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*Preparing for a Disruptive Future –
The Role of Strategic Foresight and Leadership for Organizational Success in the
Sports Ecosystem*

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List of Abbreviations

ATI	Affinity for technology interaction
cf.	Compare (Latin: ‘confer’)
CFA	Confirmatory factor analysis
CI	Confidence interval
COVID-19	Coronavirus disease
CSM	Center for Sports and Management
D	Desirability
e.g.	For example (Latin: ‘exempli gratia’)
EP	Expected Probability
et al.	And others (Latin: ‘et alii/aliae’)
etc.	And so on (Latin: ‘et cetera’)
EU	European Union
FCM	Fuzzy c-means clustering
FIFA	Fédération Internationale de Football Association
GDP	Gross domestic product
I	Impact
i.e.	That is (Latin: ‘id est’)
IFAB	International Football Association Board
IoT	Internet of things
IQR	Interquartile range
ITT	Intention to use technology
LL	Lower limit
No.	Number
OCB	Organizational citizenship behavior

p.	Page
PANAS	Positive affect negative affect scale
PEST	Political, economic, social, technological
REEST	Regulatory, economic – revenue, economic – cost, social, technological
SPOAC	Sports Business Academy by WHU
UEFA	Union of European Football Associations
UL	Upper limit
WHU	WHU – Otto Beisheim School of Management

List of Symbols

B	Regression coefficient
df	Degrees of freedom
M	Mean
N, n	Sample size (N = total sample size; n = size of a particular group)
p	Probability (the probability value, p-value or significance of a test)
r	Effect size in planned contrasts
R	Pearson's correlation coefficient
R ²	Coefficient of determination
SD	Standard deviation
SE	Standard error
t	t-test statistic
U	Mann-Whitney U statistic
z	Standard scores
%	Percent

1 Introduction

“Planning is everything, the plan is nothing.”

– Dwight D. Eisenhower

With his memorable statement, the former president of the United States, Dwight D. Eisenhower, emphasized the importance of what scientific scholars call *future-making practices* (Wenzel et al., 2020). Interestingly though, these future-making practices and the deliberate confrontation with the future are actually quite recent phenomena in human sociology (Rosa, 2005). In pre-modern times, the future was perceived as largely predetermined and therefore outside the sphere of human influence (Koselleck, 1988). Hence, future-making practices were basically limited to preaching and praying, implying an inevitable and irrevocable end state for human existence (Hölscher, 1999). This notion changed during the 18th century, in which the future became an integral part of human life, as it was increasingly perceived to be influenceable and thus makeable (Koselleck, 1988; Reckwitz, 2016). Consequently, people started to envision a desired future and developed processes to reach their self-determined goals; in other words: They started planning. In fact, this novel mindset in society could be seen as a fundamental prerequisite for the industrialized world as we know it today. Therefore, early modernity (18th to 19th century) can be understood as the natal hour of *planning* as the prevalent future-making practice (Wenzel et al., 2020).

The aspirations to plan the future increased up until a period that Wagner (1994) called the *organized modernity* (early 20th century to 1970s). In this era, nearly every organization had deployed planning processes, and the scientific rise of the strategic management discipline brought new planning measures to light, including tools like decision trees or scenario planning (Whittington et al., 2017). At that time, both practitioners and scholars formed a sense of certainty about future developments that could essentially be controlled (Reckwitz, 2016). However, this

perception had its limits, as Eisenhower pointed out aptly with his statement about worthless plans and precious planning. The increasing occurrence of *unknown unknowns* (Teece & Leih, 2016) in the late modernity (from the 1980s) has initiated a rediscovery of "the future as a prevalent temporal category in social and organizational life that is far from self-evident" (Wenzel et al., 2020, p. 1447). Against this backdrop, scholars recently introduced more holistic views on strategic foresight and its role for organizational future preparedness (A. V. Gordon et al., 2020; Højland & Rohrbeck, 2018; Rohrbeck & Kum, 2018). Not only did they show that well-prepared companies perform better, but they also pointed out the importance of the interaction between (software-supported) quantitative foresight measures and the more qualitative knowledge that subject matter experts can bring to the table (Rohrbeck et al., 2015; Rohrbeck & Schwarz, 2013). In the same vein, Wenzel et al. (2020) asked for more thorough examinations of future-making practices in today's context of amplified uncertainty and motivated scholars to become "skillful performers of these practices themselves" (p.1451).

The motivation of this dissertation is to address this identified need in the field of future-oriented research by elaborating on the role of strategic foresight and leadership for organizational success. Especially in today's time of severe disruption – be it the wide-ranging consequences of the COVID-19 pandemic or the accelerated technological transformation across all areas of society – the future is more uncertain than ever before (S. L. Schmidt, 2020b). While this holds true for almost all industries, it particularly applies in the professional sphere of sports.

1.1 Current State of Research

As this dissertation is supposed to contribute to methodological advancements of future-oriented research, the review of the current state of scientific work starts with a focus on literature on the Delphi method in particular. Delphi is a scientific method to organize and manage structured group communication processes with the aim of generating insights on either current or prospective challenges; especially in situations with limited availability of information (Dalkey &

Helmer, 1963; Kendall, 1977; Rowe & Wright, 2011; Scheibe et al., 1975). As such, it has been frequently used in various scientific disciplines ranging from health care (Boulkedid et al., 2011; Ferri et al., 2005; A. C. Lee et al., 2011; Mokkink et al., 2010), medicine (Dellinger et al., 2008; Jones & Hunter, 1995; Morley et al., 2013; Sinha et al., 2011), education (Bulger & Housner, 2007; Robertson et al., 2000; Stitt-Gohdes & Crews, 2004), business (Czinkota & Ronkainen, 1997; von der Gracht & Darkow, 2016; White, 2017), engineering and technology (Bokrantz et al., 2017; Schweizer et al., 2020), social sciences (Bishop et al., 2017; Strauss & Zeigler, 1975), to information management (Akkermans et al., 2003; R. Schmidt et al., 2001), and environmental studies (Seuring & Müller, 2008).

