherence and statistical robustness, reinforcing its foundations before venturing into new directions.

Starting from 2021, however, the index rises sharply again, marking the beginning of a new phase of methodological diversification. The years **2021 and 2022 represent a true turning point, with a heterogeneity value reaching 0.56**, the highest of the entire period analyzed. This result reflects the increasingly widespread adoption of alternative approaches, ranging from machine learning to neural networks and hybrid models that combine econometric elements with artificial intelligence techniques. It signals a field that is transforming, becoming more data-oriented, more experimental, and increasingly interdisciplinary. The use of diverse methods is no longer episodic but has become a structural feature of the field, reflecting a new stage of scientific maturity.
In the most recent years, between 2023 and 2025, the index stabilizes at relatively high levels, fluctuating between **0.32** and **0.67**. This trend suggests that the methodological landscape has reached a form of dynamic equilibrium, in which different traditions coexist and mutually reinforce one another. Sudden shifts or abrupt transitions from one paradigm to another are no longer observed; instead, a stable coexistence appears to have emerged between the econometric approach, which continues to represent the main theoretical reference, and machine learning and hybrid methodologies, now established as complementary tools. The latter, specifically, are proving increasingly effective in improving model predictive performance and in handling the growing complexity of sports data.

The growing variety of approaches and the progressive methodological maturation of the field, however, raise a crucial question: not only which methods are used, but how they are applied and evaluated in terms of scientific rigor. Understanding the **degree of rigor** with which studies are conducted is essential for interpreting the validity of the results and for assessing the overall quality of academic production. The following section examines this aspect in greater depth, analyzing the main dimensions of methodological rigor adopted in the literature on football player valuation and evaluating the extent to which different approaches meet criteria of coherence, transparency, and replicability.

4.2.2 | Methodological Rigor

In the context of scientific research, methodological rigor represents a fundamental criterion for assessing the quality, reliability, and credibility of the results obtained. It refers to the degree of precision, consistency, and transparency with which analytical methods are designed, applied, and

validated, ensuring that conclusions are derived from solid and replicable empirical procedures. In other words, **high methodological rigor implies the adoption of models based on clear theoretical foundations**, supported by adequate data, and subjected to statistical tests that guarantee their robustness.

In the field of football player valuation, where analyses aim to estimate complex and multidimensional phenomena, methodological rigor plays a notably important role. The quality of the conclusions depends on combination of the type of approach chosen and on the care with which it is implemented, the treatment of data, and the validation strategies adopted. The classification presented in **Table 11** aims to provide a structured summary of the different levels of methodological rigor identified in the analyzed literature, distinguishing between high, medium, and low categories.

Table 11. ***Classification of studies by level of methodological rigor, including descriptions and typical analytical indicators for each category.***

Level	Brief Description	Typical Indicators
High	Studies based on robust, replicable models supported by large or longitudinal datasets. They include formal validation procedures (e.g., cross-validation, out-of-sample testing) and statistical robustness checks.	Panel data models, ML models with train/test sets, regressions with control variables or sensitivity analysis.
Medium	Studies employing sound analytical methods but with moderate limitations, such as smaller samples, lack of robustness checks, or simplified model specifications.	OLS on limited datasets, regressions without multicollinearity testing, partial model validation.
Low	Studies relying mainly on descriptive or exploratory analysis, with limited empirical validation and weak generalizability of results.	Single-case analyses, qualitative descriptions, simple bivariate regressions, conceptual discussions.

This classification makes it possible to understand the degree of empirical maturity achieved by the studies over time and the progressive evolution of the field toward higher methodological standards.

The attention to rigor reflects a tendency toward greater formalization and transparency in research processes, which are essential elements for ensuring the replicability and reliability of the evidence produced.

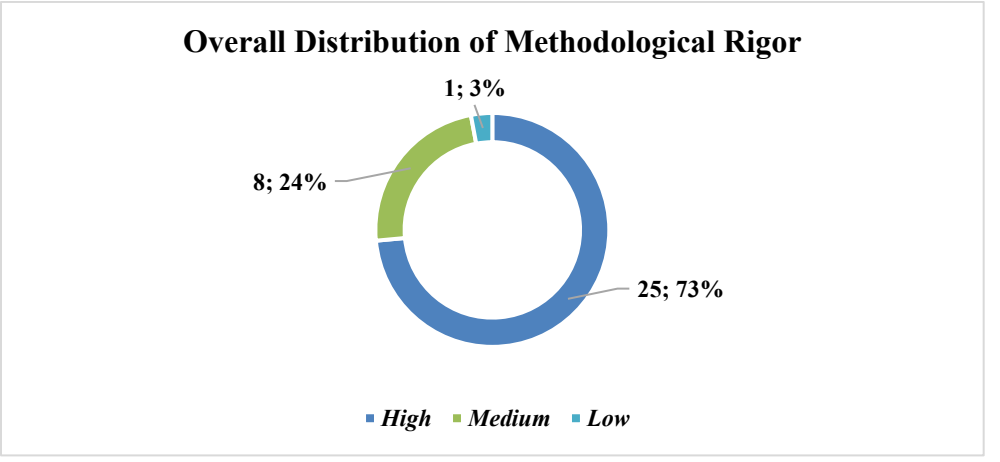


Figure 12. ***Distribution of Methodological Rigor in the publications set***
Note: ***Each segment represents the number and percentage of studies within each level of methodological rigor (High, Medium, Low) among the reviewed publications (N = 34).***

Figure 12 shows the distribution of studies according to the level of methodological rigor, distinguishing three categories: high, medium, and low. The chart provides an immediate overview of the quality of analytical practices adopted in the literature on football player valuation. The largest share, equal to **73%**, concerns studies with high methodological rigor, based on robust models, formal statistical validations, and adequately sized datasets. This result confirms that research in the field tends to favor transparent and replicable procedures, reflecting an increasing focus on empirical robustness.

Studies with medium rigor represent about **24%** of the sample and are characterized using appropriate methodologies, although with some limitations, such as small samples or the absence of robustness checks. While not reaching full formalization, these works contribute to consolidating the empirical foundation of the field and reflect an intermediate stage of methodological development. Only a small portion of the scientific production, equal to **3%**, falls into the low-rigor category. These are descriptive or exploratory studies, often lacking extensive empirical validation. Their marginal presence, however, indicates a positive trend: research is moving toward increasingly structured standards, consistent with the best practices of quantitative disciplines and data science.

To measure in greater detail how methodological rigor is distributed among different analytical approaches, **Table 12** examine a heatmap that cross-tabulates the identified methodological categories (econometric, machine

learning, hybrid, and conceptual) with the three levels of rigor, high, medium, and low. The color intensity indicates the number of studies belonging to each combination, providing an immediate representation of the areas where the literature demonstrates greater solidity or, conversely, potential for improvement.

Table 12. ***Heatmap of Methodological Rigor by Analytical Category.*** **Note:** ***The intensity of the color represents the number of studies for each combination of methodological rigor and analytical category (N=34).***

Category/Rigor Level	*High*	*Medium*	*Low*
Classic Econometric	**19**	**1**	**0**
Machine Learning/AI	**3**	**2**	**0**
Hybrid	**3**	**1**	**0**
Conceptual/Bibliometric	**0**	**4**	**1**

The centrality of classical econometric models clearly emerges, as they represent the largest portion of the sample and stand out for their high level of methodological rigor, with **19** studies showing strong methodological solidity and only one classified as medium. This confirms the role of econometrics as a well-established analytical foundation, characterized by theoretical consistency and empirical reliability.

Studies based on machine learning and hybrid approaches show a smaller diffusion but a growing qualitative profile. Both categories include works predominantly of high or medium rigor, indicating a progressive convergence toward more structured standards, supported by the introduction of more systematic validation and control procedures.
Conceptual and bibliometric contributions occupy a different position, appraising more heterogeneous levels of rigor. Their theoretical and reflective nature, being less anchored to empirical verification, explains the absence of formal statistical procedures, while still maintaining significant value in defining the conceptual framework of the field.
To make the relationship between methodological rigor and type of analytical approach more immediately understandable, **Figure 13** visualizes the distribution of rigor levels (high, medium, and low) within each methodological category.

The chart provides an immediate visual understanding of the varying degrees of empirical solidity that characterize the different research strands, revealing

that the quality of the applications is far from homogeneous. Rather, it reflects the specific level of methodological maturity and refinement achieved within each approach. This heterogeneity shedding in lights how certain methodologies have reached a more advanced stage of validation and practical implementation, while others remain exploratory or conceptually oriented. Consequently, the figure serves as a descriptive tool but and as an indicator of the developmental trajectory of the field, illustrating how empirical robustness evolves alongside theoretical and technical progress.

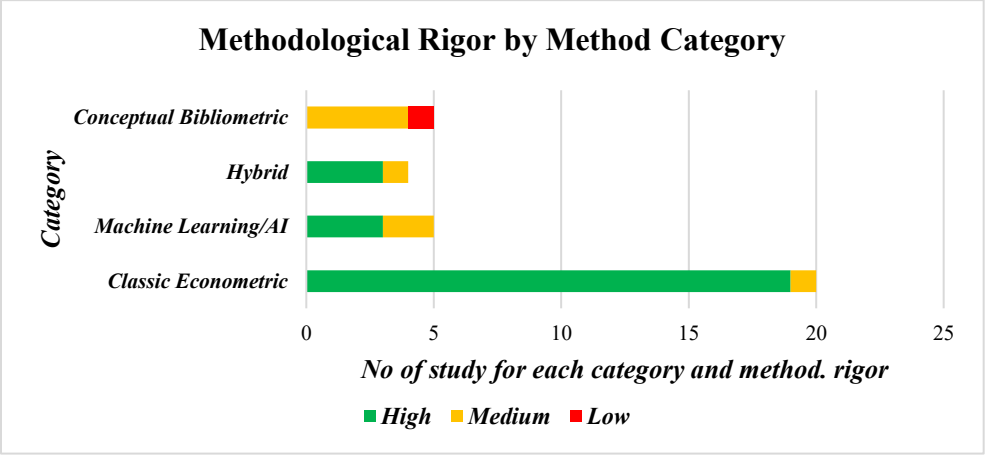


Figure 13. ***Distribution of methodological rigor (High, Medium, Low) across different analytical approaches used in the reviewed studies.***

The chart demonstrates a clear predominance of classical econometric models, which include **19** studies with high rigor, one with medium rigor, and none with low rigor. These results confirm that econometrics remains the methodological backbone of research on football player valuation, thanks to the strength of its theoretical foundations and the widespread use of established statistical validation practices. The strength of this approach lies in its ability to ensure empirical consistency and replicability, serving as a benchmark for the subsequent development of the field. Studies based on machine learning and artificial intelligence display a more balanced distribution, with **3** high-rigor works and **2** of medium rigor. Although fewer in number, these contributions show a growing commitment to the structuring of more rigorous analytical protocols, indicating that predictive research is gradually consolidating its methodological foundations. The increasing attention to model validation and systematic data management suggests a transition toward full empirical maturity.

A similar pattern can be observed for hybrid approaches, which combine econometric methods and data-driven techniques: **3** high-rigor studies and **1** of medium rigor. This balance demonstrates that the integration of different paradigms does not represent a methodological compromise but rather an advanced form of complementarity, capable of combining the interpretability of econometric models with the predictive flexibility of artificial intelligence. Conceptual and bibliometric studies, finally, include **4** works of medium rigor and **1** of low rigor. Although situated outside the stricter empirical dimension, these contributions play an essential role: they provide a theoretical reference framework and help systematize the growing methodological diversity of the field, promoting the dissemination of best practices and encouraging critical reflection on research quality.

The added value of this analysis lies in showing how methodological rigor is becoming a transversal principle across all approaches. While econometrics remains the consolidated foundation, **machine learning and hybrid approaches are rapidly narrowing the gap**, approaching comparable validation standards. Altogether, these findings suggest that football player valuation is undergoing a phase of integrated methodological maturation, in which the quality of analyses depends less on the paradigm adopted and increasingly on the precision and transparency with which it is applied.

The emphasis on methodological rigor reveals that research on football player valuation has achieved a mature analytical structure, grounded in principles of validation, coherence, and transparency. However, the **robustness of a model does not depend solely on the techniques employed, but also on the quality of the information on which it is based**. The availability of data, their origin, and the way they are translated into operational variables profoundly influence the explanatory and predictive capacity of studies. For this reason, the next step consists of examining the data sources and proxies most used in the literature, in order to understand how data construction itself contributes to shaping the results and the evolutionary trajectories of the research field.

4.2.3 | Data sources and Common proxies

The robustness of any model depends on the **quality of datas** on which it is based and, on the way, theoretical concepts are translated into measurable variables. In the field of football player valuation, the construction of information bases is never a neutral aspect, since every choice regarding data or indicators implies a different way of interpreting what “value” means.

The sources employed range from official statistical databases to digital scouting platforms and proprietary datasets developed for specific analyses. At the same time, common proxies emerge, that is, indicators which indirectly represent a player's performance or economic potential, and which constitute a shared language across different studies.

This section stresses how such sources and variables are selected and combined, showing the logic that guides the transformation of sporting data into economic information, and how this translation affects the comparability and analytical depth of the results.
The availability and nature of data represent one of the central issues in research on football player valuation. The information used to estimate players' value is never neutral, as it reflects different perspectives, economic, institutional, or performance-based, and directly influences both model construction and result interpretation. **Table 13** provides an overview of the main types of data sources identified in the literature, describing their characteristics and presenting some representative examples. This classification makes it possible to evaluate how the concept of value is modeled through different informational approaches, each with its own logic and a distinct degree of empirical precision.

Table 13. ***Classification of data-source types, with descriptions and representative examples used in the reviewed studies.***

Data-Source Type	Description	Typical Data-Sources
Market-based	Platforms provide player valuations, transfer data, or market prices.	Transfermarkt, Social medias
Institutional-Regulatory	Official data from governing bodies or clubs.	UEFA, FIFA, national leagues reports, CIES
Performance-based	Sport statistics and match data.	Data Platforms (Opta, Whoscored, FBref, SofaScore) and Videogames
Manual-Mixed	Data collected manually from multiple open sources.	Academic datasets, Press or clubs' archives, Data Simulations

The data sources used in studies on football player valuation outline a heterogeneous informational landscape, in which different perspectives contribute to constructing the concept of a player's value. Market-based platforms such as Transfermarkt or other digital channels dedicated to the transfer market represent the dimension closest to the economic reality of football. They transform perceptions, expectations, and price fluctuations into structured data, offering a dynamic reflection of the "**market sentiment**" that influences value formation.

Alongside these, institutional and regulatory sources, including UEFA, FIFA, national leagues, and CIES, provide the most formal and reliable reference, ensuring standardization, consistency, and traceability. They constitute the empirical foundation for econometric and comparative analyses, where data robustness and temporal continuity play a decisive role. Complementing this framework are performance-based sources such as Opta, WhoScored, SofaScore, or even sports video games, which capture value through on-field performance. These platforms offer granular and objective measurements of player output, making them indispensable for predictive approaches and the application of machine learning models.

Finally, manual or mixed sources reflect the more artisanal aspect of research: datasets constructed ad hoc from academic archives, journalistic sources, or open databases, which, although less standardized, offer great flexibility and allow for the exploration of qualitative dimensions such as talent perception or media narratives.
Taken together, these categories show that player valuation relies on a complex and interdependent informational ecosystem, where institutional data, performance metrics, and market signals are intertwined. **A player's value thus emerges not from a single source, but from the intersection of economics, technology, and football culture**, where different approaches interact and complement each other in an attempt to represent the multifaceted reality of modern football.

The relative weight of each source type within the analyzed corpus is illustrated in **Figure 14**, which shows the distribution of data categories used across the examined studies. The chart provides an immediate visualization of which informational perspectives are most influential in shaping player valuation models.

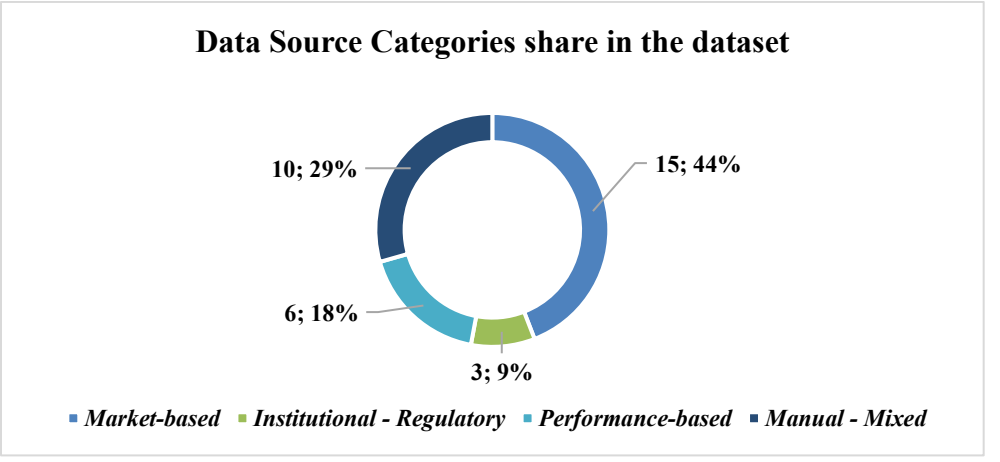


Figure 14. Distribution of data-source categories in the dataset.
Note: ***Each label shows the number of studies and their percentage share within the dataset***

It can be observed that almost half of the studies rely on market-based sources (**44%**). This means that, in most of the literature, player value is still interpreted as a market phenomenon, expressed through transfer fees, public valuations, and expectations. It is a strongly economic and, to some extent, narrative perspective: value is what the market says it is. This approach is powerful because it provides immediate and comparable measures, but it also carries the **risk of incorporating reputational biases**, media hype, and speculative dynamics. In other words, much of the existing research is still "measuring perception" rather than measuring actual performance. Alongside this dominant block, two interesting patterns emerge. First, manual or mixed sources account for **29%** of the studies. This is not a negligible figure, as it indicates that a significant part of the literature does not settle for standardized sources but instead builds its own datasets by combining multiple inputs. This is typical of more exploratory or innovative studies and suggests that the field is not yet saturated: there is still room to define new metrics and new interpretations of value.

Second, institutional or regulatory sources (**18%**) and performance-based sources (only **9%**) remain in the minority. This asymmetry can be interpreted in two ways. On the one hand, it confirms that more "official" studies, based on certified data or technical on-field performance metrics, are still less frequent than market-centered analyses. On the other hand, precisely because they are less used, these sources represent a **potential driver of evolution for the field**. They shift the focus from "how much a player costs" to "**what a**

player actually does on the field" and "what his regulatory or contractual impact is within the football system".

What emerges is therefore a point of transition. The literature remains anchored to the economic dimension of value, but it is beginning to move toward a richer and more **multidimensional definition**, one that integrates technical performance, institutional structure, and customized data construction. **Figure 15** and **Table 14** provide a hierarchical view of the informational system underlying football player valuation, distinguishing the main data categories and their respective subcomponents. The investigation quantifies the use of different data types and explores the logic guiding the selection and combination of sources: which platforms have become reference points, which approaches are emerging as alternatives, and how the integration of heterogeneous data is enriching the comparability and analytical depth of empirical studies.

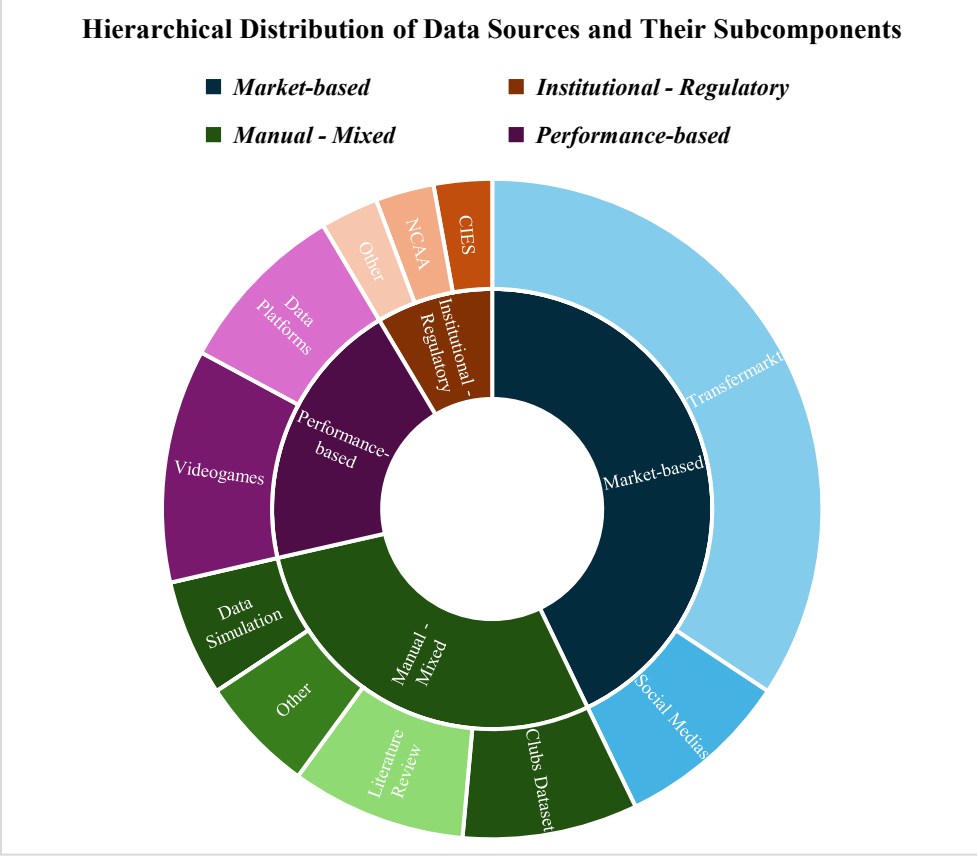


Figure 15. ***Hierarchical distribution of data sources and their subcomponents.*** **Note:** ***The inner ring represents the main data-source categories, while the outer ring details their specific subcomponents***

Table 14. ***Breakdown of data-source categories and subcategories, showing the number and percentage share of studies using each source type.***

Data-Source Type	*Subcategory*	*No of Studies*	*% of share*
Market-based	Transfermarkt	12	34,3%
	Social Medias	3	8,6%
Institutional - Regulatory	CIES	1	2,9%
	NCAA	1	2,9%
	Other	1	2,9%
Manual - Mixed	Literature Review	3	8,6%
	Clubs Dataset	3	8,6%
	Data Simulation	2	5,7%
	Other	2	5,7%
Performance-based	Videogames	4	11,4%
	Data Platforms	3	8,6%
Total		35	100,0%

It is shown how each main category is articulated into specific subcomponents. This hierarchical view analyzes the strong concentration of certain sources compared to others and the growing diversity of resources on which research relies.

The most evident finding concerns the dominance of market-based sources, which account for more than one third of the total (**34.3%**). Within this category, **Transfermarkt** clearly emerges as the main reference platform, used in **12 out of 35** studies, followed by social media (**8.6%**), which are employed to collect perceptions of value, popularity, or market signals. This prevalence confirms the central role of market valuations as an empirical proxy for player value, an approach that emphasizes the economic and perceptual dimension over the purely performance-based one. However, reliance on these sources also evaluates a possible methodological vulnerability: datas often derive from estimates or subjective evaluations and therefore partially reflect perception dynamics rather than actual performance.

Manual or mixed sources represent the second most common component (**20%**), with a balanced distribution among literature reviews (**8.6%**), datasets constructed by clubs or researchers (**5.7%**), and data simulations (**5.7%**). This category reflects the growing trend toward customized and adaptive research designs, in which scholars assemble and integrate multiple sources to meet specific analytical needs. The use of manually constructed data requires

greater effort in terms of collection and validation but also provides superior control over the quality and consistency of the information employed.

Performance-based sources account for about **11.4%** of the total, with two main subcomponents: sports video games (4 studies) and data analytics platforms such as Opta or WhoScored (2 studies). These sources represent the most direct entry of quantitative on-field performance analysis into the economic evaluation of football players. Although still a minority, they embody the clearest connection between sports analytics and predictive modeling, introducing objective and granular variables that make it possible to measure the individual contribution to collective performance.

Institutional and regulatory sources have a more limited presence (**8.6%** overall), divided among data from CIES, NCAA, and other official institutions. Their use, though less frequent, plays a strategic role in studies that prioritize reliability, traceability, and temporal comparability. These sources are particularly suited to econometric or comparative analyses, where data consistency is more important than informational variety.

The analysis reveals an evolutionary tension between immediacy and precision: on one side, the practicality and accessibility of market data continue to hold their appeal; on the other, there is a growing interest in more controlled, customized, and technically robust sources. It is precisely within this balance that the methodological maturation of the field is taking place. Football player valuation is progressively evolving from a descriptive practice into a data-driven science, capable of integrating economic, performance, and institutional dimensions into a single coherent analytical framework.

Beyond revealing structural differences among categories, the distribution of sources also suggests a temporal evolution. Researchers' choices are not static but respond to technological developments, data availability, and advances in analytical methodologies. **Figure 16** illustrates this dynamic showing how the use of different types of sources has changed over the years.

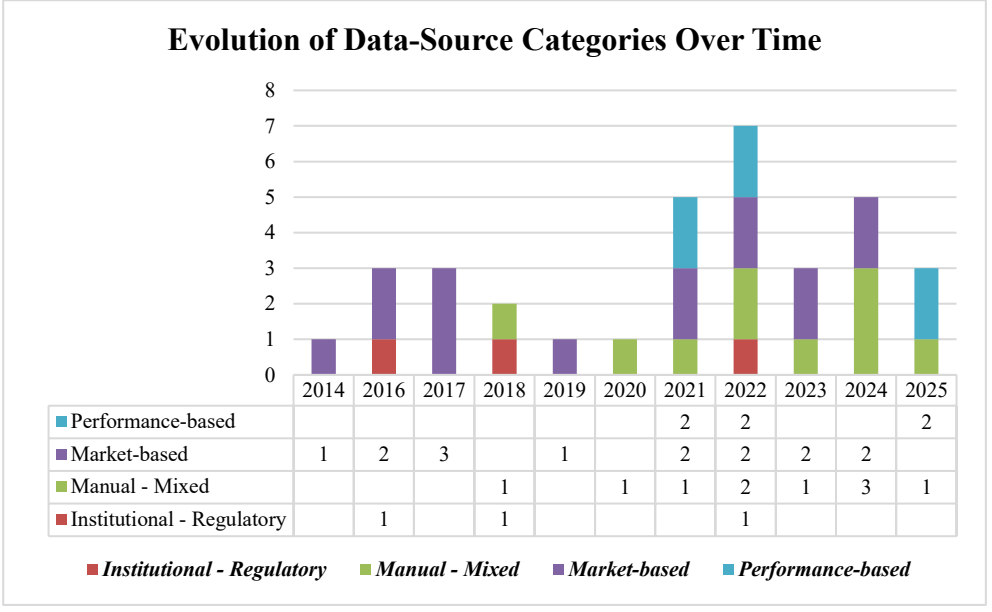


Figure 16. ***Evolution of data-source categories over time, showing the yearly distribution of studies based on market-based, institutional-regulatory, manual-mixed, and performance-based data sources.***

This diagram continues and deepens the contribution presented in **Figures 14** and **15**, shifting the focus from the overall and hierarchical distribution of data sources to their temporal evolution. Previous representations showed that research on football player valuation is based on a heterogeneous data ecosystem, where market, institutional, performance, and manually constructed sources coexist, the current graph illustrates **how such heterogeneity has formed and consolidated over time.**

In the early years observed (2014–2018), the literature appears strongly anchored in an institutional and market-oriented logic, where player value is conceived primarily as an observable economic variable derived from prices, wages, or regulatory indicators. This initial phase, consistent with the findings of **Table 13**, reflects an explanatory and descriptive paradigm: data are not constructed but rather acquired from pre-validated sources, in line with the dominant econometric orientation.

Starting from 2020, a shift in the informational paradigm becomes evident, as already anticipated by the diversification shown in Figure 15. The use of manual and performance-based sources increases, signaling a more empirical and design-oriented approach to data collection. Researchers begin to integrate

granular statistics, performance metrics, and ad hoc databases, introducing a more experimental and data-driven perspective. This evolution suggests that player valuation is no longer understood solely as a market estimate, but as a multidimensional construct capable of incorporating the technical, tactical, and contextual contributions of the athlete. The year 2022 marks a turning point: all categories of data sources coexist and reach an unprecedented level of use. This peak in diversification is not accidental: reflects a mature phase of methodological hybridization, in which research integrates economic, institutional, and performance-based sources into a coherent analytical framework. The balance observed in subsequent years (2023–2025), with the continued presence of manual and performance-based sources alongside market data, confirms that **informational plurality is not a transitory phase but a structural feature of the field.**

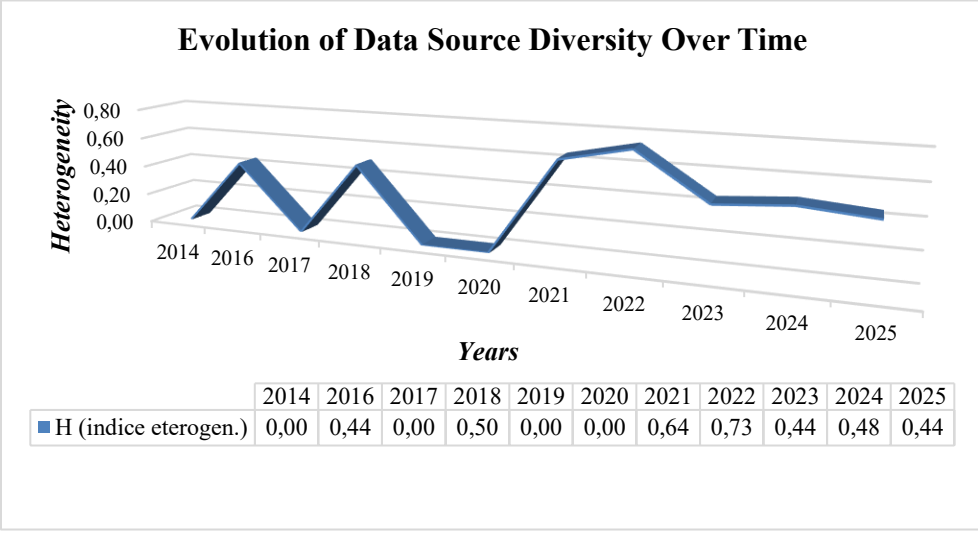
This temporal trajectory directly connects to the processes of methodological maturation described in the previous sections. Just as the heterogeneity of analytical methods (**Figure 11**) and the progressive diversification of models (**Figure 10**) highlighted a transition from purely explanatory to predictive and integrated paradigms, the evolution of data sources mirrors the same epistemological dynamic. Football player valuation is shifting from a phase of dependence on pre-existing data to one of active and reflective data construction, where the quality, consistency, and interpretative capacity of information take on central importance.

Consistent with the approach adopted in the previous section, this part of the analysis also employs the **heterogeneity index** $\boldsymbol{H}$ to measure the internal variety of data sources used over time. The objective is to understand how diversified the use of sources is in each year and to what extent research tends to favor balanced combinations of market, institutional, performance, and manually constructed data. The index is calculated according to the following expression, where each type of data source is considered as an independent informational category:

$$\boldsymbol{H = 1 - \sum_{i} \left(\frac{n_i}{N}\right)^2}$$

- $i = DataSource\ type$
- $n_i = Number\ of\ studies\ that\ use\ DataSource\ type\ i$
- $N = Total\ number\ of\ studies\ published\ in\ that\ year$

The application of the H index to the collected data makes it possible to **trace the temporal trend of the diversity of information sources used in the analyzed studies**. The following graph shows how the level of heterogeneity has changed over time, providing a dynamic picture of the informational system on which the literature on football player valuation is based. Through this representation, it is possible to identify the moments of greater concentration on specific types of data and the phases in which research has experimented with broader integration among heterogeneous categories, reflecting the methodological and interdisciplinary evolution of the field.



	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
H (indice eterogen.)	0,00	0,44	0,00	0,50	0,00	0,00	0,64	0,73	0,44	0,48	0,44

Figure 17. ***Evolution of data-source diversity over time, measured through the heterogeneity index (H) to capture the yearly variability in the types of data sources used across studies.***

The visual depiction of the heterogeneity index illustrate how research on football player valuation has evolved from a static and concentrated use of data sources to an increasingly complex and dynamic informational structure. In the early years, values close to zero indicate an almost exclusive reliance on market-based or institutional data, consistent with a phase in which player value was treated merely as an economic measure.

The sharp increase in 2021–2022, with a peak at **H = 0.73**, marks a substantial turning point: the multiplication of data sources reflects an **epistemological transition**, in which **value is constructed through the combination of economic, performance-based, and contextual dimensions**. This diversification does not stem from a purely technical necessity but represents a reconfiguration of the very concept of data, which shifts from a static content to an element of analytical design.

The subsequent stabilization (**H ≈ 0.44–0.48**) suggests that informational diversity has consolidated as a structural feature of the field. Research no longer alternates between exploratory and conservative phases but rather develops a mature **balance between standardization and innovation**, where the selection of sources follows criteria of methodological coherence rather than mere availability. Along this trajectory, one can observe the full integration between rigor and informational pluralism, already highlighted in the methodological evolution (**Figure 11**): the understanding of player value no longer depends on access to a single authoritative source but on the ability to orchestrate multiple perspectives in a scientifically coherent manner. The analysis of the variety and evolution of data sources thus shows that data construction has become an essential prerequisite for understanding player value. However, to fully interpret the mechanisms that determine its formation, it is necessary to shift attention from the informational to the analytical level, examining the variables that, within empirical models, directly explain the determinants of value.