Irrespective of the focus in time or content, the Delphi technique builds on the anonymity of participating experts who are invited to assess and comment on different statements or questions related to a specific research topic (Keeney et al., 2001; McKenna, 1994). Quantitative assessments traditionally include probability, impact, and desirability of occurrence but are not limited to these. Further dimensions could refer to innovativeness, urgency, or (technical) feasibility, for instance. Moreover, participant-related information such as confidence or expertise can be collected (Devaney & Henchion, 2018; Förster & von der Gracht, 2014; Spickermann et al., 2014). In addition, especially in medical and clinical research, Delphi studies make use of rank-order questions, rating scales, or open questions, while often being designed to examine levels of consensus among experts (Boulkedid et al., 2011; Robertson et al., 2000; Sinha et al., 2011).

In a Delphi survey, the aggregated group opinion is fed back to participants across multiple discussion rounds of the same set of statements. During this multi-round procedure, the rounds can be performed sequentially, or – with the help of dedicated software – immediately (so-called real-time Delphi) (Aengenheyster et al., 2017; Gnatzy et al., 2011; T. Gordon & Pease, 2006). After each round, panelists have the possibility to review the aggregated results and to reconsider their assessment based on the added quantitative and qualitative information (Bolger & Wright,

2011; Linstone & Turoff, 2011). This structured group communication process is supposed to lead to a convergence – or divergence – of opinions, hence, producing more accurate results than traditional opinion-polling techniques (McKenna, 1994). Moreover, the Delphi method has advantages over in-person techniques such as group discussions or brainstorming sessions, as it rules out personal sensitivities among the experts and therefore avoids potentially destructive group dynamics (P. L. Williams & Webb, 1994). The results of a Delphi survey can deliver stand-alone insights but are increasingly linked to scenario analytics to fulfill idea-generation, consolidation, or judgment functions (Nowack et al., 2011). While previous developments of the Delphi technique provided a valuable tool for researchers and practitioners, there was a lack of a comprehensive overview of best practices as well as new scientific developments of related areas of research.

In addition to methodological advancements of the Delphi technique, this dissertation also aims to apply the developed best practices to provide valuable insights for scholars and practitioners within the field of sports management. At the intersection of sports and future-oriented research, only few scholars applied the Delphi method in the past (Mallen et al., 2010; Merkel et al., 2016). Especially in times of increased disruption – be it due to technological developments or more unpredictable shocks like the COVID-19 pandemic – more forward-looking approaches in the context of sports management research are in order (S. L. Schmidt, 2020b). In this regard, not only organizational but also institutional and global research perspectives are required.

While it is important to consider previously neglected strategic foresight processes in the sports ecosystem, this dissertation also has the goal to shed light on another frequently overlooked aspect in sports organizations: the role of employees that are not playing on the pitch or training in the gym. Especially in times of crisis like the COVID-19 pandemic, it is essential to consider how this affects individuals within the organizations. Without the backbone of people in

administration and management, organizations would not have been able to deal with this difficult situation and would not have been capable of delivering sports- as well as business-related performance. While previous research in that field looked at psychological capital, leadership behavior, or employees' commitment in sports organizations (Bang et al., 2013; Kim et al., 2017, 2019; Y. H. Lee et al., 2018; Rocha & Chelladurai, 2011), it did not consider the influence of outside disruptions like the COVID-19 pandemic and how sports management leaders can support their employees in these unforeseeable situations.

1.2 Research Questions, Outline, and Abstracts

1.2.1 Research Questions

The dissertation at hand explicitly addresses the three following research questions:

Research Question I: How do exogenous disruptions (i.e., COVID-19 and technological advancements) impact the international football ecosystem?

Research Question II: How can the Delphi method (as a strategic foresight process) be advanced to serve both theory and practice?

Research Question III: How does leadership behavior impact organizational success in times of increased remote work?

By answering these three distinct research questions, this dissertation addresses the overall question of *how strategic foresight and leadership behavior can impact organizational success in the sports ecosystem – specifically in times of exogenous disruption.*

1.2.2 Outline

The overall structure of this dissertation – which builds on four stand-alone research papers – is represented in Figure 1.1. Chapter 1 introduces the dissertation project as a whole and provides abstracts of all four papers. These are then presented in chapters 2 to 5. Chapter 5 concludes the

dissertation and summarizes overarching findings. These include implications for both academia and practice as well as potential trajectories for future research.