4.3 | Analysis of Key Determinants

The focus now shifts from how data are collected to what they reveal. After outlining the sources and their evolution, the objective becomes **understanding which concrete elements shape the value of football players** and how these factors are translated into variables within analytical models. Studying the determinants means entering the interpretative **core of football player valuation**, where information is transformed into economic relationships and individual performance intertwines with market dynamics, role, age, and competitive context. This section therefore explores the logic underlying the construction of variables and the trends that define how contemporary research interprets value in football.

4.3.1 | Variable Identification and Classification

To grasp how literature translates the concept of player value into operational terms, it is necessary to examine which variables are actually used in analytical models and what logic guides their selection. The proposed classification distinguishes four main categories: **sporting, contractual, intangible, and financial or club-related variables**. These represent the different dimensions through which value takes shape. Each reflects a distinct analytical perspective: performance as a technical measure, the contract as an economic constraint, image as reputational capital, and the club context as a structural framework. Together, these components outline a multidimensional representation of the player, in which value is never a single, fixed quantity

but rather the outcome of the interaction between performance, market forces, and perception.

Table 15. ***Classification of variable types with corresponding descriptions used in the reviewed studies.***

Variable Type	*Description*
Sport	Sport performance indicators and physical characteristics.
Contractual	Contract-related and transferability aspects.
Intangible	Image, popularity, and visibility factors.
Financial / Club	Economic, contextual, and organizational data.

The next step is to observe how these dimensions are distributed within the sample. The following graph provides a synthetic representation of the dataset composition, showing the relative weight of sporting, contractual, intangible, and financial variables. This distribution makes it possible to realize which analytical perspectives dominate the literature and to what extent player value is interpreted through performance, market dynamics, or other complementary factors.

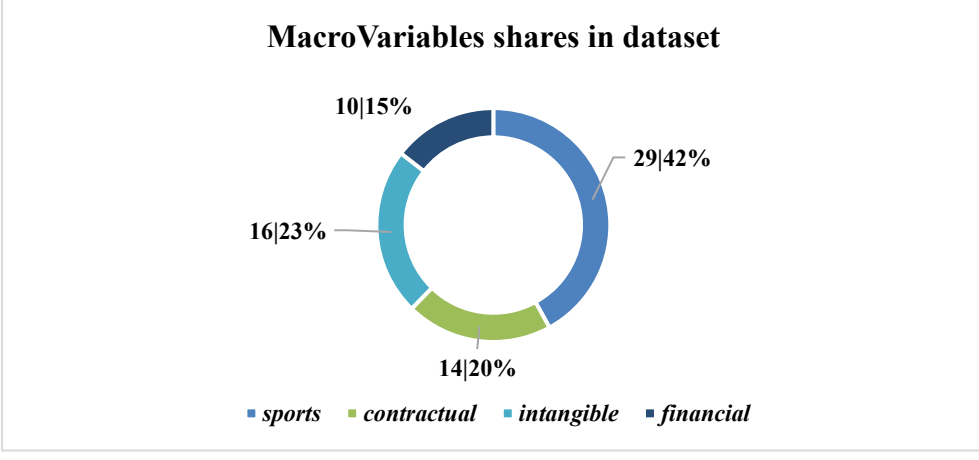


Figure 18. ***Distribution of macro-variable categories in the dataset showing the number and percentage share of studies using sport, contractual, intangible, and financial variables.***

The visualization confirms the centrality of the sporting dimension (**42%**), which remains the empirical cornerstone in the evaluation of talent, although its predominance now fits within a more complex framework. The substantial presence of contractual (**23%**) and financial (**15%**) variables suggests a progressive integration between performance and economic sustainability,

indicating a market increasingly attentive to the management of human capital. Even more significant is the weight of intangible variables (**20%**), which points out how value construction also depends on public and media perception, recognizing that visibility and reputation generate economic returns comparable to those of sporting performance. This structure shows that literature is converging toward a systemic conception of value, where athletic, **economic, and symbolic components do not compete but rather reinforce each other** in explaining a player's price.

After outlining the overall structure of the variables used in player valuation models, it is useful to detect how their presence has evolved over time. Temporal analysis makes it possible to capture the phases in which specific methodological approaches have found greater application. The following graph therefore illustrates the evolutionary dynamics of the independent variables, recognizing how research has adapted to changes in the football market and to the growing availability of heterogeneous data.

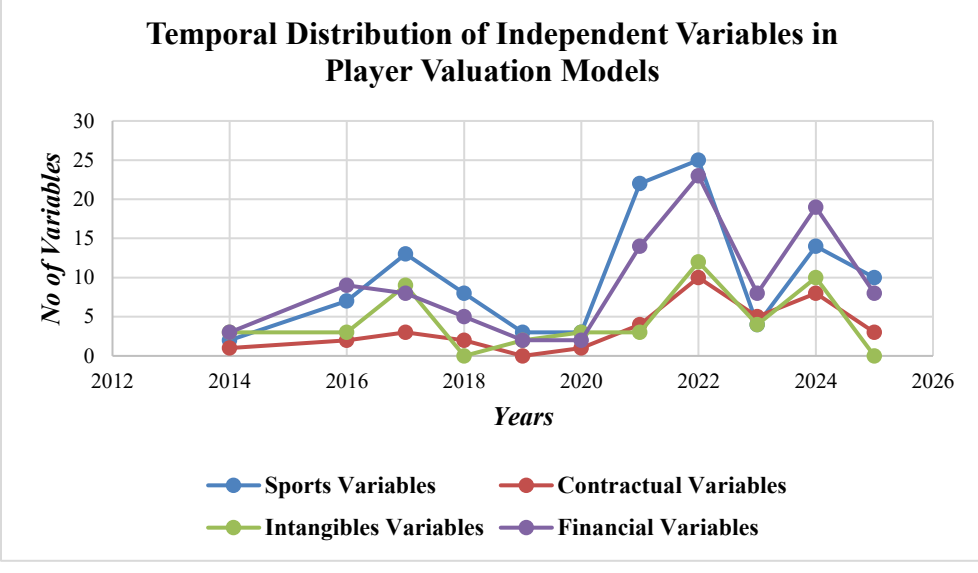


Figure 19. ***Temporal distribution of independent variable categories used in player valuation models, illustrating yearly trends for sports, contractual, intangible, and financial variables.***

The temporal distribution of independent variables reveals a clear structural evolution in player valuation approaches between 2014 and 2025. In the first phase (2014-2018), the number of variables used remains limited and relatively stable, with sporting variables predominating, accounting for over **40%** of the total on average. This stage reflects research still rooted in

traditional models, focused on performance indicators and physical attributes as the main predictors of player value.

From 2020 onward, there is a marked expansion in both the variety and the total number of variables employed, with a significant peak in 2022, when sporting variables exceed **25** and financial variables reach around **18**. This increase is not merely quantitative: it marks a methodological transition toward more complex and multidimensional models capable of simultaneously incorporating sporting, economic, and reputational dimensions.

Intangible and contractual variables, initially marginal, display a more discontinuous yet steadily growing trend, indicating a progressive sensitivity within literature to non-performance-related factors. The inclusion of elements such as popularity, contract duration, or release clauses suggests that market value is now interpreted as a synthesis of performance and economic potential rather than a simple reflection of on-field output.

The simultaneous rise of financial and sporting variables after 2020 can also be interpreted because of the maturation of data sources (as shown in **Figures 16** and **17**), which made more comprehensive and structured datasets available. In this sense, the growth in the number of variables signifies not only richer information but also an enhancement of the explanatory capacity of models, which increasingly adapt to a football environment intertwined with economic and media dynamics.

The slight decline observed in 2024-2025 suggests a phase of consolidation: the exploratory stage appears to give way to greater balance between the quantity and quality of variables, signaling that research is converging toward a more mature and methodologically conscious framework.

In this context of maturation, **Figure 20** allows for a deeper exploration of this internal balance, showing that the **variety of variables does not merely translate into numerical growth but into a more coherent and articulated structuring of the dimensions analyzed**. The graph illustrates the hierarchical distribution of variables used in player valuation models, distinguishing the four main macro-areas (sporting, financial, contractual, and intangible) and their respective subcomponents.

The representation reveals the increasing sophistication with which the literature combines performance indicators, economic data, and reputational

factors, integrating traditional elements (such as goals, assists, or position) with more complex aspects related to profitability, visibility, or contract structure. The evolution of these models thus appears oriented toward a systemic conception of value, in which the multiplicity of variables reflects not dispersion but a more mature ability to capture interdependencies among sporting results, financial dynamics, and symbolic capital, marking a definitive shift from mere description to a structured understanding of value in modern football.

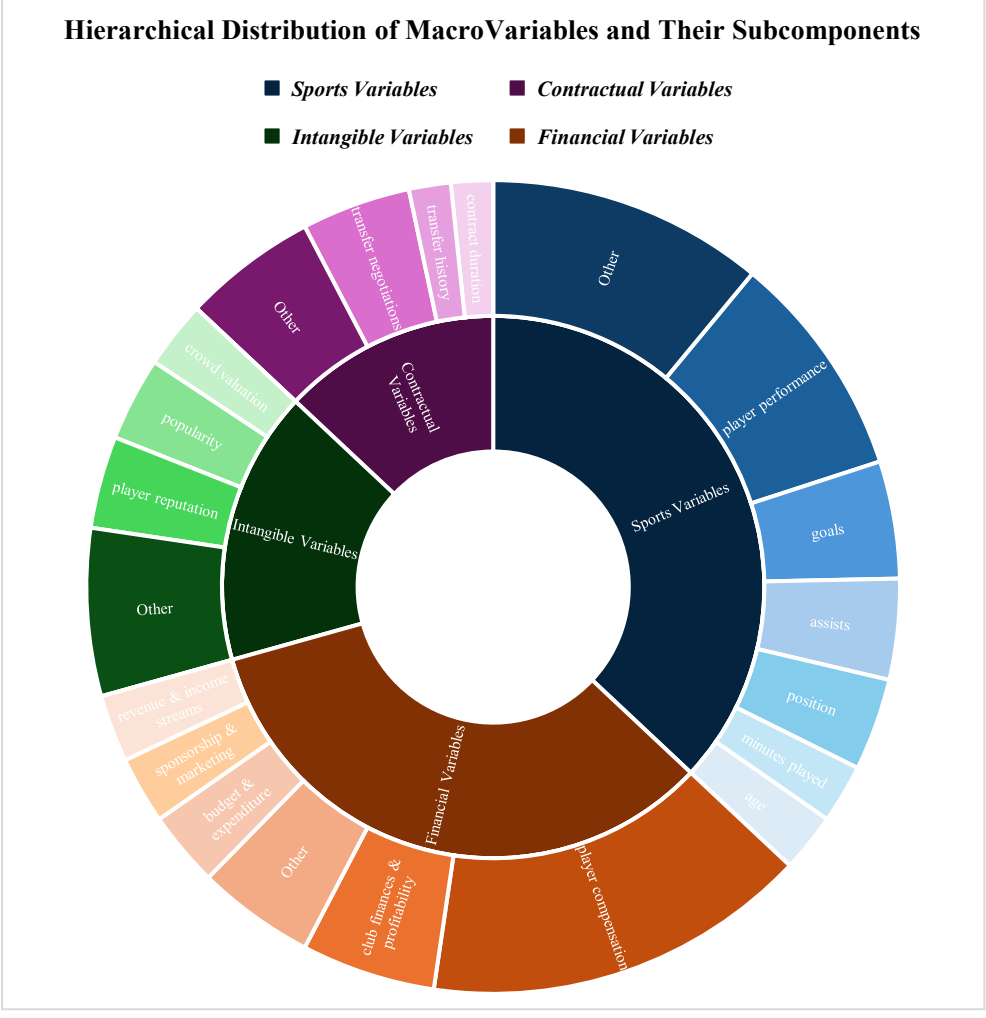


Figure 20. ***Hierarchical distribution of macro-variables and their subcomponents, showing the main variable categories (inner ring) and their detailed subdimensions (outer ring) used in player valuation models.***

The hierarchical distribution of macro-variables and their subcategories, presented in **Figure 20** and **Table 16**, identify the structural evolution of player

valuation models and the growing complexity of how a football player's value is conceptualized, measured, and interpreted. The quantitative evidence shows a structured yet balanced hierarchy, in which the sporting dimension remains predominant (**34.7%**) but now coexists with economic, contractual, and reputational components that expand its interpretative scope.

Sporting variables continue to represent the empirical foundation of the system, with indicators such as player performance (**9%**), goals (**4.7%**), and assists (**4%**) reinforcing the link between performance and market value. However, the internal fragmentation, with the inclusion of position, minutes played, age, and an **11%** share of "other" variables, signals a qualitative transformation: research no longer merely quantifies performance but explores its contextual dimension, assessing how productivity depends on role, continuity, athletic maturity, or contribution to team play. The focus thus shifts from an output measurement logic to a performance profiling perspective, where performance becomes a multidimensional construct.

Financial variables (**33.7%**) lead to a second analytical layer, oriented toward economic sustainability and the profitability of talent. The high incidence of player compensation (**15.3%**) reveals the growing interdependence between performance and remuneration, but also a new awareness: an athlete's value is not only what they "produce" but also what they "cost" and what they "yield." The inclusion of variables such as club finances and profitability (**5.3%**), budgets, or revenue streams (**2.7%**) shows that valuation is adopting a systemic perspective in which individual assessment is inseparable from the organizational and financial context that sustains it. In other words, the player is viewed as an economic asset integrated within a broader structure of human, sporting, and financial capital.

Contractual variables, accounting for **13%**, complete this systemic view by emphasizing the logic of mobility and transferability of value. Indicators such as transfer negotiations (**4.3%**) and contract duration (**1.7%**) describe an athlete's capacity to generate economic returns over time, while also reflecting the growing institutionalization of the football market: value is no longer only "produced" or "recognized," but also "**regulated**". These variables translate into analytical terms the intersection between economics and governance, showing how the legal and administrative dimension has become an integral part of the valuation process.

Intangible variables (**16.4%**) represent the most innovative and dynamic frontier. The presence of indicators such as popularity (**3.3%**), player reputation (**3.7%**), and crowd valuation (**2.7%**) suggests that sporting value is increasingly incorporating a symbolic and communicative dimension, consistent with the transformation of football into a cultural industry. In a context dominated by digital platforms and global media, visibility and recognizability become fully-fledged economic resources: reputation generates commercial returns, influences negotiations, and even affects technical decisions. This shift clearly shows that a player's value no longer depends solely on what they do on the field but also on what they represent, a paradigmatic change that links sports economics to the celebrity economy.

Taken as a whole, the analysis reveals a recomposition of valuation logics. Performance remains the foundation, but its relative weight is increasingly distributed across tangible and intangible dimensions. A convergence emerges among sporting efficiency, financial sustainability, contractual structure, and reputational capital, transforming player valuation into a multidimensional and interactive process. This convergence reflects an epistemological maturation of the field: **from a descriptive and fragmented phase to an integrated approach capable of capturing the complexity of value in modern football.**

An additional layer of insight lies in the temporal reading implicit in this structure. Sporting variables dominate the empirical tradition, but financial and intangible components have shown recent growth, consistent with the transformations in the football industry following digitalization and the **globalization of economic flows**. This also explains the tendency, highlighted in previous figures, toward a diversification of sources and variables: as research evolves, valuation models become richer but also more reflective and critical.

What is presented is not merely a distribution of frequencies, but rather a **map of the changing way in which football value is conceived**, from a statistical measure of performance to a complex construct that integrates output, reputation, and economic structure. Today, value is the result of the interactions among what a player does, represents, and generates, a concept that unites performance, economics, and sporting culture within a single analytical framework.

Table 16. ***Breakdown of macro-variable types and their subcategories showing frequency of occurrence and percentage share across the analyzed studies.***

MacroVariable Type	Subcategory	Occurence	% of share
Sports Variables	player performance	27	9,0%
	goals	14	4,7%
	assists	12	4,0%
	position	11	3,7%
	age	7	2,3%
	minutes played	7	2,3%
	Other	33	11,0%
Contractual Variables	transfer negotiations	13	4,3%
	contract duration	5	1,7%
	transfer history	5	1,7%
	Other	16	5,3%
Intangible Variables	popularity	10	3,3%
	player reputation	11	3,7%
	crowd valuation	8	2,7%
	Other	20	6,7%
Financial Variables	player compensation	46	15,3%
	club finances & profitability	16	5,3%
	budget & expenditure	9	3,0%
	revenue & income streams	8	2,7%
	sponsorship & marketing	8	2,7%
	Other	14	4,7%
TOT		300	100,0%

The simple quantification of occurrences is not sufficient to grasp the underlying logic of the different approaches: the structure of the data reveals trends, priorities, and distinct visions of the very concept of value. From this perspective, it becomes essential to interpret the observed patterns, that is, the ways in which the sporting, economic, contractual, and intangible dimensions are integrated, weighted, and interconnected, in order to spot the direction in which research is moving.

The following section focuses precisely on this interpretative transition, analyzing the most significant recurrences and the emerging configurations that outline the theoretical and applied evolution of football player valuation models.

4.3.2 | Interpretation of Observed Patterns

The quantitative analysis of variables provides a structural overview of the phenomenon, but it is through the **interpretation of emerging patterns that research attains its true explanatory power**. Realizing how the different dimensions (sporting, economic, contractual, and intangible) are distributed and interact with one another allows for the identification not only of methodological trends but also of the conceptual evolution in how player value is defined and represented. The focus thus shifts from the inventory of variables to the way they are used: which categories assume greater centrality, in which methodological contexts they emerge most prominently, and how their combination reflects distinct conceptions of value. This section interprets these configurations to **uncover the underlying logics of player valuation models**, highlighting the progressive convergence between empirical and theoretical approaches, and between quantitative prediction and economic-social interpretation.

Figure 21 visualizes this heterogeneity, showing how sporting, contractual, intangible, and financial variables are distributed across the main methodological orientations, highlighting the priorities and differences that characterize each model of football player valuation.

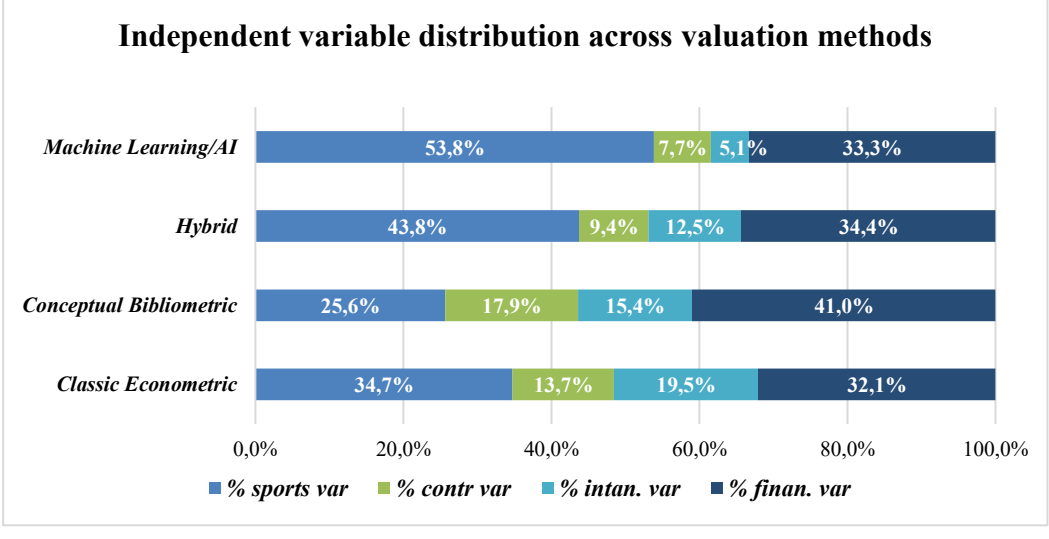


Figure 21. ***Distribution of independent variable categories across valuation methods, showing the relative use of sports, contractual, intangible, and financial variables within each methodological approach.***

The analysis above allows for a direct connection between the methodological dimension (chapter 4.2) and the substantive one (chapter 4.3), showing that

analytical choices are not neutral but instead reflect different conceptions of player value.

- **Data-driven methods** tend to objectify value by relying on measurable and quantifiable data.
- **Hybrid approaches** seek a balance between methodological rigor and analytical flexibility.
- **Conceptual and econometric perspectives** maintain a stronger theoretical grounding, though with varying degrees of openness toward symbolic and reputational components.

This type of scrutiny implies that football player valuation is evolving from a one-dimensional view, centered solely on performance, to a multilayered conception in which sporting, financial, and reputational factors coexist and mutually reinforce one another. It represents, therefore, a crucial step toward an integrated theory of value, in which the methodological choice shapes not only the analytical process but also the very form of value that emerges from it.

A clear divergence can be observed in the logic governing variable selection across methodological approaches, revealing how each paradigm translates the notion of value into its own interpretative framework.

In **machine learning and artificial intelligence models**, more than half of the variables (**53.8%**) pertain to the sporting dimension, while financial variables (**33.3%**) represent the second interpretative pillar. This configuration indicates that predictive algorithms rely primarily on quantitative and observable indicators, emphasizing athletic performance as the empirical foundation for model training, while maintaining a substantive link with economic data that translates performance into monetary value. The limited use of contractual and intangible variables (**7.7%** and **5.1%**, respectively) highlights the difficulty of these approaches in capturing qualitative or contextual dimensions, which remain challenging to formalize numerically.

Hybrid models exhibit a more balanced distribution: the sporting component (**43.8%**) remains dominant, but the presence of contractual (**9.4%**) and intangible (**12.5%**) variables increases noticeably. This pattern suggests an effort to reconcile predictive accuracy with economic interpretability, consistent with the underlying logic of methodological hybridization, which

aims to combine the flexibility of data-driven models with the theoretical robustness of econometrics.

Conceptual and bibliometric studies, by contrast, reduce the weight of the sporting dimension (**25.6%**) and privilege financial variables (**41%**), accompanied by greater attention to contractual (**17.9%**) and intangible factors (**15.4%**). This configuration reflects the more theoretical and systemic nature of such approaches, which aim to understand the economic and symbolic mechanisms underlying valuation rather than to estimate it empirically.

Classical econometric models retain a more traditional structure, with sporting performance (**34.7%**) and financial variables (**32.1%**) forming the two central dimensions. However, the non-negligible presence of intangible factors (**19.5%**) indicates a gradual broadening of the econometric paradigm toward less tangible aspects, acknowledging the growing relevance of reputation and player image as determinants of value.

The progressive integration of sporting, economic, and intangible dimensions across methodological approaches prompts a broader reflection: “what extent does the composition of variables depend on the degree of methodological rigor adopted in each study?” Understanding this relationship is crucial to assess whether the theoretical evolution of player valuation has advanced alongside empirical refinement, or whether a gap persists between conceptual complexity and statistical formalization.

Figure 22 deepens this connection by illustrating how the categories of sporting, contractual, intangible, and financial are distributed across different levels of methodological rigor (high, medium, and low), offering a useful perspective for interpreting the scientific maturity and methodological balance of the literature on football player valuation.

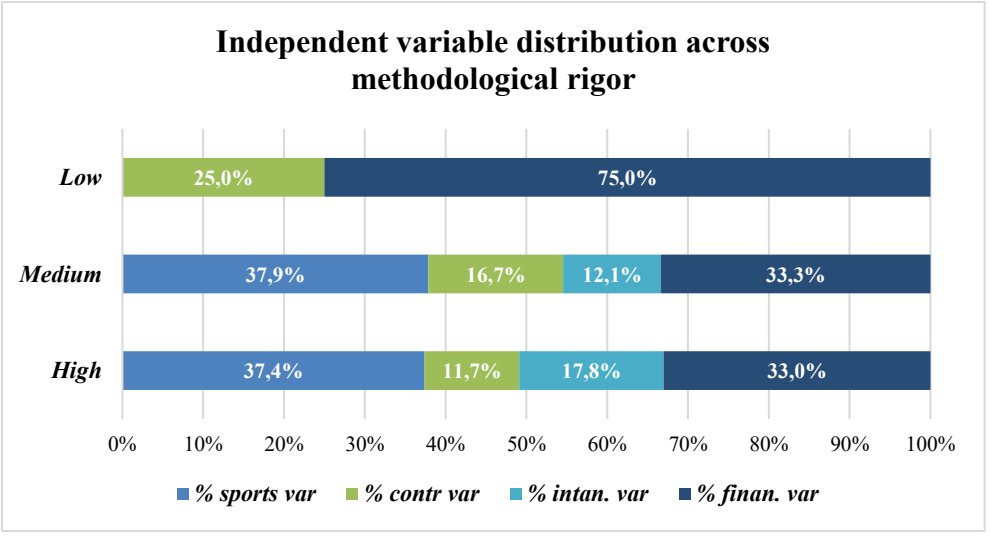


Figure 22. ***Distribution of independent variable categories across levels of methodological rigor, highlighting the relative importance of sports, contractual, intangible, and financial variables within low, medium, and high-rigor studies.***

The chart relates the distribution of variable categories to the level of methodological rigor adopted in the studies, revealing how the formal quality of analysis directly influences the conceptual structure of player valuation models.

From a quantitative perspective, studies characterized by **low methodological rigor** display a markedly unbalanced composition: **75%** of the employed variables belong to the financial category, while **25%** are contractual, and no sporting or intangible components are included. This configuration reflects a predominantly descriptive approach, in which player value is interpreted mainly through aggregate economic metrics (such as budgets or salaries), with limited attention to individual performance or reputation. Although these studies may offer interpretative insights, their explanatory capacity at the micro-analytical level remains limited.

In **medium-rigor studies**, the distribution becomes more articulated: sporting variables account for **37.9%** of the total, financial for **33.3%**, while contractual (**16.7%**) and intangible (**12.1%**) dimensions acquire a non-negligible role. This composition suggests a partial balance between performance measurement and economic dimension, although the methodological framework is not yet fully consolidated. These studies seem to represent a transitional stage where the integration of heterogeneous variables is underway but not yet supported by robust statistical procedures.

It is, however, in **high-rigor studies** that the strongest methodological coherence and interpretative maturity emerge. The distribution, **37.4%** sporting variables, **33%** financial, **17.8%** intangible, and **11.7%** contractual, reveals a nearly systemic balance, in which all dimensions of value are represented. The stable inclusion of intangible components indicates that the **most rigorous studies go beyond the quantitative measurement of performance or economic impact to incorporate reputational and media-related aspects**, treating them in a formalized and replicable manner. In other words, methodological rigor is accompanied by greater conceptual openness rather than a reduction in complexity.

From a qualitative standpoint, these results suggest that **scientific maturity** in the field of football player valuation **lies not only in the technical sophistication of models but also in the ability to integrate different dimensions coherently and verifiably**. The most rigorous studies are therefore not the simplest ones, but those capable of operationalizing complex concepts such as visibility or symbolic capital, translating them into formalized analytical variables.

This distribution reflects a clear evolutionary tendency: methodological rigor fosters multidimensionality in the conceptualization of value, pushing research toward an integrated paradigm in which performance, economy, and image are not separate domains but interrelated components of a unified interpretative framework. Complexity thus ceases to be perceived as a limitation to scientific validity and instead becomes one of its key indicators: **the ability to model and quantify player value in both its empirical and symbolic articulation emerges as the defining feature of advanced research.**

The preceding analysis has shown that the most rigorous models achieve a balanced integration of sporting, economic, and intangible variables, signaling an evolution toward increasingly mature and comprehensive approaches. Yet a crucial question remains: **is this methodological sophistication recognized by the academic community?** In other words, do studies employing more complex structures (with a greater number of variables and more elaborate empirical frameworks) achieve higher scientific impact, or do the academic audience still tend to favor simpler and more accessible models?

Figure 23 addresses precisely this issue, examining the relationship between model complexity and scientific impact in terms of citations. The bubbles represent the main reference publications, plotted according to the number of

independent variables and normalized citations per year. This perspective makes it possible to assess whether methodological sophistication correlates with greater academic influence, or whether research visibility and recognition are instead driven by other factors, such as model clarity or practical applicability.

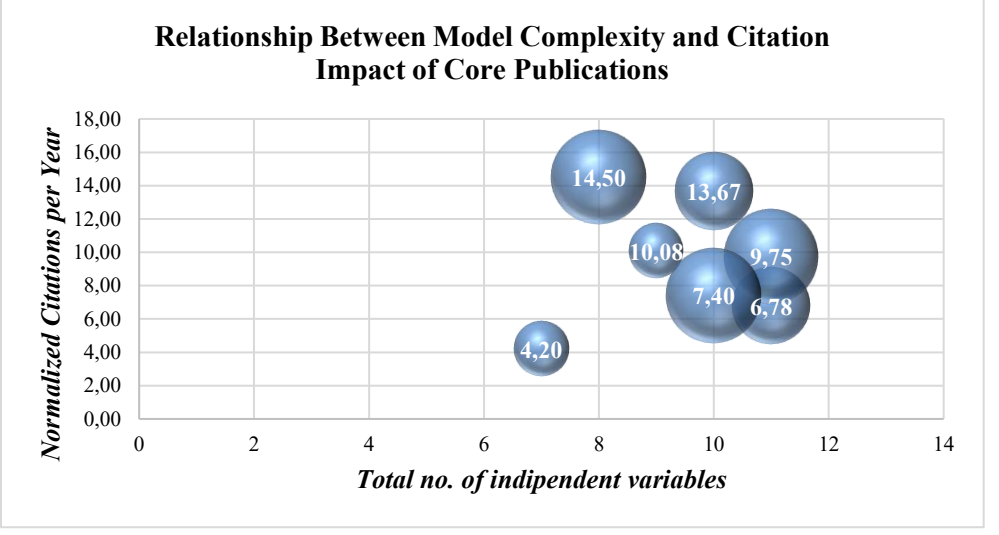


Figure 23. ***Relationship between model complexity and citation impact of core publications. Note: Bubble size represents publication year, 10 for 2014 and 2016, 20 for 2017, and 30 for 2021 and 2022. All core publications exhibit high methodological rigor (blue color).***

Figure 23 focuses on the core publications, the most influential and frequently cited works within the football player valuation literature, previously identified in **Table 8** as methodological and theoretical reference points for the field. The objective of this analysis is to examine the relationship between model complexity, expressed by the number of independent variables employed, and scientific impact, measured through normalized citations per year. All included studies exhibit high methodological rigor, allowing differences in impact to be interpreted as a function of model structure rather than baseline quality.

The distribution of points reveals a more nuanced picture than one might expect: complexity is not, in itself, an indicator of greater scientific success. The most cited studies, recording normalized values of **14.50** and **13.67 citations per year**, employ models of moderate complexity, typically comprising 8–10 independent variables. By contrast, more extensive models, with 11 variables, display a lower impact (**9.75** and **6.78 citations per year**). This evidence suggests the existence of an optimal threshold of complexity,

beyond which the inclusion of additional analytical dimensions does not yield proportional gains in academic recognition.

In other words, **excessive complexity risks making models more opaque, less replicable, and harder to generalize, thereby reducing their scientific appeal**. Conversely, models that maintain a parsimonious, yet theoretically robust structure appear to be more effective in communicating results and attracting scholarly attention.

A clear connection emerges with the Lorenz curve presented in **Figure 7**. As noted in that section, citation distribution within the player valuation field is highly concentrated: a small subset of publications accounts for the majority of academic recognition. **Figure 23** helps explain why: the most impactful core publications do not stand out for the sheer quantity of data or variables used, but rather for their conceptual clarity and methodological soundness, their ability to translate the complexity of the phenomenon into interpretable and reproducible models.

It is the quality of modeling, rather than its extensiveness, that determines academic success. The most cited works are characterized by a balance between theoretical depth, empirical rigor, and communicative clarity, qualities that enable them to combine technical precision with practical relevance for both scholars and practitioners.

A temporal perspective adds another interpretative layer. The largest bubbles, corresponding to **2021** and **2022**, display medium-high citation values and stronger methodological coherence. This indicates that recent research is undergoing a phase of structural maturity, where analytical sophistication no longer undermines model readability but rather enhances it through a more conscious use of statistical techniques and available datasets.

Earlier publications (2014–2016), by contrast, occupy the lower portion of the chart, with lower impact levels (ranging from **4.2** to **10.08 citations per year**). These studies represent the pioneering efforts of the field: foundational works that established the theoretical groundwork for subsequent research but were characterized by limited methodological standardization and replicability.

The comparison reveals a clear evolutionary trajectory: the field progressively moving away from purely descriptive or redundant models toward parsimonious yet theoretically grounded structures capable of capturing the

complexity of player value through truly meaningful variables. In this sense, **Figure 23** represents a quantitative analysis and a metaphor for disciplinary maturation. **The most influential research is that which succeeds in "taming" complexity, not by eliminating it**, but by managing it, making models accessible, transparent, and reproducible.

The message that emerges from this analysis is twofold. On the one hand, it confirms that complexity has value, but only when it serves to enhance understanding. On the other, it highlights that academic credibility in the field of player valuation depends on the balance between rigor and readability, between technical innovation and theoretical coherence. It is this balance that allows a model to become not only methodologically sound but also influential, widely recognized, and replicable within international literature.