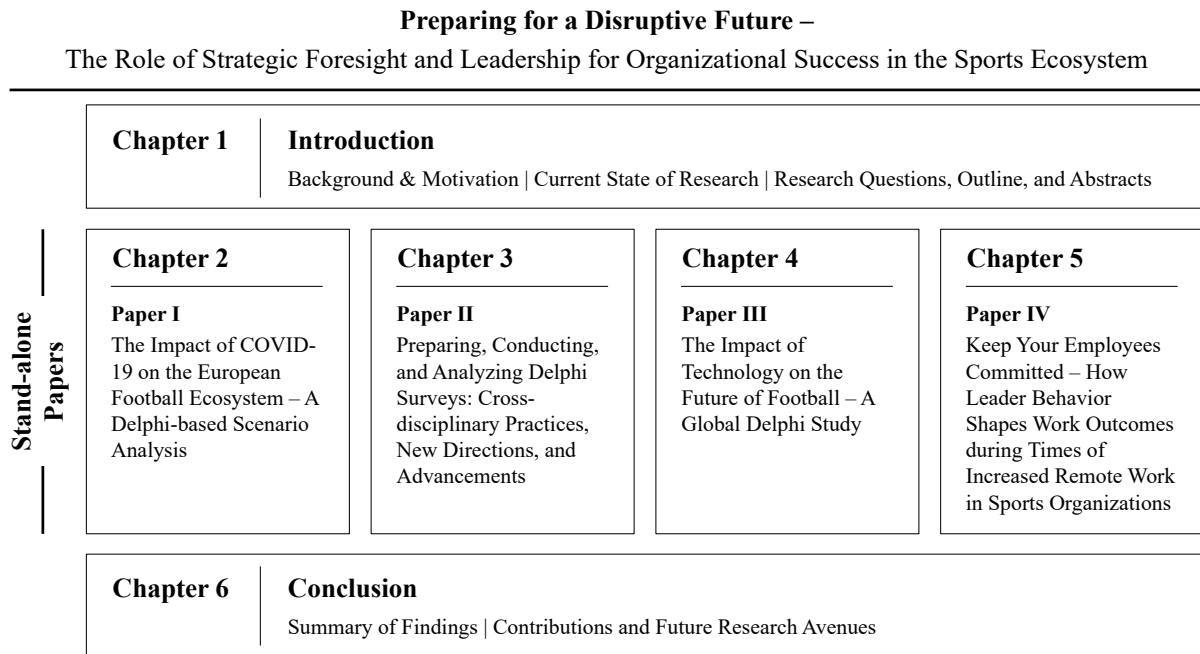


Figure 1.1 Structure of the Dissertation.

1.2.3 Paper I: The Impact of COVID-19 on the European Football Ecosystem – A Delphi-based Scenario Analysis

Abstract. COVID-19 has had a tremendous impact on the world's society and economy. This also applies to European football; the continent's largest professional sports ecosystem with millions of employees in football-related jobs and even more people emotionally attached to the sport. To account for stakeholders' unprecedented level of uncertainty regarding regulatory, economic, social, and technological implications for their business, we systematically examined how COVID-19 will impact the future of the European football ecosystem in the short, medium and long-term. We present a Delphi-based scenario analysis with 110 subject matter experts, who assessed 15 future projections both on a quantitative and qualitative basis. We find that, for example, a salary cap for players would have the highest impact on the ecosystem, but is still unlikely to be implemented, while an increased awareness for social responsibility would be the

most desirable effect of the crisis. To refine results, we account for surface-level and deep-level characteristics of participants and find significant effects in both cases. We identify three different clusters of projections and discuss potential threats and opportunities for the European football ecosystem caused by COVID-19 to contribute to the scientific discussion and to provide guidance for policy and decision-makers.

Publication status. This paper was co-authored by Prof. Dr. Sascha L. Schmidt, Prof. Dr. Heiko A. von der Gracht, Nicolas Frevel, and Vera Schweitzer. It was published in the academic journal *Technological Forecasting and Social Change* in January 2021 (Beiderbeck et al., 2021b).

1.2.4 Paper II: Preparing, Conducting, and Analyzing Delphi surveys: Cross-disciplinary Practices, New Directions, and Advancements

Abstract. Delphi is a scientific method to organize and structure an expert discussion aiming to generate insights on controversial topics with limited information. The technique has seen a rise in publication frequency in various disciplines, especially over the past decades. In April 2021, the term *Delphi method* yielded 28,200 search hits in Google Scholar for the past five years alone. Given the increasing level of uncertainty caused by rapid technological and social change around the globe, collective expert opinions and assessments are likely to gain even more importance. Therefore, the paper at hand presents technical recommendations derived from a Delphi study that was conducted amid the outbreak of the COVID-19 pandemic in 2020. The paper comprehensively demonstrates how to prepare, conduct, and analyze a Delphi study. In this regard, it combines several methodological advancements of the recent past (e.g., dissent analyses, scenario analyses) with state-of-the-art impulses from other disciplines like strategic management (e.g., fuzzy clustering), psychology (e.g., sentiment analyses), or clinical trials (e.g., consensus measurement). By offering insights on the variety of possibilities to exploit Delphi-based data, we aim to support researchers across all disciplines in conducting Delphi studies and potentially expand and improve the method's field of application.

Publication status. This paper was co-authored by Prof. Dr. Sascha L. Schmidt, Prof. Dr. Heiko A. von der Gracht, Nicolas Frevel, and Vera Schweitzer. It was published in the academic journal *MethodsX* in June 2021 (Beiderbeck et al., 2021a).

1.2.5 Paper III: The Impact of Technology on the Future of Football – A Global Delphi Study

Abstract: Technology has played a vital role in the incremental improvement of the game of football over the past decades. However, there is an ambivalent notion in both research and practice as to whether an increase in technology deployment in football is beneficial or detrimental for the game. Especially due to unequal preconditions around the globe (e.g., financial budget, technical infrastructure), there is a lack of understanding with regard to attitude towards technology in football in different parts of the world. Therefore, we present results of a sequential Delphi study in which we involved 85 technical directors of international football associations from all six continental confederations. We find that attitude towards technology generally does not differ across regions. Indeed, technical directors of smaller associations express more desirability for technology to diffuse until the year 2026 than those experts representing the top-50 football nations in the world. Moreover, we show that individual sentiments (e.g., affinity for technology interaction, openness to experience) significantly affect participants' valuation behavior. Irrespective of their surface-level or deep-level characteristics participants express confidence in technology to successfully support the game and utter concerns when it comes to directly game-related interventions of technology.

Publication status. This paper was co-authored by Prof. Dr. Sascha L. Schmidt, Nicolas Evans, and Nicolas Frevel. It was published in the academic journal *Technological Forecasting and Social Change* in February 2023 (Beiderbeck et al., 2023).