The analyses presented thus far have conceptualized the complexity and progressive maturation of the field devoted to football player valuation, showing how methodological evolution mirrors a broader theoretical and applied transformation. After examining the models, variables, and dynamics underlying their construction, the next step is to interpret these findings critically, shifting the focus from a descriptive to a conceptual level. **Chapter 5** adopts this perspective, offering a qualitative and reflective discussion of the evidence gathered, with the aim of linking the analytical results to the economic, regulatory, and human dimensions that define the value of the football player in the contemporary context.

5 | DISCUSSION OF RESULTS

The analysis developed in the previous chapters has shown that the valuation of football players is not merely a technical or statistical issue, but a complex phenomenon intertwining economic, human, and institutional dimensions. Quantitative results have revealed increasing methodological rigor and a progressive integration of sporting performance, financial factors, and intangible variables. However, beyond empirical robustness, there emerges a need to question the meaning and limitations of an approach that is becoming increasingly data driven.

5.1 | The Risks of a Purely Data-Driven Approach

The methodological evolution of football player valuation has led to an increasingly extensive use of data, predictive models, and machine learning techniques, making quantitative analysis an indispensable component in estimating players' market value. As demonstrated in **Chapter 4**, the research field has achieved a high level of

methodological rigor, with models capable of handling hundreds of observations and variables describing sporting performance, contractual structure, financial conditions, and even players' reputational capital. However, this pursuit of absolute measurability of value entails a series of cognitive and interpretive risks that warrant critical reflection.

First, relying exclusively on data often implies, implicitly, a reduction of football's intrinsic complexity to a set of numerical relationships data, no matter how accurate, are partial representations: they measure what can be observed, but not necessarily what is meaningful. **Advanced metrics**, from expected goals to progressive passes, from duels won to market value indices, **offer a powerful but inevitably simplified image of a phenomenon that remains dynamic**, situational, and profoundly human. A model can capture a player's statistical contribution, but **not his symbolic impact**, his ability to change the momentum of a match, or his **psychological influence** on teammates. The qualitative dimension of sporting experience, rooted in intuition, tactical context, and charisma, still escapes full mathematical formalization.

Second, the predominance of data risks producing a form of **cognitive moral hazard**: analysts or executives may delegate the responsibility of judgment to the model, conflating the apparent objectivity of numbers with the truth of the phenomenon. This automatic **trust in algorithms creates an epistemological distortion** in which errors are no longer attributed to model design but to reality itself, which "fails to fit the data." In other words, **error becomes invisible**, concealed behind excessive confidence in statistical precision. Such mechanisms can lead to biased decisions, particularly in applied contexts where player valuations directly affect financial, strategic, and reputational outcomes.

The risk, in essence, is that analysis becomes an autotelic exercise, an end, where the technical sophistication of the model overshadows interpretive capacity. As several scholars in sports economics have noted, talent valuation requires not only the measurement of parameters but also the contextual understanding of data: **why a variable matters, in what environment it generates value, and how it interacts with the external factors shaping an athlete's career.**

Within this framework, **human experience regains a central role**. The analyst, scout, or sporting director should not compete with data, but dialogue with it, interpreting quantitative results through tacit knowledge of the game. Direct observation, sensitivity to weak signals, on-field behavior, leadership, and adaptability constitute a complementary and irreplaceable form of expertise that gives meaning to model outputs. Only through such integration can quantification and interpretation valuation

of a football player become truly meaningful, capturing the full complexity of his sporting, economic, and human contribution.

The risk of a purely data-driven paradigm does not lie in the use of data itself, but in its epistemological misuse, in the tendency to conflate representation with reality, and numerical precision with deep understanding. The maturity of the player valuation field will depend on its ability to transcend this technocratic drift, **rediscovering intuition, experience, and critical reflection as essential components of analytical judgment**. In a context increasingly dominated by algorithms, it will ultimately be the human capacity to interpret uncertainty that determines, paradoxically, the true progress of the science of value in football.

5.2 | Economic Translation of Talent

The distinction between value and price constitutes one of the central issues in the literature on football player valuation and represents an essential step toward understanding the economic logic that governs the contemporary football market.

As shown in the empirical findings of **Chapter 4**, this distinction emerges clearly. The most balanced econometric and data-driven models demonstrate that the estimation of value is progressively merging into a multidimensional logic, in which sporting performance coexists with financial, contractual, and intangible factors. However, the transition from theoretical value to market price involves a series of informational and behavioral asymmetries that make the relationship between the two measures inherently non-linear. **Price does not simply reflect a player's observable performance**; it also incorporates expectations, perceptions, and market dynamics, often distorted by exogenous elements such as media pressure, agents' bargaining power, club branding strategies, or financial regulations imposed by governing bodies.

This structural discrepancy between value and price becomes particularly evident in the case of "media-driven" transfers, where reputational components can inflate prices well beyond sporting contribution. Conversely, tactically essential but less visible players often suffer from systemic undervaluation. This confirms that the football market does not operate as a perfectly competitive system, but as a hybrid space in which economic efficiency is intertwined with the symbolic construction of value.

From a theoretical perspective, a player's value can be interpreted as a relational good: it does not exist in absolute terms but depends on the interaction between the player, the team, the tactical context, and the broader economic system in which he operates. **A footballer does not "have" the same value in every environment**; his marginal contribution varies according to tactical fit, role within the project, and the club's

capacity to monetize his performance through marketing, sponsorships, audience engagement, or merchandising. This relational conception, aligned with the more mature strands of literature, moves beyond a static notion of value as an intrinsic attribute and replaces it with a dynamic logic, in which value is produced and reproduced through ongoing interactions among on-field performance, market conditions, and public perception.

Price, on the other hand, can be seen as the momentary crystallization of these interactions. It represents a fragile synthesis between estimated sporting value and the market's capacity to sustain it. In economic terms, price is a temporary equilibrium between supply and demand, yet it remains subject to fluctuations triggered by unpredictable events such as injuries, coaching changes, regulatory adjustments, or macroeconomic trends.

In this sense, **the divergence between value and price does not signal a market failure but rather reflects the inherently complex and incomplete nature of the information guiding evaluations.**
From an operational standpoint, the challenge for clubs and analysts is to narrow this gap by translating valuation models into effective decision-support tools. The most recent methodologies aim to estimate fair value, a measure aligned with both sporting and financial performance yet less sensitive to speculative market fluctuations. In this light, football player valuation emerges as an imperfect but necessary science: it cannot eliminate uncertainty, but it allows decision-makers to manage it more rationally, providing an objective reference point within an inherently volatile market.

Nevertheless, the growing financialization of football has turned value itself into an economic and communicative construct, increasingly detached from pure sporting output. Clubs no longer acquire mere performance, but reputational assets: a player's popularity can generate economic returns exceeding his technical contribution, fueling a cycle of media-driven valorization that reinforces market price.

This process reflects a profound transformation of modern football: the player is no longer merely an athlete, but an investment asset, a strategic component of both the club's financial statements and its brand identity.

The relationship between a player's value and price thus represents a permanent field of tension between measurability and perception, between real economy and symbolic construction. Valuation models can mitigate informational asymmetries and rationalize decision-making, yet they can never eliminate the subjective and cultural dimension that defines the very nature of the game. Ultimately, the value of a football

player is not a number, but an economic narrative, a temporary representation of a constantly shifting equilibrium among performance, reputation, and financial strategy.

5.3 | Bridging Academic Research and Sporting Practice

One of the most significant findings emerging from the study is the structural distance that continues to separate academic research from operational decision-making in professional football. In recent years, football player valuation has achieved a remarkable methodological leap forward: increasingly sophisticated models, large-scale datasets, and rigorous validation procedures have made the field more mature and scientifically coherent. Yet, this evolution does not always find a direct counterpart in the everyday practices of clubs or sporting institutions, where the application of research results remains often fragmented and uneven.

Academia tends to operate according to the logic of universality and rigor: it seeks stable relationships, generalizable models, and rules capable of enduring across time and context. Football organizations, by contrast, are governed by the principle of contingency: **decisions must be rapid, adaptive, and pragmatic**; information has value only insofar as it yields an immediate competitive advantage. From this divergence in temporal and epistemic horizons arises a fundamental gap, research seeks to build knowledge, while practice seeks to find answers.

This tension, however, does not represent a contradiction but rather a form of potential complementarity. Academic models provide a shared language and a theoretical framework through which reality can be interpreted more coherently, while practice offers concrete verification, the testing ground where hypotheses are challenged, refined, or reformulated. It is within the dialogue between these two perspectives that player valuation can evolve from an analytical exercise into a genuine decision-making tool. Theory provides structure; practice restores meaning.

In recent years, there have been growing signs of convergence. Several clubs, particularly within Europe's top leagues, have begun importing academic logics into their decision-making processes, integrating regression models, machine learning algorithms, and predictive performance systems into scouting and player management departments. At the same time, the research community has become more permeable to the realities of professional football, engaging in collaborations with clubs and federations, utilizing proprietary datasets, and paying closer attention to issues of operational transferability.

Still, the convergence remains incomplete. **Theoretical models, to be truly effective, must undergo interpretive mediation**: numbers alone are insufficient. They require

contextualization and translation into actionable insights that can inform choices. This process demands hybrid figures, professionals fluent in both scientific and sporting languages: analysts who understand the dynamics of the game, and coaches or executives familiar with modeling principles and statistical inference.

From this perspective, football player valuation is no longer merely an analytical domain, but an interdisciplinary meeting ground, where economics, data, and sporting sensibility intersect.

In the absence of such integration, two parallel worlds risk persisting: on one side, a body of research that is methodologically impeccable yet detached from reality; on the other, an empirically driven practice that is effective but theoretically unanchored. Bridging this divide means recognizing that no evaluation is truly complete if it remains confined to only one of these poles. Theory without application remains abstract; practice without theory descends into randomness.

The future of player valuation thus depends on the ability to construct models that unite rigor and adaptability, analytical precision and interpretive sensitivity. Only within this equilibrium can the discipline evolve into a genuine applied science of sporting value, one capable not only of measuring, but of understanding. Ultimately, a **player's value cannot be reduced to numerical parameters or estimation formulas:** it emerges from the encounter between scientific knowledge, human experience, and the culture of the game. It is in this space of dialogue between the model and the pitch, that football valuation finds its most authentic dimension and, perhaps, its most mature form.

6 | CONCLUSIONS

The research conducted in this thesis has made it possible to explore a topic that appears purely technical, the valuation of football players, but which is profoundly connected to the ways in which knowledge, economics, and human experience interact. Studying how value is defined, estimated, and communicated has meant questioning not only the mechanisms of the football market but also the very concept of value itself: what can be measured objectively, and what, inevitably, remains a matter of interpretation.

The quantitative analysis has revealed a field in constant evolution, characterized by increasing methodological rigor and the adoption of increasingly sophisticated analytical tools. Econometrics, machine learning, and hybrid methodologies have contributed to making football player valuation a more solid and multidimensional

discipline, capable of combining sporting performance, economic variables, and intangible factors. However, methodological maturity does not necessarily equate to interpretative completeness. The results suggest that model precision alone is insufficient if it is not accompanied by a genuine capacity to understand the reality those models seek to represent.

In this sense, one of the main contributions of this research lies in highlighting the limits of a purely data-driven approach. Datas are the raw material of analysis, but not its ultimate purpose. The growing risk is that blind trust in numbers may reduce football to a mere set of correlations, stripping it of its human, situational, and creative dimensions. Value, by contrast, emerges from the dialogue between what can be measured and what must be interpreted, between empirical evidence and expert judgment.

Similarly, the distinction between value and price has proven to be fundamental. Price expresses a market equilibrium influenced by contractual, media, and strategic factors, whereas value represents a more complex construct, one that accounts for performance, potential, reputation, and context. The former is transitory and observable; the latter is relational and constantly evolving. This distinction, often overlooked, underscores that the economic valuation of football players is a dynamic process in which market efficiency intertwines with the symbolic dimension of the game.

Another key finding concerns the need for a closer dialogue between theory and practice. The persistent gap between academic models and operational applications limits the full realization of the field's analytical potential. Football player valuation can progress only through the development of a shared language between researchers and practitioners, one capable of combining theoretical rigor with practical relevance. This calls for professionals who can read data with sporting sensitivity and interpret the game with analytical competence. Only through this synthesis can knowledge be translated into tangible value.

From a broader perspective, player valuation emerges as border discipline, suspended between science and interpretation. It reflects the enduring tension between the ambition of measurement and the awareness of its limits. The future of the field will depend on its capacity to integrate quantitative and qualitative approaches, technology and intuition, rigor and flexibility, recognizing that value, in football as in any complex system, is always the result of a dynamic equilibrium.

In conclusion, this work suggests that to value a player means to understand a relationship, not to assign a number. Value is not a definitive figure but an interpretative process arising from the interplay between performance, context, and perception. Embracing this complexity does not diminish the scientific character of research; rather, it strengthens it, grounding it in the living reality of the game. Only by acknowledging the coexistence of numbers and meanings, of rules and intuition, can football player valuation consolidate itself as a true science of sporting value, one capable not only of explaining but also of interpreting the language of contemporary football.

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APPENDIX – Supplementary Files

1. The complete list of the 265 records identified after the duplication removal phase is available here (*ThesisDatabase – Identification.xlsx*).