1.2.6 Paper IV: Keep Your Employees Committed: How Leader Behavior Shapes Work Outcomes during Times of Increased Remote Work in Sports Organizations

Abstract. Commitment plays a critical role for employees' work-related outcomes like individual well-being, positive organizational behavior, and creativity. However, it is likely to suffer in times of crises. Therefore, this study examined the relationships between COVID-19-induced changes to the work environment (i.e., increased remote work percentage), affective commitment, work-related outcomes, and leader behavior. Therefore, we surveyed 246 employees within the sports industry through an online questionnaire amid the COVID-19 crisis. To test our proposed hypotheses, we calculated a moderated mediation model. We found that affective commitment was positively associated with all three work-related outcomes. For remote work percentage, we identified leader interaction frequency as a boundary condition for the mediation via affective commitment. That is, the indirect effect of remote work percentage on work-related outcomes was positive in case of increased leader interaction frequency and negative when leader interaction frequency decreased. From a practical point of view, executives in the realm of sports should install measures to monitor staff commitment. In case of an (externally enforced) increase of remote work percentage, leaders should interact more frequently with subordinates, which might require strategic reorganizations to meet these demands. From an academic perspective, we add to the discussion around mechanisms and boundary-conditions for positive work-related outcomes, especially focusing on a concrete behavioral leadership indicator of leader proximity.

Publication status. This paper was co-authored by Prof. Dr. Sascha L. Schmidt and Nicolas Frevel. At the time of submission of this dissertation, the paper has been under review with a peer-reviewed journal.

2 Paper I: The Impact of COVID-19 on the European Football Ecosystem – A Delphi-based Scenario Analysis¹

2.1 Introduction

On May 6, 2020, the international daily newspaper *Financial Times* titled “coronavirus threatens €10 billion hit to football transfer market” (M. Ahmed, 2020). While the transfer market is only one component of the football industry, this headline representatively demonstrates the drastic impact of COVID-19 on the entire ecosystem. As for all other industries, the outbreak of the epidemic disease came unexpectedly for European football, thus instantly confronting stakeholders with extreme ambiguity in terms of regulatory, economic, social, and technological consequences of the crisis.

Especially in the period March to May 2020, responsible managers and authorities had to make directional decisions despite a maximum degree of uncertainty (Parnell et al., 2020). For example, governing bodies like associations and leagues had to decide on a potential continuation of sports competitions, so that on March 17, the Union of European Football Associations (UEFA) decided to postpone the 2020 UEFA European Football Championship by twelve months (UEFA, 2020b). Similarly, most national leagues decided to interrupt their domestic match schedule until further notice, particularly to avoid large gatherings and potential risks associated with travel activities (Nakamura & Managi, 2020; Ozili & Arun, 2020; Tovar, 2020). While postponements of sports competitions were largely inevitable from a health perspective, associations and leagues simultaneously had to deal with further challenges like re-start strategies or broadcasting compensations, for instance (Q. A. Ahmed & Memish, 2020; Reade et al., 2020c). However, other

¹ Beiderbeck, D., Frevel, N., von der Gracht, H. A., Schmidt, S. L., & Schweitzer, V. M. (2021b). The Impact of COVID-19 on the European Football Ecosystem – A Delphi-based Scenario Analysis. *Technological Forecasting and Social Change*, 165, 120577. <https://doi.org/10.1016/j.techfore.2021.120577>

stakeholders of the European football ecosystem were also heavily affected by the consequences of COVID-19. Clubs faced financial threats since matchday, sponsoring and broadcasting revenues were at risk, while player and employee contracts remained in place (Duarte Muñoz & Meyer, 2020; Fühner et al., 2020). Coaches and managers, in turn, had to ensure the physical and mental fitness of their players to be prepared for a possible continuation of competitions under aggravated conditions like extended health precautions or games behind closed doors (Mohr et al., 2020).

Given the complexity of the situation, our research study aims to identify and assess possible short, medium, and long-term effects of COVID-19 on the European football ecosystem. Taking into account different stakeholder perspectives, we asked subject matter experts from different countries, backgrounds, and occupations to evaluate the expected probability, desirability, and impact of possible future developments. Using both qualitative and quantitative survey data, we elaborate on different viewpoints and reasons for dissent regarding the consequences of the pandemic to better understand diverging views within the industry (Warth et al., 2013). Moreover, we enrich these findings by additionally investigating sentiments of the experts to account for the fact that valuation behavior might be affected by the mood of participants during the lockdown (Loye, 1980). Finally, we aggregate our findings in fuzzy clustered scenarios and reflect on their practical implications (Curry, 2007; Wilkinson, 2009).

Our research contributes to the existing body of research by providing a comprehensive and multifaceted view of the possible effects of the COVID-19 pandemic on the European football ecosystem. While scholars have mostly offered theoretical considerations on subareas of the football industry thus far (Duarte Muñoz & Meyer, 2020; Evans et al., 2020; Mohr et al., 2020), we integrate regulatory, economic, social, and technological perspectives to draw a more complex picture. Hence, we pose our research question as follows: How will COVID-19 impact the future of the European football ecosystem in the short, medium and long-term? To derive an objective

and credible answer to this question, we develop Delphi-based scenarios (Nowack et al., 2011). We use a Delphi survey for data collection because this method allows collecting both qualitative and quantitative input from a heterogeneous expert panel (Grisham, 2009). The survey itself was organized in a real-time format (Gnatzy et al., 2011; T. Gordon & Pease, 2006). The methodology has proven to enhance validity, acceptance, plausibility and consistency of future-oriented studies by allowing experts to effectively discuss complex matters in a structured and anonymous group communication process (Belton et al., 2019; Linstone & Turoff, 2011).

2.2 Background

2.2.1 Relevance of the European football ecosystem

Sports and sportive competitions have always been part of human society (Coakley & Pike, 2001) in which most people regularly engage in sports – either actively as professional or recreational athletes or passively as sports spectators (Leeds et al., 2018). In recent decades, the sports industry has seen exceptional growth leading to a social-economic impact that also reflects in numbers (Eurostat, 2019; Siegfried & Zimbalist, 2006; Southall et al., 2003): According to the European Parliament Research Service, the sports industry generates almost 3% of total European Union (EU) gross value added and provides more than seven million sports-related jobs, which is equivalent to 3.5% of total EU employment (Katsarova & Halleux, 2019). Concerning professional sports in Europe, football has the largest economic contribution with record revenue of €21 billion in 2018 (UEFA, 2020a). In the same year, the International Federation of Association Football (FIFA) likewise reported the highest revenues in history of €4.1 billion (FIFA, 2019). Given the steady performance over the last decades, there were no evident signs of impending revenue shortfalls for the near future by the end of 2019 (Rohde & Breuer, 2016). However, the outbreak of COVID-19 led to an unexpected lockdown and an almost immediate stop in operations. In this regard, the European football ecosystem is an interesting subject of observation as the industry as such has been widely spared from crises in the past – at least on an operational level.

2.2.2 Existing research on the impact of COVID-19 on football

Given the topicality of events around the COVID-19 outbreak, we currently know little about the potential impact of the disease on the world of football. The scientific work that has already been published mainly focused on four aspects: (1) When and how to return to elite football operations (e.g., Buldú et al., 2020; Carmody et al., 2020; Corsini et al., 2020; Dores & Cardim, 2020; Mohr et al., 2020; Parnell et al., 2020), (2) effects of the lockdown on fandom and social life (e.g., Black, 2020; Duarte Muñoz & Meyer, 2020; Waliaula & Okong'o, 2020), (3) observations from the re-start of professional competitions (e.g., Bryson et al., 2020; Reade et al., 2020a, 2020b), and (4) the future impact of COVID-19 on particular areas of the European football ecosystem (e.g., Clarkson et al., 2020; Fühner et al., 2020; Webb, 2020).

Especially regarding the last group of future-oriented research, the body of literature is limited. Clarkson et al., for example, took elite women's football in England as an object of observation and reflected "upon some of the immediate threats and uncertainties for the governing body, leagues, and clubs" (2020, p. 8). In light of this angle, the commentary did not build on empirical data but rather pointed out crucial challenges to ensure the future of professional women's football in England. Webb, in turn, addressed the impact of COVID-19 on referees in world sports, concluding that despite the challenges posed by the pandemic, "opportunities can be working towards changing attitudes and behavior towards referees" (2020, p.5), if governing bodies take supporting decisions. Also, in this case, the scope of research was rather narrow, and no primary data were collected to underpin assumptions. Against this backdrop, our study at hand contributes to literature by providing a holistic perspective on the short, medium, and long-term impact of COVID-19 on the European football ecosystem based on primary data.

2.3 Research methodology

For our study, we used a real-time online Delphi survey to be able to both collect reliable data for scientific analyses (Aengenheyster et al., 2017; Flostrand et al., 2020; Gnatzy et al., 2011)

and to practically facilitate a valuable expert debate in midst of the COVID-19 crisis (A. V. Gordon et al., 2020; Kavoura & Andersson, 2016). To ensure quality and validity of our Delphi results, we applied the approach proposed by Roßmann et al. (2018), which is illustrated in Figure 2.1.

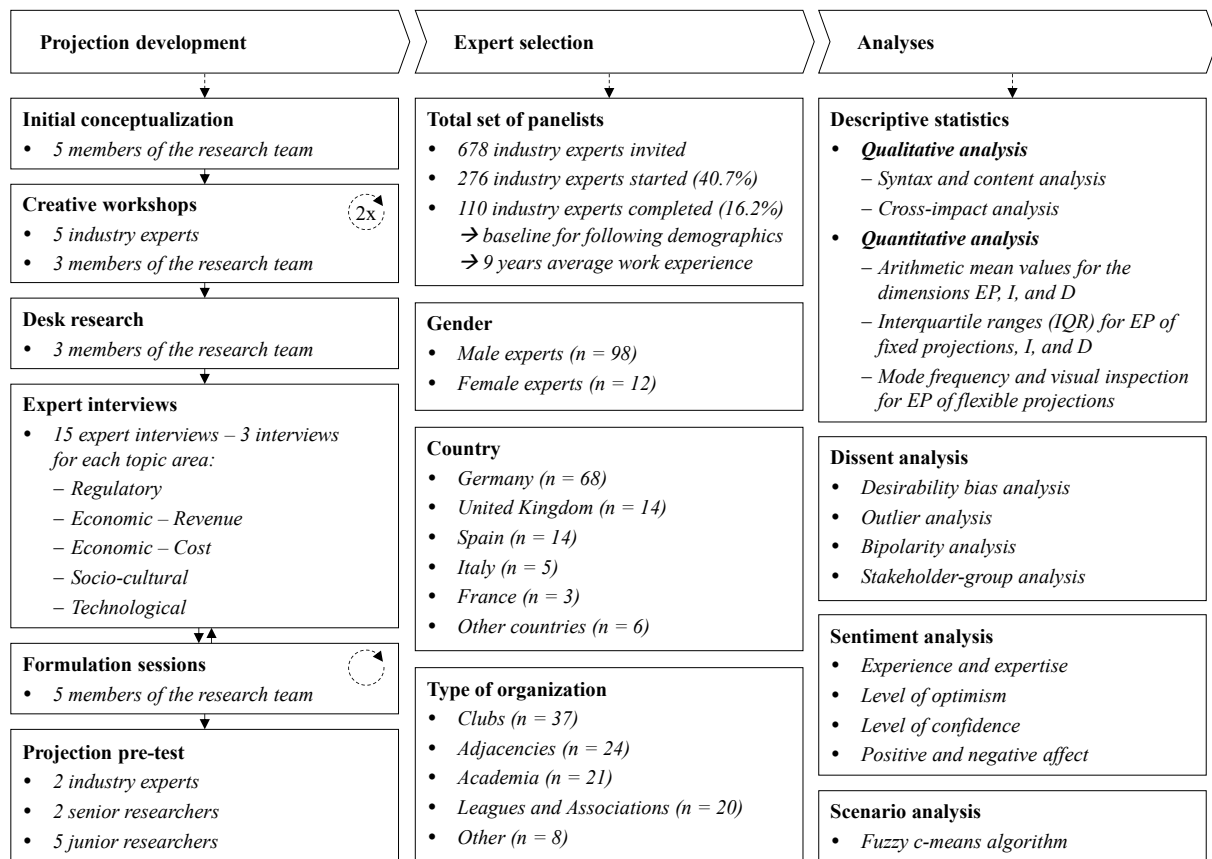


Figure 2.1 Projection development, expert selection, and analysis (based on Roßmann et al. 2018).