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
1	J	Z., Huan	Beyond La	2025	0	Given the	Fiscal Revenue Effect;	Article	10.1061/JU	https://ww	Journal of	Scopus
2	J	S., Özayc	DETERM	2025	0	Due to bei	Croatian Football; Det	Article	10.16926/s	https://ww	Sport i Tu	Scopus
3	J	K.W., va	Forecastin	2025	0	Featured A	Explainable Machine L	Article	10.3390/ap	https://ww	Applied Sc	Scopus
4	J	D., Khali	Dynamic F	2025	0	The financ	Financial Modeling In	Article	10.3390/ijf	https://ww	Internation	Scopus
5	J	W., Frost	The use of	2025	0	Football cl	Due Diligence; Perfor	Article	10.1177/17	https://ww	Internation	Scopus
6	J	D., Sheng	Football le	2025	0	Purpose: T	Balanced League; Foo	Article	10.1108/S	https://ww	Sport, Bus	Scopus
7	J	B., Mizra	Stablecoin	2025	1	This article	compares stablecoins t	Article	10.3905/ja	https://ww	Journal of	Scopus
8	J	J., Liu, Ja	Post-Prim	2025	0	This study	Depreciation; Football	Article	10.3390/ijf	https://ww	Internation	Scopus
9	J	A., Cohe	European	2025	0	This paper	Financial Mathematics	Article	10.1515/jq	https://ww	Journal of	Scopus
10	J	Q., Shen,	Predicting	2025	1	The study	Dempster-shafer Theo	Article	10.1007/s1	https://ww	Applied In	Scopus
11	J	M., Redd	Technolog	2025	2	Purpose: T	Banking; Communal V	Article	10.1108/IJ	https://ww	Internation	Scopus
12	J	T.K., Qu	Multi-club	2025	0	Research o	Financial Fair Play; Fi	Article	10.1080/16	https://ww	European	Scopus
13	J	D.F., Hill	A review o	2025	2	This paper	Corporate Finance Me	Article	10.1080/23	https://ww	Managing	Scopus
14	J	G., Rubic	The financ	2025	0	Research q	Football; Human Capi	Article	10.1080/23	https://ww	Managing	Scopus
15	J	K., Walth	The debate	2025	0	Purpose: T	Crowdsourced Market	Article	10.1080/23	https://ww	Managing	Scopus
16	J	G., Grigg	A race to t	2025	0	The advent	Investments; Commer	Book chapter	10.4324/97	https://www.scopus.c		Scopus
17	J	Y., Lu, Y	Influences	2025	0	There exist	Channel Conflicts; In-s	Article	10.1007/s1	https://ww	Electronic	Scopus
18	C	N., Jain,	Predicting	2025	0	Football, a	Football; Lightgbm; M	Conference paper	10.1007/97	https://ww	Lecture N	Scopus
19	J	B., Geng,	Predicting	2025	0	Accurately	Bagging Regression; D	Article	10.31449/i	https://ww	Informatic	Scopus
20	J	H., Zhan	Resettleme	2025	0	In the mod	Ecological Civilization;	Article	10.3389/fs	https://ww	Frontiers i	Scopus
21	J	A.B., Als	An Integra	2025	0	Airline con	Aviation Maintenance;	Article	10.1142/S0	https://ww	Asia-Pacif	Scopus
22	J	B., Jiang,	A Multidin	2025	0	Soccer, the	Attentional Mechanism	Conference paper	10.1109/D	https://www.scopus.c		Scopus
23	J	S., Corsa	The evalua	2025	1	The global	Expected Goal; Machi	Article	10.1007/s1	https://ww	Annals of	Scopus
24	J	M.A., Ya	The Role	2024	0	The transfe	Football Player Valuat	Article	10.54141/j	https://ww	Pamukkale	Scopus
25	R	S., Li, Sh	Freight trai	2024	10	This paper	Benders Decompositio	Article	10.1016/j.t	https://ww	Transporta	Scopus
26	J	N.N., Ku	Asymmetr	2024	0	Using non-	Asymmetric Effects; E	Article	10.1016/j.l	https://ww	Heliyon	Scopus
27	J	D.W., Ro	Does the I	2024	1	It is comm	Agents; Commissions;	Article	10.1177/15	https://ww	Journal of	Scopus
28	J	R., Poli, I	Statistical I	2024	0	Professiona	Econometric Model; F	Article	10.3390/ijf	https://ww	Internation	Scopus
29	J	X., Liao,	Towards E	2024	2	The Regior	China; Land Rent; Lar	Article	10.3390/su	https://ww	Sustainabil	Scopus
30	J	M., Verd	Digital pay	2024	5	This article	Banking Regulation; C	Article	10.1016/j.j	https://ww	Journal of	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
31	J	Y., Liu, Y	A pricing s	2024	6	Purpose: T	Business-to-business M	Article	10.1108/JI	https://ww	Journal of	Scopus
32	J	M., Franc	Determina	2024	22	As a result	Football Players' Mark	Article	10.1111/jo	https://ww	Journal of	Scopus
33	J	I., Runse	Machine L	2024	5	The spread	Adaboost; Football Tra	Article	10.3390/cc	https://ww	Computers	Scopus
34	J	T., van d	Why trans	2024	0	Over the y	Bosman Ruling; Comp	Article	10.1007/s4	https://ww	Internation	Scopus
35	J	F., Panco	Soccer Bu	2024	2	An exponer	Soccer Player Registra	Article	10.1177/15	https://ww	Journal of	Scopus
36	J	S., Merte	Fan identif	2024	6	Purpose: Ir	Athlete Brand; Fan Lo	Article	10.1108/S	https://ww	Sport, Bus	Scopus
37	J	M., Di D	The Appra	2024	2	This paper	Asset Management; Fc	Article	10.32731/I	https://ww	Internation	Scopus
38	J	M., Piepe	Performan	2024	2	We analyze	Beauty; Facial Attracti	Article	10.1016/j.j	https://ww	Journal of	Scopus
39	J	M., Cefis	The higher	2024	10	Supporting	Confirmatory Compos	Article	10.1007/s(	https://ww	Computati	Scopus
40	J	C., Wang	Tax substi	2024	0	The purpos	Corporate Tax Burden	Article	10.18488/:	https://ww	Journal of	Scopus
41	C	M., Shah	Framewor	2024	0	As per Wo	Non-govt Entities; Reg	Conference paper	10.52202/(	https://ww	Proceeding	Scopus
42	J	E.H.C.A.	Factors ass	2024	0	Introductio	Acceptability; Health;	Article	10.11604/p	https://ww	Pan Africa	Scopus
43	J	H., Nelen	Burying th	2024	0	This article	Denial; Ethics; Fraud;	Article	10.1080/17	https://ww	Sport in Sc	Scopus
44	J	J., Liu, Ji	Pricing me	2024	0	With a grac	Improved Sequential A	Article	10.13587/j	https://ww	Journal of	Scopus
45	J	H., Yu, H	Developing	2024	0	Football is	Decision Tree Regress	Article	10.14569/I	https://ww	Internation	Scopus
46	J	A.M., On	Integrating	2024	0	Neutrosopl	Accounting Informatio	Article	10.54216/I	https://ww	Internation	Scopus
47	J	E., Ehsan	Willingnes	2024	0	Providing p	Ambulance; Discrete C	Article	10.18502/I	https://ww	Health Tec	Scopus
48	R	F.J., Mar	Critical dis	2024	0	This paper	Auditors; Fair Value; I	Article	10.6018/rc	https://ww	Revista de	Scopus
49	J	C., Thran	Using com	2024	3	Purpose: T	Composite Variables; I	Article	10.1080/23	https://ww	Managing	Scopus
50	J	Y., Yang,	Predicting	2024	5	Research q	Covid-19; Machine Le	Article	10.1080/16	https://ww	European	Scopus
51	J	M.A., Hic	Territorial	2024	3	The profes	City; Football Clubs; C	Article	10.1080/21	https://ww	Territory,	Scopus
52	J	W., Cross	Import-exp	2024	0	This chapte	Foreigner Limits; Impo	Book chapter	10.4337/97	https://www.scopus.c		Scopus
53	J	J., Sun, J	FINDING	2023	1	The differe	Cooperation Level; De	Article	10.3934/jir	https://ww	Journal of	Scopus
54	J	M., Kim,	Multilevel	2023	0	In Internet-	Internet Of Things; M	Article	10.1016/j.i	https://ww	Internet of	Scopus
55	J	L., Zeng,	An inter-pr	2023	7	The revers	Karush–kuhn–tucker C	Article	10.1016/j.e	https://ww	Energy	Scopus
56	J	P., Malag	Measuring	2023	7	Google Tre	Article; Football Playe	Article	10.1371/jo	https://ww	PLOS ON	Scopus
57	R	M., Amat	Soccer lab	2023	2	This paper	Football; Human Capi	Article	10.1016/j.e	https://ww	European	Scopus
58	J	R., Sharn	Cryptocurr	2023	9	Young investors, fuelled by the hy		Book chapter	10.4018/97	https://www.scopus.c		Scopus
59	J	H., Todd	Social Prot	2023	13	Tuberculos	Bank Account; Diseas	Review	10.4269/aj	https://ww	American	Scopus
60	J	I.G., McI	Estimating	2023	31	The paper	Analytics; Machine Le	Article	10.1016/j.e	https://ww	European	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
61	J	Y., You,	Regulating	2023	0	Local gove	Case Study; Fiscal Co	Article	10.1080/1	https://ww	Journal of	Scopus
62	J	N., Leifh	Financial p	2023	15	1. Rational	Finance; Football; Inc	Article	10.1080/2	https://ww	Managing	Scopus
63	J	Y., Wang	Model con	2023	6	The Englis	Empirical Model; Engl	Article	10.1504/IJ	https://ww	Internation	Scopus
64	J	M.D.A.,	Contribute	2023	1	The top tie	Consumption; Data A	Article	10.14569/I	https://ww	Internation	Scopus
65	J	J., Ward,	Implement	2023	5	Objective:	Community Hospital;	Article	10.3389/fd	https://ww	Frontiers i	Scopus
66	J	B.J., Fric	Talent con	2023	5	Introductio	Competitive Balance;	Article	10.3389/fs	https://ww	Frontiers i	Scopus
67	J	R., Johan	Zlatan Ibra	2023	2	In October 2019, Zlatan Ibrahimo		Article	10.1080/1	https://ww	Soccer anc	Scopus
68	J	R.K., Mc	The deterr	2023	2	The study	Brazil; Expectations; F	Article	10.1080/0	https://ww	Applied Ec	Scopus
69	J	I.A., Zayt	Moneyball	2023	5	Market ine	Football; Inefficiency;	Article	10.1080/0	https://ww	Applied Ec	Scopus
70	J	J., Wang,	Will the in	2023	6	The issue c	Air Pollution; Chinese	Article	10.1080/0	https://ww	Journal of	Scopus
71	J	Z., Kim,	Factors inf	2023	5	How can th	Contractual Exclusivity	Article	10.1080/0	https://ww	Technolog	Scopus
72	J	Y., Wang	Study on s	2022	13	In order to	Economic Analysis; M	Article	10.1016/j.	https://ww	Journal of	Scopus
73	J	E., Gal-O	Designing	2022	12	We conside	Analytical Models; Bu	Article	10.1287/m	https://ww	Manageme	Scopus
74	C	C.I., Pädt	Enhancing	2022	3	In this pap	Blockchain; Framewo	Conference paper	10.1145/3	https://ww	ACM Inter	Scopus
75	J	E., Helm	Elasticity c	2022	3	Understanc	Elasticity; Public Tran	Article	10.9744/ce	https://ww	Civil Engir	Scopus
76	J	Y., Wu,	The Local	2022	8	Since 1998	Balance Of Revenue A	Article	10.3390/la	https://ww	Land	Scopus
77	J	D.C., Co	The wisdo	2022	39	Crowd-sou	Decision Support; Fifa	Article	10.1016/j.	https://ww	European .	Scopus
78	J	G., Rubic	Measuring	2022	16	Purpose: T	Crowdsourcing; Finan	Article	10.1108/JI	https://ww	Journal of	Scopus
79	J	M., Užík,	Manageme	2022	2	The intenti	Football Player; Mathe	Article	10.3390/m	https://ww	Mathemati	Scopus
80	J	S., Cato,	Understan	2022	4	Social entr	Ecosystem; Moral Haz	Article	10.3390/su	https://ww	Sustainabil	Scopus
81	J	M., Serna	Worldwide	2022	14	Purpose: T	Bibliometrix R-tool; Li	Review	10.1108/T	https://ww	Team Perf	Scopus
82	J	C.R., Sch	Effectiven	2022	0	Prospectiv	Funding Efficiency; H	Article	10.1002/h	https://ww	Health Ec	Scopus
83	J	M., Ballia	Does the q	2022	11	Purpose: F	Football; Multiple Reg	Article	10.1108/SI	https://ww	Sport, Bus	Scopus
84	J	T., Wand	Analysis o	2022	5	Using publ	Complex Networks; E	Article	10.1007/s1	https://ww	Journal of	Scopus
85	J	N.E., Kha	Should sup	2022	3	This resear	Buyer–supplier Negoti	Article	10.1111/pc	https://ww	Production	Scopus
86	J	D., Camp	Exploring t	2022	13	This paper	Estimated Players' Inh	Article	10.1177/1	https://ww	Journal of	Scopus
87	J	S., Kaew	The Devel	2022	0	The purpos	Financial System; Mar	Article	10.14456/t	https://ww	Engineerin	Scopus
88	J	V., Steve	Predicting	2022	6	The domai	Machine Learning; Ne	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
89	J	S., Özayc	Investigati	2022	0	Sunk cost f	English Premier Leagu	Article	10.54141/j	https://ww	Pamukkal	Scopus
90	R	S., Kolke	People ove	2022	2	The term "mass incarceration" is		Article	10.15779/	https://ww	California	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
91	J	M.A., Al-	Predict the	2022	58	Football is	Fifa Video Game Data	Article	10.1109/A	https://ww	IEEE Acc	Scopus
92	J	R., Poli, I	Econometı	2022	17	Billions of	Econometric Model; F	Article	10.3390/ec	https://ww	Economies	Scopus
93	J	M., Zhan	The mecha	2022	7	Accessibilit	Economic Growth; Th	Article	10.3390/la	https://ww	Land	Scopus
94	C	E., Özbal	National B	2022	1	Basketball	Basketball; Machine L	Conference paper	10.1007/9	https://ww	Lecture N	Scopus
95	J	T., Jiang,	Integrated	2021	18	Based on tl	Eor; Gas Storage; Gra	Article	10.11698/I	https://ww	Shiyou Ka	Scopus
96	J	T., Jiang,	Integrated	2021	16	Based on tl	Eor; Gas Storage; Gra	Article	10.1016/S	https://ww	Petroleum	Scopus
97	J	L., Richa	The sky is	2021	10	In light of i	Financial Investors; Fc	Article	10.1007/s1	https://ww	Journal of	Scopus
98	J	M., Rom	How relati	2021	14	Backgroun	Drafts; Market Value;	Article	10.3390/sp	https://ww	Sports	Scopus
99	J	S., Majev	Football pl	2021	3	Brand build	Econometrics; Footbal	Article	10.7752/jp	https://ww	Journal of	Scopus
100	J	S., Jiang,	Do politica	2021	66	With the co	Fiscal Incentives; Mar	Article	10.1016/j.i	https://ww	Marine Po	Scopus
101	J	A., Metel	Factors aff	2021	13	The transfe	Ekstraklasa; Football;	Article	10.7752/jp	https://ww	Journal of	Scopus
102	J	S., Hoey,	The transf	2021	13	We assess	Antitrust; European Fc	Article	10.1016/j.i	https://ww	Internation	Scopus
103	J	Y., Kim,	Data-drive	2021	7	Transfer m	Data Analytics; Featur	Conference paper	10.1002/cp	https://ww	Concurren	Scopus
104	J	I., Behrav	A novel m	2021	37	Every year	Apso-clustering; Fifa 2	Article	10.1007/s0	https://ww	Soft Comp	Scopus
105	J	C., Li, Cl	Breeding a	2021	1	The Crops	Lodging Resistance; Q	Article	10.16768/j	https://ww	Guangdon	Scopus
106	J	P., Hame	THE FRA	2021	0	This article	Bosman; Eu Law; Fifa	Article		https://ww	Lawyer Qu	Scopus
107	J	D., Camp	Do soccer	2021	4	Soccer play	Accounting For Player	Article	10.1504/IJ	https://ww	Internation	Scopus
108	J	C., Liu, C	Trusted Pl	2021	8	With the w	Blockchain; Locality-s	Article	10.1109/A	https://ww	IEEE Acc	Scopus
109	J	S., MacIs	Re-brandir	2021	5	After the 2	Development; Formali	Article	10.1080/14	https://ww	Conflict, S	Scopus
110	J	T.K., Qu	The impor	2021	24	The COVI	Coronavirus; Covid-19	Article	10.3390/su	https://ww	Sustainabil	Scopus
111	J	C.A., Dep	Football tra	2021	16	This article	European Football; So	Article	10.1002/sc	https://ww	Southern E	Scopus
112	J	N., Oner,	The airpor	2021	18	This paper	Airport Shuttle Bus Se	Article	10.1080/0(	https://ww	Internation	Scopus
113	J	M., Serna	Factor ana	2021	3	Research q	Cluster Analysis; Disc	Article	10.1080/23	https://ww	Managing	Scopus
114	J	L.O., Ran	The revers	2021	19	Research q	Brazilian Soccer; Play	Article	10.1080/1(	https://ww	European	Scopus
115	J	P.E., Din	The impac	2021	38	Research q	Club Performance; Fir	Article	10.1080/1(	https://ww	European	Scopus
116	C	T., Okam	Consumer	2020	0	The e-com	Consumers' Priorities;	Conference paper	10.1145/34	https://ww	ACM Inter	Scopus
117	J	L., Liu, L	Compensa	2020	19	The goal of	Compensation Standar	Article	10.11975/j	https://ww	Nongye G	Scopus
118	J	W., Myu	Legal and	2020	1	[Purpose] T	Fa Compensation Syst	Article	10.24985/I	https://ww	Korean Jo	Scopus
119	J	Ž., Kokot	Whole-farı	2020	6	Crop produ	Crop Production; Insu	Article	10.3390/SI	https://ww	Sustainabil	Scopus
120	C	X., Zhang	Which are	2020	0	According	Earnings; Filtration; R	Conference paper	10.1088/1	https://ww	IOP Confe	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
121	J	L., Ma, L	Risk Identi	2020	3	This paper	Logistic Regression; P	Article	10.2112/SI	https://ww	Journal of	Scopus
122	J	B., Pérez	Are Europ	2020	13	The relativ	Economic Value; Rela	Article	10.3390/ij	https://ww	Internation	Scopus
123	J	W., Gong	Economic	2020	7	At present,	Back Calculation; Chi	Article	10.3787/j.i	https://ww	Natural Ga	Scopus
124	J	J., Leitho	Cost-awar	2020	28	We propos	Cooperative Strategies	Article	10.1016/j.r	https://ww	Renewable	Scopus
125	C	S., Thaku	Collusion /	2020	5	Offline cha	Banzhaf Index; Block	Conference paper	10.1007/97	https://ww	Springer P	Scopus
126	J	P., Garcia	Recruiting	2020	25	Purpose: T	Economic Valuation; (	Article	10.1108/M	https://ww	Manageria	Scopus
127	C	T., Decro	Player Vec	2020	24	Transfer fe	Budget Control; Data	Conference paper	10.1007/97	https://ww	Lecture N	Scopus
128	J	C., Poza,	A concept	2020	3	The aim of	Analytic Hierarchy Pr	Article	10.5232/ri	https://ww	RICYDE:	Scopus
129	J	S., Karag	Blockchair	2020	9	The main a	im of the study is to de	Book chapter	10.1007/97	https://ww	Contributi	Scopus
130	J	J., Hackir	Ignoring m	2019	6	According	3660; Behavioural Spo	Article	10.1016/j.j	https://ww	Journal of	Scopus
131	J	E., Winta	Reducing I	2019	0	In Indonesi	Flip.id; Free; Interbank	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
132	J	T.W., Ch	Transfer F	2019	2	[No abstrac	Z21	Note	10.1007/s1	https://ww	Internation	Scopus
133	J	M., Serna	Uncoverin	2019	20	This article	Bma; Ivbma; Mc3; So	Article	10.1177/15	https://ww	Journal of	Scopus
134	J	T., Kirscl	Assessing	2019	29	The paper	Market Value; Multiva	Article	10.1080/02	https://ww	Journal of	Scopus
135	R	T.A., Vel	Upward ar	2019	18	One questi	Boundaryless Careers;	Article	10.1016/j.s	https://ww	Sport Man	Scopus
136	J	W., Myu	Korean foo	2019	4	[Purpose] T	Football; Footballer; K	Article	10.24985/I	https://ww	Korean Jo	Scopus
137	J	M., Maci	Can player	2019	3	As Associa	Asset-backed Security	Article	10.1007/s4	https://ww	Internation	Scopus
138	J	D., Patna	A study of	2019	4	The global	Data-driven; Moneyba	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
139	J	J., Wu, Ji	Exploring	2019	14	Many prote	Capture Effect; China;	Article	10.1016/j.c	https://ww	Cities	Scopus
140	J	P., Singh,	Influence	2019	27	Every weel	Association Football; M	Article	10.1080/09	https://ww	Journal of	Scopus
141	R	S., Birkha	Did UEFA	2019	23	When intro	Competition; Financial	Article	10.1007/s1	https://ww	Review of	Scopus
142	J	T.A., Her	THIRD PA	2019	1	Football co	Governance; Sport Ma	Article	10.22495/j	https://ww	Journal of	Scopus
143	J	H., Granr	Artists' roy	2019	9	In this pape	Artists' Resale Royalti	Article	10.30819/c	https://ww	Cultural M	Scopus
144	C	C., Pan, (	Gnocchi: M	2019	6	As the und	Bidirectional Payment	Conference paper	10.1007/97	https://ww	Lecture N	Scopus
145	J	T., Obuch	Comparati	2019	5	This study	Bovine Female Embry	Article	10.1262/jr	https://ww	Journal of	Scopus
146	J	M., Li, M	Network a	2019	8	The transfer of football players is		Article	10.1209/02	https://ww	Europhysi	Scopus
147	J	W., Andr	Financial a	2018	27	Despite the	Disequilibrium Modelli	Article	10.3390/ij	https://ww	Internation	Scopus
148	C	J., Leitho	Renewable	2018	5	We propos	Cooperation; Optimiza	Conference paper	10.23919/I	https://ww	European	Scopus
149	C	J., Leitho	Cooperativ	2018	3	We propos	Non-convex Optimizat	Conference paper	10.23919/I	https://ww	European	Scopus
150	J	B., Krenr	Does Facia	2018	11	A growing	Aggression; Dominanc	Article	10.1177/14	https://ww	Evolutiona	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
151	J	J., Pairan	Remittanc	2018	7	In many lo	Disaster Risk Manage	Article	10.1007/s1	https://ww	Internation	Scopus
152	R	T.A., Vel	A game of	2018	18	Globalizati	Careers; Domestic Mc	Article	10.1177/1(	https://ww	Internation	Scopus
153	J	F., Chen,	Rethinking	2018	28	China has	Inclusive Growth; Lan	Article	10.3390/su	https://ww	Sustainabil	Scopus
154	J	H., Riepe	Profession	2018	3	The top fo	Bundesliga; Injuries; L	Article	10.1016/j.(	https://ww	Sports Ort	Scopus
155	J	C., Gaum	On the wo	2018	7	Neymar da	Aesthetics; Contingenc	Article	10.1007/s1	https://ww	German Jc	Scopus
156	J	J.Z., Zha	The rise o	2018	56	This paper	Infrastructure Finance	Article	10.1080/2	https://ww	Journal of	Scopus
157	J	U., Demi	Server-Bas	2018	27	Mass trans	Bus Transportation; D	Article	10.1109/M	https://ww	IEEE Intel	Scopus
158	J	E.B., Ak	Natural Re	2018	0	The purpo	Incomplete Contract; I	Review	10.1007/s1	https://ww	Environme	Scopus
159	J	B., Gerra	Managing	2018	1	This chapter introduces high perfo	Book chapter	10.4324/9	https://www.scopus.c	Scopus		
160	J	Y.M., Pe	The oppor	2018	20	Despite the	Digital Economy; Fina	Article	10.21511/i	https://ww	Investmen	Scopus
161	J	H., Fu, H	Risk transf	2018	20	The risk m	Agricultural Products;	Article	10.1155/2(	https://ww	Complexity	Scopus
162	J	C., Zhang	Use-based	2018	4	This paper	Bertrand Game; Custo	Article	10.1109/A	https://ww	IEEE Acce	Scopus
163	J	I.V., Soln	Bargaining	2018	1	The article	Bargaining Power; Est	Article	10.18288/1	https://ww	Ekonomicl	Scopus
164	J	I.A., Zay	Social capi	2018	1	Social capi	Collective Action; Fifa	Article	10.31737/2	https://ww	Zhournal N	Scopus
165	C	E., Damia	Porting the	2018	2	Pay with a	Crypto Currency; Pay	Conference paper	10.1007/9	https://ww	Lecture No	Scopus
166	J	L., Colan	The Sell-o	2018	0	The use of	Contracts; Fifa—cas J	Book chapter	10.1007/9	https://www.scopus.c	Scopus	
167	J	O., Mülle	Beyond cr	2017	123	Association	Crowdsourcing; Footb	Article	10.1016/j.(	https://ww	European .	Scopus
168	J	C., Liao,	Examining	2017	11	A large nur	Developed Land; Driv	Article	10.3390/ij	https://ww	ISPRS Int	Scopus
169	J	T.A., Her	Does Selec	2017	8	The paper	Football Transfers; Hu	Article	10.1080/2	https://ww	Journal of	Scopus
170	J	D., Weim	Moneyball	2017	45	In Moneyb	Bundesliga; Distance;	Article	10.1177/1	https://ww	Journal of	Scopus
171	J	U., Rosar	Physical at	2017	3	That attractive people are more su	Article	10.1080/1	https://ww	Soccer and	Scopus	
172	J	A., Lardo	Social mec	2017	61	Purpose: T	Football Clubs; Intelle	Article	10.1108/JI	https://ww	Journal of	Scopus
173	J	J., Kakhk	Transactio	2017	32	Labour mi	Migration; Money Tra	Article	10.1016/j.(	https://ww	Economic	Scopus
174	J	P., Suau-	Measuring	2016	34	One of the	Air Transport Networl	Article	10.1016/j.j	https://ww	Journal of	Scopus
175	J	M., Marc	The Bosm	2016	7	This paper	Bosman Ruling; Coton	Article	10.1007/s1	https://ww	European .	Scopus
176	J	S., Majev	Identificati	2016	42	Purpose: T	Econometrics; Econon	Review	10.7206/jn	https://ww	Journal of	Scopus
177	R	M., Miral	Multi-perio	2016	49	This study	Equilibrium Credit Pri	Article	10.1016/j.(	https://ww	Transporta	Scopus
178	J	S., Szym	Testing the	2016	2	This paper	O-ring Theory; Optim	Article	10.1016/j.(	https://ww	Research i	Scopus
179	C	R.S., Star	Towards I	2016	20	Understanc	Data Mining; Football;	Conference paper	10.1109/IC	https://ww	IEEE Inter	Scopus
180	J	I.K., Whi	Transfer o	2016	19	Objective (	Cost; Linear; Pediatric	Article	10.3171/2(	https://ww	Journal of	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
181	J	S.L., Bro	The impac	2016	15	Purpose: T	Ncaa Football; Quantil	Article	10.1108/M	https://ww	Manageria	Scopus
182	J	J., Lindh	Can I plea	2016	6	Trading fo	Competition Law; Eu	Article	10.1007/s	https://ww	Internation	Scopus
183	J	M., Greg	To invite c	2015	2	We study a	Access Fee; Attention;	Article	10.1515/b	https://ww	B.E. Journ	Scopus
184	J	P., Rao S	Status, Pe	2015	5	This paper	European Labour Law	Article	10.1007/s1	https://ww	Journal of	Scopus
185	R	S., Herm.	When the	2014	121	Evaluating	Crowd Valuation; Hun	Article	10.1016/j.	https://ww	Sport Man	Scopus
186	J	B.J., Fric	The footba	2014	6	This chapter will chart the develo		Book chapter	10.4337/9	https://www.scopus.c		Scopus
187	J	B., Gerra	Achieving	2014	5	The core production process in pr		Book chapter	10.4337/9	https://www.scopus.c		Scopus
188	C	I., Lim, I	The analys	2014	31	Due to the	Bitcoin; Bitcoin Securi	Conference paper	10.1007/9	https://ww	Lecture N	Scopus
189	J	L., Zhao,	A cooperat	2014	4	A cooperat	Cooperation; Interjuris	Article	10.1111/ja	https://ww	Journal of	Scopus
190	J	M.F., Ch	Solidarity	2013	2	The presen	Contract; Fifa; Solidar	Article	10.1007/s	https://ww	Internation	Scopus
191	J	P.R., For	The Acqui	2013	0	Winning soccer matches is the ma		Book chapter	10.4324/9	https://www.scopus.c		Scopus
192	J	W., Chen	Incentive	2012	2	This paper	Effort Extent; Incentiv	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
193	J	M.F., En	Trap appli	2012	0	The electro	Bank Fraud; Cyber Cr	Conference paper	10.1109/A	https://www.scopus.c		Scopus
194	J	S., Weath	Sport as C	2012	0	Professiona	Broadcasting Rights; E	Book chapter	10.1093/ac	https://www.scopus.c		Scopus
195	J	L., Wang	Carbon em	2011	2	Considering	Equivalent Price Of C	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
196	J	L., Wang	Carbon tax	2011	5	Through al	Carbon Emission Redu	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
197	J	L., Wang	Risk analy	2011	0	Athlete-clu	Athlete; Risk Analysis;	Conference paper	10.1109/IC	https://www.scopus.c		Scopus
198	J	F.J., Mar	Deficits of	2011	24	Football pla	"cantera"; Accounting	Article	10.1007/s(	https://ww	Journal of	Scopus
199	J	S., Hamil	The gover	2010	48	Italian football represents a parad		Article	10.1080/14	https://ww	Soccer and	Scopus
200	J	P., Chen,	Stochastic	2010	72	This paper	Correlation; Monte Ca	Article	10.1109/T	https://ww	IEEE Tran	Scopus
201	J	J., Yao, J	An iteratio	2010	1	This paper	Iteration Algorithm; Lo	Article	10.3963/j.i	https://ww	Wuhan Lig	Scopus
202	J	Y., Takal	Moving wi	2010	0	Research interest in the movemen		Book chapter	10.4324/9	https://www.scopus.c		Scopus
203	J	H., Boba	The financ	2009	0	The financ	Commercial Business;	Conference paper	10.1049/cp	https://www.scopus.c		Scopus
204	J	B., Jungw	Analysis o	2009	2	In knowled	Economic Values; Glo	Conference paper	10.1109/P	https://www.scopus.c		Scopus
205	J	C.L., Fre	Remittance	2008	220	Recorded v	Migration; Money Tra	Article	10.1016/j.j	https://ww	Journal of	Scopus
206	J	H., Gurn	Supply co	2008	144	We conside	Information Asymmet	Article	10.1002/na	https://ww	Naval Res	Scopus
207	J	H.M., Di	Why footb	2008	11	Transfer restrictions have a long t		Article	10.1007/s1	https://ww	European .	Scopus
208	J	B.J., Fric	The footba	2007	192	The growir	Economic Growth; En	Review	10.1111/j.	https://ww	Scottish Jo	Scopus
209	J	M.A., Ha	Competitiv	2007	21	A world without soccer is unimagi		Book chapter	10.1201/9	https://www.scopus.c		Scopus
210	J	L., Popp	The norma	2006	10	Consider the following stories reg		Book chapter	10.1007/9	https://www.scopus.c		Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
211	J	M., Tervi	Transfer fe	2006	19	This paper studies the role of tran		Article	10.1162/JI	https://ww	Journal of	Scopus
212	R	E., Feess,	Transfer fe	2003	43	We analyze	Bosman Judgement; B	Article	10.1016/S(	https://ww	European	Scopus
213	J	E., Feess,	The impac	2003	23	We evaluat	Bosman Judgement; G	Article	10.1111/1-	https://ww	Scandinavi	Scopus
214	J	E., Feess,	Economie	2002	18	We discuss	Bosman Judgement; E	Article	10.1023/A	https://ww	European	Scopus
215	R	N., Rowb	The Applic	2002	27	This paper investigates the use of		Review	10.1006/be	https://ww	British Acc	Scopus
216	J	A., Dilger	"The Erics	2001	2	Ericson argued in this journal that		Article	10.1177/1:	https://ww	Journal of	Scopus
217	J	K., Lackr	Die neue k	2001	1	In 1995, on the occasion of the le		Article	10.1007/s1	https://ww	Gruppendy	Scopus
218	J	B., Gerra	Testing for	2000	31	Using the t	Economics; Football; I	Article	10.1108/0	https://ww	Journal of	Scopus
219	J	T., Ericsc	The Bosm	2000	32	A league benefits from signing a c		Article	10.1177/1:	https://ww	Journal of	Scopus
220	J	S.M., Do	The deterr	2000	36	In recent y	Economic Analysis; M	Article	10.1080/0(	https://ww	Applied Ec	Scopus
221	J	S.M., Do	The deterr	1999	62	Unlike most major U.S. sport tear		Article	10.1123/js	https://ww	Journal of	Scopus
222	J	F., Carmi	The labour	1999	63	This paper	Labor Market; Sport;	Article	10.1111/1-	https://ww	Bulletin of	Scopus
223	J	A.E.H., S	Arbitrator	1997	21	This paper analyses data generate		Article	10.1111/1-	https://ww	Scottish Jo	Scopus
224	J	A.E.H., S	Football le	1997	19	This paper investigates the differe		Review	10.1080/7:	https://ww	Applied Ec	Scopus
225	J	R., Simm	Implicatior	1997	56	This paper seeks to assess the imp		Article	10.1111/1-	https://ww	Economic	Scopus
226	J	C., Peter	Inositol lip	1993	5	[No abstract available]		Article	10.1016/0(	https://ww	Current Bi	Scopus
227	J	F., Carmi	Bargaining	1993	72	This paper examines the transfer r		Article	10.1080/0(	https://ww	Applied Ec	Scopus
228	J	A.L., Boc	Redundanc	1989	14	This paper	Firm-specific Training	Article	10.2307/2:	https://ww	Economica	Scopus
229	J	Hanke, M	Football cl	2013	9	Corporate s	sports sponsorship; ad	Article	10.1080/1:	http://dx.d	EUROPEA	WoS
230	J	Myftiu, A	Does Marl	2025	0	This study	Market value; Game a	Article			INTERNA	WoS
231	J	Chen, YY	The Effect	2019	11	This paper	event study; European	Article; Proceedin	10.32731/I	http://dx.d	INTERNA	WoS
232	J	Sanchez,	Are footba	2024	3	Purpose: T	Sport economics; foot	Article	10.1080/2:	http://dx.d	MANAGII	WoS
233	J	Tang, W	Game char	2024	0	Our investi		Article	10.1002/m	http://dx.d	MANAGE	WoS
234	J	Lee, YH;	Do uncerta	2024	1	PurposeTh	Ticket pricing; Second	Article	10.1108/S	http://dx.d	SPORT B	WoS
235	J	Hadley, E	Redefining	2025	0	The Nation	NFL; draft pick; pick v	Article	10.3389/fs	http://dx.d	FRONTIE	WoS
236	J	Quansah,	Determinir	2024	8	Research q	Ticket pricing; compet	Article	10.1080/1(	http://dx.d	EUROPEA	WoS
237	J	Huefner,	Value-base	2017	5	This paper	value-based pricing; pr	Article	10.1057/s4	http://dx.d	JOURNAL	WoS
238	J	Bradbury	Financial F	2021	5	Major Leag	soccer; professional sp	Article	10.1177/1:	http://dx.d	JOURNAL	WoS
239	J	Hinterhub	Pricing pra	2023	2	Revenue m	Revenue management;	Article	10.1057/s4	http://dx.d	JOURNAL	WoS
240	J	Courty, P	The Impac	2020	18	Toward the	variable pricing; dynan	Article	10.1177/1:	http://dx.d	JOURNAL	WoS