First, we developed a comprehensive set of 15 projections, based on expert workshops, interviews, and desk research. Second, we selected a heterogeneous set of subject matter experts to participate in our study. Third, we conducted the Delphi survey and asked participants to assess each of our 15 projections regarding their estimated expected probability (EP) of occurrence, their estimated impact (I) in case of occurrence, and their subjective desirability (D) of occurrence. Moreover, we asked participants to share their level of confidence (C) in responding to the respective projection. Last, we analyzed the results on a qualitative and quantitative level and additionally examined the impact of surface- and deep-level diversity criteria on valuation

behavior before closing with a scenario analysis and discussion. The study was conducted over a period of seven weeks in April and May 2020 (i.e., during a peak period of the outbreak in Europe). While this was a very interesting period of examination, we explicitly want to acknowledge the fact that the experts' assessments were depending on a temporary impression of the potential impact of COVID-19 on the European ecosystem, having no detailed information about subsequent developments with regards to vaccines or treatments of the disease.

2.3.1 Development of Delphi projections

To study the impact of COVID-19 on the European football ecosystem, we aimed to create a holistic picture of potential effects caused by the lockdown. Hence, we conducted an initial conceptualization workshop to define a comprehensive structure for a multifaceted set of future projections. We therefore adopted the classical PEST (political, economic, social, technological) analysis framework which has been frequently used in foresight (Jiang et al., 2017; Merkel et al., 2016). Given the context of football, we interpreted the political dimension with a strong focus on regulations, since governing bodies like leagues and association determine the regulatory framework for sportive competitions. Based on this structure (regulatory, economic, social, technological), we held two creative workshops with industry experts to create a long-list of potential developments related to COVID-19. In these sessions, we generated 78 ideas which were then grouped and allocated to the four dimensions. The discussions also revealed that economic consequences were the most urgent issue for the industry, which could be considered from both a revenue and cost perspective. This is why we later split this dimension into revenue-related projections (economic – revenue) and cost-related projections (economic – cost). Within the research team, we then conducted desk research to scrutinize the initial set of ideas and to add another source of input to the projection development process (Nowack et al., 2011). Given the topicality of the subject, we took into account previous research but also tried to reflect the current public debate to refine the thought trajectories.

Next, we organized 15 expert interviews to gather feedback on the refined long-list of projections from professionals with acknowledged expertise in their respective topic areas. To avoid biased perspectives (Bonaccorsi et al., 2020) we invited representatives from different stakeholder groups like clubs, leagues, associations, media companies, consultancies, and academia as well as from different countries to these discussions. Parallel to the interviews, we conducted formulation workshops to include additional suggestions and to eliminate or condense certain projections. This iterative approach allowed us to speed up the process while not jeopardizing the methodological rigor that is crucial for the success of a Delphi study (Landeta, 2006; Salancik et al., 1971). As a result, we derived a final set of 15 projections with three projections for each of our five dimensions. In the last step, these 15 projections were once again checked for all relevant quality criteria by two senior researchers as well as comprehensibility and clarity by two previously not involved industry experts and five junior researchers (Hasson & Keeney, 2011; Markmann et al., 2020).

In the process of expert discussions, we also evaluated suitable timeframes to best understand the potential impact of COVID-19 on the European football ecosystem. While Delphi surveys often forecast developments in the far future (i.e., time horizons of more than 10 years), we also wanted to gain insights into short-term and medium-term consequences of the crisis, because these would also deliver a helpful practical contribution. To create such a perspective, we used two types of projections, which we called fixed (end-state) and flexible (interval) projections. For fixed projections, we set the review date to the end of 2022 and asked participants to assess the expected probability of occurrence of those projections in 10-percent intervals. For flexible projections, in turn, we asked experts to indicate the most probable date of occurrence of the respective projection. In this case, participants were able to choose a response in quarterly intervals from the survey date on (i.e., Q2/2020) until the end of 2024, or alternatively indicate that the projection would either become reality "later than 2024" or "never" occur at all (Schweizer et al.,

2020). Based on the characteristics of our topics, we decided to either formulate them as fixed or flexible projections. For example, our first projection ("*clubs are required by regulation to guarantee administrative operations in case of unforeseen disasters*") was formulated in the flexible format, because we were interested if policymakers and regulators would act soon or rather late in response to the pandemic. The second projection ("*in 2022, the number of fixed games/dates in the international match calendar has been reduced*") was formulated in the fixed style because we were interested in the probability that officials would react quickly; in this particular case up until the World Cup in Winter 2022. The final set of projections and their respective format is explained and presented in the following:

2.3.1.1 Regulatory projections

In terms of regulatory consequences caused by COVID-19, we built on the creative workshops with industry experts. One central motive that emerged from the discussions was the financial instability of clubs shortly after the lockdown. The majority of football-related organizations, in this case the clubs, still maximizes for sportive success; a goal that partly incentivizes limited cash reserves. The same holds true for leagues and associations which by nature mostly operate as non-profit organizations. Therefore, many voices publicly demanded new regulations within the European football ecosystem, also reinvigorating the debate around a possible salary cap for players (Kesenne, 2000). The lockdown also showed that there was very limited room for maneuver for clubs, leagues and associations, given the multitude of games to be played. Hence, experts uttered the need to thin out the international match calendar in order to gain more freedom for leagues and associations to react. Overall, we derived the three regulation-related projections below:

Projection 1 (flexible). Clubs are required by regulation to guarantee administrative operations in case of unforeseen disasters (*short: disaster regulations*).

Projection 2 (fixed). In 2022, the number of fixed games/dates in the international match calendar has been reduced (*short: match calendar*).

Projection 3 (flexible). A salary cap for professional football players has been introduced (*short: salary cap*).

2.3.1.2 Economic projections with revenue focus

With respect to revenues, we aimed to focus on the biggest levers for football-related organizations in Europe. First, we identified (strategic) investments as a pivotal financial resource for various clubs and anticipated that the increased financial pressure due to the lockdown could lead to an increased willingness or compulsion for clubs to offer shares (Andreff, 2007; Rohde & Breuer, 2017). Moreover, an analysis of clubs' financial statements revealed that the two major revenue streams apart from potential investments are broadcasting and sponsoring (UEFA, 2020a). Hence, we wanted to understand if these two sources of income were at risk and whether media companies and sponsors would alter their sports engagement in response to the COVID-19 lockdown (Henderson, 2010; Naidenova et al., 2016). After the process of iteration with experts and the research team, we came to the following three economic projections with revenue focus:

Projection 4 (fixed). In 2022, (strategic) investors got more shares in European football clubs due to COVID-19 (*short: investors' shares*).

Projection 5 (flexible). Clubs' broadcasting revenues have started to decrease (*short: broadcasting revenues*).

Projection 6 (flexible). Clubs' sponsorship revenues have reached pre-COVID-19 level (*short: sponsorship revenues*).

2.3.1.3 Economic projections with cost focus

Similar to the revenue perspective, we aimed to cover essential cost factors for football clubs in our set of projections. First of all, player salaries represent the biggest cost item for clubs. While potential salary caps have been included in the regulatory dimension, our creative

workshops revealed that clubs could include more performance-based elements in player contracts, thus reducing the risk in case of a loss of income. While this model is very common in other industries, it is still underrepresented in European football, particularly when salary incentives are not linked to a player's performance on the pitch, but rather to the overall financial performance of the club, for instance (Selviaridis & Wynstra, 2015). Another major source of cost is related to transfers, which typically constitute the second highest cost item for clubs. A potential shock to transfer fees could therefore have a severe impact on the entire ecosystem (M. Ahmed, 2020; Matesanz et al., 2018). Last, the employee payroll apart from players also weights heavy on the cost side. Many organizations announced short-term work at the beginning of the lockdown, so that headcount reductions seemed to be within the realms of possibility. Therefore, we formulated the following three economic projections with cost focus:

Projection 7 (flexible). Player contracts have changed towards a more performance-based model (*short: player contracts*).

Projection 8 (flexible). Total transfer fees have reached pre-COVID-19 level (*short: transfer fees*).

Projection 9 (fixed). In 2022, professional football clubs have reduced their number of employees compared to pre-COVID-19 (*short: number of employees*).

2.3.1.4 Socio-cultural projections

On a socio-cultural level, we included a set of topics that went beyond regulatory and economic effects of the lockdown. First, we focused on the actual scene of action – the stadium. Shortly after the outbreak of COVID-19 it became evident that matches behind closed doors would be inevitable for the near future (Q. A. Ahmed & Memish, 2020; Parnell et al., 2020). Still, the question remained to what extend the lockdown would impact stadium attendance in the medium to longer term. Especially for lower league clubs, matchday income is often essential. Therefore, many smaller clubs would face existential risks, if local sponsors would refrain their financial

support because of COVID-19. This particularly holds true in areas with lower purchasing power and less financial stability (Martin et al., 2020). Potential bankruptcies of lower league clubs would then also affect the local community, taking into account that football is a central component of leisure activities for many children and adults (Müller et al., 2008). A hope that was often expressed in public was an increased sense of social responsibility by clubs and their players which could prevent the ecosystem from bigger (reputational) damages. To gain insights into the persistence of possible effects of the lockdown, we confronted the Delphi panel with the following socio-cultural projections:

Projection 10 (fixed). In 2022, live attendance at stadiums has decreased compared to pre-COVID-19 (*short: stadium attendance*).

Projection 11 (fixed). In 2022, at least one out of ten lower league clubs has gone bankrupt due to the effects of COVID-19 (*short: clubs' bankruptcy*).

Projection 12 (fixed). In 2022, clubs (and their players) have a much higher awareness of their social responsibility compared to pre-COVID-19 (*short: social responsibility*).

2.3.1.5 Technological projections

As a last dimension we focused on technological consequences of COVID-19. Obviously, technological innovation always needs to bring a monetary advantage or efficiency gains in order to be implemented (Beiderbeck, Krüger, et al., 2020). Therefore, we included the topic of eSports in our set of projections as competitive gaming was one of the few sports that could further be played and broadcasted, which motivated many clubs to increase their eSports activities during the lockdown (Nicola et al., 2020; S. L. Schmidt & Holzmayer, 2019). Also, clubs quickly adopted individual remote training for their players in order to prepare for a potential re-start of competitions (Eirale et al., 2020). Questionable though, in how far these technologies that were necessarily tested during the lockdown would transform and potentially disrupt training procedures in the medium term (Frevel, Schmidt, et al., 2020). A last topic that emerged from the

creative workshop related to advertising activities. Given the fact that many leagues stopped their operations and then re-started with games behind closed doors, there was an increased attention on the monetization of spectators in front of the TV screen or mobile device (De Keyzer et al., 2015). Taking these different technological angles into account, we derived the three following technology-related projections:

Projection 13 (flexible). eSports activities have become a relevant source of revenue (at least 5%) for most football clubs (*short: eSports activities*).

Projection 14 (fixed). In 2022, football has widely adopted technology to allow for individual remote training of players (*short: remote-training*).

Projection 15 (flexible). (Fully) personalized advertising has been widely established (*short: personalized advertising*).