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
241	C	Nsolo, E;	Player Val	2019	10	As the succ	Sports analytics; Data	Proceedings Paper	10.1007/9	http://dx.d	MACHINI	WoS
242	J	Salaga, S.	Determina	2015	12	A strong se	National Football Leag	Article	10.1177/1	http://dx.d	JOURNAL	WoS
243	J	Majewski	Econometr	2018	1	Sports spor	Stock price valuation;	Article	10.5605/IE	http://dx.d	AESTIMA	WoS
244	J	Tang, M(	Contract L	2015	8	This study	contract length; expect	Article	10.1177/1	http://dx.d	JOURNAL	WoS
245	C	Brotons, .	A MODEL	2010	0	The need t		Proceedings Paper	10.1142/9	http://dx.d	COMPUT	WoS
246	J	Follert, F.	A decision	2024	6	PurposeFro	Football; Valuation; In	Article	10.1108/M	http://dx.d	MANAGE	WoS
247	J	Lee, YH;	Does time	2023	4	PurposePri	Ticket pricing; Second	Article	10.1108/S	http://dx.d	SPORT B	WoS
248	J	Rohde, M	The marke	2017	99	Research o	Sports economics; clul	Review	10.1080/1(	http://dx.d	EUROPE/	WoS
249	J	Ahtiainen	Has UEFA	2022	43	Research q	Break-even rule; finan	Article	10.1080/1(	http://dx.d	EUROPE/	WoS
250	J	Serrano,	Financial f	2023	6	Purpose Tl	Financial fair play; Eur	Article	10.1108/S	http://dx.d	SPORT B	WoS
251	J	Angelini,	Efficiency	2019	62	This paper	Market efficiency; Spo	Article	10.1016/j.i	http://dx.d	INTERNA	WoS
252	J	Megía-Ca	Valuation	2023	3	This paper		Article	10.1002/m	http://dx.d	MANAGE	WoS
253	J	Prigge, S;	Efficiency	2022	2	Purpose Tl	Listed football clubs; M	Article	10.1108/M	http://dx.d	MANAGE	WoS
254	J	Wheatcro	A profitabl	2020	12	The over/u	Probability forecasting	Article	10.1016/j.i	http://dx.d	INTERNA	WoS
255	J	Prinz, A;	Value-max	2021	4	In this pap	football; players as ass	Article	10.1111/sj	http://dx.d	SCOTTIS	WoS
256	J	Prigge, S;	Market va	2019	21	Purpose Tl	Risk analysis; Asset pr	Article	10.1108/S	http://dx.d	SPORT B	WoS
257	J	Serrano,	Expected c	2015	39	The aim of	L83; D12; uncertainty	Article	10.1080/1	http://dx.d	APPLIED	WoS
258	J	Nicoliello	Football cl	2016	30	Purpose - I	Profitability; Football;	Article	10.1108/S	http://dx.d	SPORT B	WoS
259	J	Pantuso,	Maximizin	2021	14	Composing	Association football; T	Article	10.1007/s1	http://dx.d	TOP	WoS
260	J	Shapiro, S	An examin	2014	43	Over the pa	Sport finance; Dynam	Article	10.1016/j.s	http://dx.d	SPORT M	WoS
261	J	Vlastakis,	How Effic	2009	62	This paper	betting markets; marke	Article	10.1002/fo	http://dx.d	JOURNAL	WoS
262	J	Menary, S	The Price	2021	0			Book Review	10.1080/1	http://dx.d	SOCCER	WoS
263	J	Borghesi,	Pay for pla	2017	10	We explore	NCAA Football; recrui	Article	10.1080/0(	http://dx.d	APPLIED	WoS
264	J	Hofer, V;	Relative pr	2017	3	Live socce	Binary options; Sports	Article	10.1016/j.j	http://dx.d	JOURNAL	WoS
265	J	Amir, E;	Accounting	2005	67	FRS 10 rec	FRS 10; intangible ass	Article; Proceedin	10.1111/j.(	http://dx.d	JOURNAL	WoS

2. The complete list of studies included after the screening phase is available here (*ThesisDatabase - Identification, Screening.xlsx*).

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
10	J	Q., Shen, (	Predicting	2025	1	The study	Dempster-shafer Th	Article	10.1007/s1	https://ww	Applied In	Scopus
13	J	D.F., Hill,	A review c	2025	2	This paper	Corporate Finance I	Article	10.1080/2	https://ww	Managing	Scopus
23	J	S., Corsar	The evalua	2025	1	The global	Expected Goal; Mac	Article	10.1007/s1	https://ww	Annals of	Scopus
32	J	M., Franc	Determina	2024	22	As a result	Football Players' M	Article	10.1111/jc	https://ww	Journal of	Scopus
36	J	S., Merten	Fan identif	2024	6	Purpose: I	Athlete Brand; Fan	Article	10.1108/S	https://ww	Sport, Bus	Scopus
37	J	M., Di Do	The Appra	2024	2	This paper	Asset Management;	Article	10.32731/I	https://ww	Internation	Scopus
49	J	C., Thran	Using com	2024	3	Purpose: T	Composite Variable	Article	10.1080/2	https://ww	Managing	Scopus
56	J	P., Malag	Measuring	2023	7	Google Tr	Article; Football Pla	Article	10.1371/jc	https://ww	PLOS ON	Scopus
62	J	N., Leifhe	Financial p	2023	15	1. Rationa	Finance; Football; I	Article	10.1080/2	https://ww	Managing	Scopus
64	J	M.D.A., P	Contribute	2023	1	The top tie	Consumption; Data	Article	10.14569/I	https://ww	Internation	Scopus
67	J	R., Johans	Zlatan Ibra	2023	2	In Octobe	0	Article	10.1080/1	https://ww	Soccer and	Scopus
77	J	D.C., Coa	The wisdo	2022	39	Crowd-sou	Decision Support; F	Article	10.1016/j.	https://ww	European	Scopus
78	J	G., Rubio,	Measuring	2022	16	Purpose: T	Crowdsourcing; Fin	Article	10.1108/JI	https://ww	Journal of	Scopus
79	J	M., Užík,	Manageme	2022	2	The intent	Football Player; Ma	Article	10.3390/m	https://ww	Mathemati	Scopus
83	J	M., Ballia	Does the q	2022	11	Purpose: F	Football; Multiple R	Article	10.1108/S	https://ww	Sport, Bus	Scopus
88	J	V., Steve	Predicting	2022	6	The doma	Machine Learning;	Conference paper	10.1109/IC	https://ww	0	Scopus
91	J	M.A., Al-A	Predict the	2022	58	Football is	Fifa Video Game D	Article	10.1109/A	https://ww	IEEE Acc	Scopus
92	J	R., Poli, R	Econometr	2022	17	Billions of	Econometric Model	Article	10.3390/ec	https://ww	Economies	Scopus
98	J	M., Roma	How relati	2021	14	Backgroun	Drafts; Market Valu	Article	10.3390/sp	https://ww	Sports	Scopus
99	J	S., Majew	Football pl	2021	3	Brand buil	Econometrics; Foot	Article	10.7752/jp	https://ww	Journal of	Scopus
101	J	A., Metels	Factors aff	2021	13	The transf	Ekstraklasa; Footba	Article	10.7752/jp	https://ww	Journal of	Scopus
103	J	Y., Kim, Y	Data-drive	2021	7	Transfer n	Data Analytics; Fea	Conference paper	10.1002/cp	https://ww	Concurren	Scopus
104	J	I., Behrav	A novel m	2021	37	Every yea	Apso-clustering; Fif	Article	10.1007/s(	https://ww	Soft Comp	Scopus
108	J	C., Liu, Cl	Trusted Pl	2021	8	With the w	Blockchain; Locality	Article	10.1109/A	https://ww	IEEE Acc	Scopus
110	J	T.K., Qua	The impor	2021	24	The COVI	Coronavirus; Covid	Article	10.3390/su	https://ww	Sustainabil	Scopus
111	J	C.A., Dep	Football tr	2021	16	This article	European Football;	Article	10.1002/sc	https://ww	Southern I	Scopus
113	J	M., Serna	Factor ana	2021	3	Research c	Cluster Analysis; Di	Article	10.1080/2	https://ww	Managing	Scopus
128	J	C., Poza, (	A concept	2020	3	The aim o	Analytic Hierarchy	Article	10.5232/ri	https://ww	RICYDE:	Scopus
137	J	M., Macie	Can player	2019	3	As Associa	Asset-backed Secur	Article	10.1007/s4	https://ww	Internation	Scopus
138	J	D., Patnail	A study of	2019	4	The global	Data-driven; Money	Conference paper	10.1109/IC	https://ww	0	Scopus

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
140	J	P., Singh,	Influence	2019	27	Every wee	Association Football	Article	10.1080/0	https://ww	Journal of	Scopus
146	J	M., Li, Mi	Network a	2019	8	The transf	0	Article	10.1209/0	https://ww	Europhysi	Scopus
152	R	T.A., Vele	A game of	2018	18	Globalizati	Careers; Domestic	Article	10.1177/1	https://ww	Internation	Scopus
154	J	H., Riepen	Profession	2018	3	The top fo	Bundesliga; Injuries	Article	10.1016/j.	https://ww	Sports Ort	Scopus
155	J	C., Gaum,	On the wo	2018	7	Neymar da	Aesthetics; Continge	Article	10.1007/s1	https://ww	German Jo	Scopus
167	J	O., Müller	Beyond cr	2017	123	Associatio	Crowdsourcing; Foc	Article	10.1016/j.	https://ww	European .	Scopus
169	J	T.A., Herb	Does Selec	2017	8	The paper	Football Transfers;	Article	10.1080/2	https://ww	Journal of	Scopus
171	J	U., Rosar,	Physical at	2017	3	That attrac	0	Article	10.1080/1	https://ww	Soccer and	Scopus
172	J	A., Lardo,	Social med	2017	61	Purpose: T	Football Clubs; Inte	Article	10.1108/JI	https://ww	Journal of	Scopus
175	J	M., Marcé	The Bosm	2016	7	This paper	Bosman Ruling; Co	Article	10.1007/s1	https://ww	European .	Scopus
176	J	S., Majew	Identificati	2016	42	Purpose: T	Econometrics; Econ	Review	10.7206/jn	https://ww	Journal of	Scopus
179	C	R.S., Stan	Towards I	2016	20	Understan	Data Mining; Footb	Conference paper	10.1109/IC	https://ww	IEEE Inter	Scopus
181	J	S.L., Broo	The impac	2016	15	Purpose: T	Ncaa Football; Qua	Article	10.1108/M	https://ww	Manageria	Scopus
182	J	J., Lindhol	Can I plea	2016	6	Trading fo	Competition Law; E	Article	10.1007/s4	https://ww	Internation	Scopus
185	R	S., Herm,	When the	2014	121	Evaluating	Crowd Valuation; H	Article	10.1016/j.	https://ww	Sport Man	Scopus
187	J	B., Gerrar	Achieving	2014	5	The core p	0	Book chapter	10.4337/9	https://ww	0	Scopus
198	J	F.J., Martí	Deficits of	2011	24	Football pl	"cantera"; Accounti	Article	10.1007/s0	https://ww	Journal of	Scopus
207	J	H.M., Die	Why footb	2008	11	Transfer r	0	Article	10.1007/s1	https://ww	European .	Scopus
208	J	B.J., Frick	The footba	2007	192	The growi	Economic Growth;	Review	10.1111/j.	https://ww	Scottish Jo	Scopus
210	J	L., Poppo,	The norma	2006	10	Consider t	0	Book chapter	10.1007/9	https://ww	0	Scopus
227	J	F., Carmic	Bargaining	1993	72	This paper	0	Article	10.1080/0	https://ww	Applied Ec	Scopus
246	J	Follert, F;	A decision	2024	6	PurposeFr	Football; Valuation;	Article	10.1108/M	http://dx.d	MANAGE	WoS

3. The complete list of the studies deemed eligible after the full-text assessment phase is available here (*ThesisDatabase - Identification, Screening, Eligibility Assessment.xlsx*)

ID	Publication Type	Authors	Title	Year	Cited by	Abstract	Author Keywords	Document Type	DOI	Link/DOI	Source	Database
10	Journal	Q., Shen, (	Predicting	2025	1	The study	Dempster-shafer Th	Article	10.1007/s1	https://ww	Applied In	Scopus
13	Journal	D.F., Hill,	A review c	2025	2	This paper	Corporate Finance M	Article	10.1080/2	https://ww	Managing	Scopus
23	Journal	S., Corsar	The evalua	2025	1	The global	Expected Goal; Mac	Article	10.1007/s1	https://ww	Annals of	Scopus
32	Journal	M., Franc	Determina	2024	22	As a result	Football Players' Ma	Article	10.1111/jo	https://ww	Journal of	Scopus
36	Journal	S., Merten	Fan identif	2024	6	Purpose: I	Athlete Brand; Fan I	Article	10.1108/SI	https://ww	Sport, Bus	Scopus
37	Journal	M., Di Do	The Appra	2024	2	This paper	Asset Management;	Article	10.32731/I	https://ww	Internation	Scopus
49	Journal	C., Thrane	Using com	2024	3	Purpose: T	Composite Variables	Article	10.1080/2	https://ww	Managing	Scopus
56	Journal	P., Malagó	Measuring	2023	7	Google Tr	Article; Football Play	Article	10.1371/jo	https://ww	PLOS ON	Scopus
62	Journal	N., Leifhe	Financial p	2023	15	1. Rational	Finance; Football; In	Article	10.1080/2	https://ww	Managing	Scopus
64	Journal	M.D.A., P	Contribute	2023	1	The top tie	Consumption; Data	Article	10.14569/I	https://ww	Internation	Scopus
77	Journal	D.C., Coat	The wisdo	2022	39	Crowd-sou	Decision Support; Fi	Article	10.1016/j.(	https://ww	European	Scopus
78	Journal	G., Rubio,	Measuring	2022	16	Purpose: T	Crowdsourcing; Fina	Article	10.1108/JI	https://ww	Journal of	Scopus
79	Journal	M., Užík,	Manageme	2022	2	The intenti	Football Player; Mat	Article	10.3390/m	https://ww	Mathemati	Scopus
83	Journal	M., Balliau	Does the q	2022	11	Purpose: F	Football; Multiple R(	Article	10.1108/S	https://ww	Sport, Bus	Scopus
88	Journal	V., Steve A	Predicting	2022	6	The domai	Machine Learning; M	Conference paper	10.1109/IC	https://ww	0	Scopus
91	Journal	M.A., Al-A	Predict the	2022	58	Football is	Fifa Video Game Da	Article	10.1109/A	https://ww	IEEE Acc	Scopus
92	Journal	R., Poli, R	Econometr	2022	17	Billions of	Econometric Model;	Article	10.3390/ec	https://ww	Economies	Scopus
98	Journal	M., Roma	How relati	2021	14	Backgroun	Drafts; Market Valu	Article	10.3390/sp	https://ww	Sports	Scopus
99	Journal	S., Majew	Football pl	2021	3	Brand buil	Econometrics; Footb	Article	10.7752/jp	https://ww	Journal of	Scopus
103	Journal	Y., Kim, Y	Data-drive	2021	7	Transfer m	Data Analytics; Feat	Conference paper	10.1002/cp	https://ww	Concurren	Scopus
104	Journal	I., Behrava	A novel m	2021	37	Every yea	Apso-clustering; Fifa	Article	10.1007/s(	https://ww	Soft Comp	Scopus
113	Journal	M., Serna	Factor ana	2021	3	Research c	Cluster Analysis; Dis	Article	10.1080/2	https://ww	Managing	Scopus
128	Journal	C., Poza, (	A conceptu	2020	3	The aim o	Analytic Hierarchy F	Article	10.5232/ri	https://ww	RICYDE:	Scopus
140	Journal	P., Singh,	Influence c	2019	27	Every wee	Association Football	Article	10.1080/0(	https://ww	Journal of	Scopus
152	Review	T.A., Vele	A game of	2018	18	Globalizati	Careers; Domestic M	Article	10.1177/1(	https://ww	Internation	Scopus
154	Journal	H., Riepen	Profession	2018	3	The top fo	Bundesliga; Injuries;	Article	10.1016/j.(	https://ww	Sports Ort	Scopus
167	Journal	O., Müller	Beyond cr	2017	123	Associatio	Crowdsourcing; Foo	Article	10.1016/j.(	https://ww	European	Scopus
169	Journal	T.A., Herb	Does Selec	2017	8	The paper	Football Transfers; I	Article	10.1080/2	https://ww	Journal of	Scopus
172	Journal	A., Lardo,	Social med	2017	61	Purpose: T	Football Clubs; Intel	Article	10.1108/JI	https://ww	Journal of	Scopus
176	Journal	S., Majew	Identificati	2016	42	Purpose: T	Econometrics; Econ	Review	10.7206/jn	https://ww	Journal of	Scopus
179	Conference Paper	R.S., Stan	Towards I	2016	20	Understan	Data Mining; Footba	Conference paper	10.1109/IC	https://ww	IEEE Inter	Scopus
181	Journal	S.L., Broo	The impac	2016	15	Purpose: T	Ncaa Football; Quan	Article	10.1108/M	https://ww	Manageria	Scopus
185	Review	S., Herm,	When the	2014	121	Evaluating	Crowd Valuation; H	Article	10.1016/j.s	https://ww	Sport Man	Scopus
246	Journal	Follert, F;	A decision	2024	6	PurposeFr	Football; Valuation;	Article	10.1108/M	http://dx.d	MANAGE	WoS

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