2.3.2 Expert selection

Proper selection of participants is key for the validity of Delphi research (Hasson et al., 2000a). Scholars have shown that designated expertise and multi-level diversity of the expert panel have a positive impact on the reliability of results while at the same time lowering the susceptibility to cognitive biases (Ecken et al., 2011; Spickermann et al., 2014; Winkler & Moser, 2016). Therefore, we aimed to recruit a heterogeneous set of experts, including participants from different countries, diverse stakeholder groups, and age cohorts. In total, we invited 678 representatives of the European football ecosystem to participate in our survey, using offline and online networking approaches (Jiang et al., 2017). To maintain methodological rigor, we contacted all experts individually and specifically asked not to share the survey link without permission from the research team. Upon invitation, 276 experts opened the survey and 110 actually participated, which means an overall response rate of 16.2% (see Figure A). In terms of nationalities, we invited experts from the five biggest European football leagues (Wilkesmann, 2011) with a majority of final participants (62%) originating from Germany. Regarding stakeholder groups, we aimed to

cover diverse perspectives and got a final set of participants from several football-related organizations, which we clustered into clubs (33%), leagues and associations (18%), academia – including healthcare specialists (18%), football-related adjacencies (22%, including consulting firms, sales agencies, broadcasters, and media companies), and other organizations (7%). On average, participants had 37 years of age and nine years of experience in the European football ecosystem with a gender split of 89% male and 11% female participants, which roughly represents the sports industry average (Burton, 2015).

2.3.3 Delphi survey conduction

The real-time format of our study allowed experts to start, pause, and continue the questionnaire at any time. Moreover, it enabled participants to see other experts' assessments instantly after completion of the survey, thus encouraging the review process in which participants were able to re-access and adjust their own estimations. From a technical perspective, we used *Surveylet* as a professional software tool for Delphi research (Aengenheyster et al., 2017).

To ensure a clear understanding of the procedure, we provided a thorough introduction to all participants including written and audio-visual information about the Delphi technique. Further, we aimed to mitigate the risk of potential cognitive biases by addressing and explaining them explicitly at the beginning of the survey (Bonaccorsi et al., 2020). Following the introduction, experts were asked to assess all 15 projections quantitatively and qualitatively. The quantitative evaluation included the four dimensions probability of occurrence (with the above-mentioned variations for fixed and flexible projections), impact in case of occurrence (5-point Likert-scale), desirability of occurrence (5-point Likert-scale), and confidence of answering the question (5-point Likert-scale). Additionally, participants had the opportunity to provide written statements for each projection, including textboxes for both pro and contra arguments for the probability dimensions as well as an input field for comments regarding the impact of the respective projection. These separated feedback requests were designed to encourage participants to actively

think of different viewpoints and counter-arguments, thus mitigating belief-perseverance and enhancing judgmental accuracy (Winkler & Moser, 2016). Moreover, we randomized the order of display for all projections in order to avoid disbalanced attention (e.g., more cognitive attention towards projections that are presented at the beginning). In order to be counted as a participant, experts had to revisit the Delphi survey at least once.

2.3.4 Descriptive statistics – qualitative and quantitative

For the analysis of qualitative inputs, we followed the approach presented by Roßmann et al. (2018) and used two coders to separately break down and label all written arguments. For each projection the two coders examined three different inputs (pro arguments for expected probability, contra arguments for expected probability, and arguments for impact) with individual coding processes. In accordance with Weber (1990) we defined consistent classification criteria for both our syntax analysis and content analysis, which were inspired by Roßmann et al. (2018). To assure concordance and interrater reliability, we compared labelling outcomes and calculated the percentage of agreement (Lombard et al., 2002). With an agreement rate of 83.2% the two coders reached an acceptable level of reliability. Results from this analysis were used to evaluate the quality of the online discourse and provided a foundation for the final discussion.

Qualitative expert opinions were also used to evaluate potential relations between projections and to enrich the discussion of results. To understand more about these interdependencies, we conducted a cross-impact analysis (Bauls & Turoff, 2011; Serdar Asan & Asan, 2007). The use of cross-impact analyses in Delphi and forecasting research has a long tradition and the technique was first introduced in a seminal paper of Gordon and Hayward (1968). Since then, numerous scholars have elaborated on methodological and contextual research questions associated with cross-impact analyses (Bañuls et al., 2013; Kendall, 1977; Weimer-Jehle, 2006). For the research at hand, we followed a more recent procedure introduced by Lechler et al. (2019) and identified four interaction categories (active, reactive, buffering, critical). Active

projections are those that theoretically have an overall reinforcing impact on the occurrence of other subjects, whereas reactive projections are those that are primarily influenced by the development in other fields (Kosow & Gaßner, 2008). Buffering projections typically have limited interaction effects, while critical projections have both an active and reactive impact on the ecosystem (Lechler et al., 2019).

In terms of quantitative information, we asked for four data points per projections and expert. Accounting for 336 missing values (missing value rate of 5.1%), we effectively generated 6,264 projection-related numeric assessments. In line with prior Delphi research, we first analyzed the evaluations for the dimensions EP, I, and D to show descriptive statistics and assess panel consensus. For the dimension EP, we applied different approaches to analyze the degree of consensus of flexible and fixed projections. For flexible projections, we used established measures like mode's frequency or visual inspections (Belton et al., 2019; Schweizer et al., 2020). For fixed projections, in turn, we relied on the interquartile range (IQR) as a classical indicator for consensus in Delphi research (von der Gracht, 2012). The IQR was also applied to the dimensions I and D to determine the level of agreement among experts. In order to gain insights into potential reasons for diverging expert opinions, we conducted a dissent analysis subsequent to our descriptive statistics (Warth et al., 2013).

2.3.5 Sentiment analysis

Inspired by Loye (1980) and Spickermann (2014), we also collected participants' deep-level information to better understand the impact of knowledge, skills, and attitudes on the valuation behavior. To gain insights into knowledge and skills, we captured the years of experience within the football industry. Additionally, experts were able to indicate their familiarity with specific topic areas like strategy, marketing, sales, digital, etc. In terms of attitudes, we included two dedicated questions to approximate experts' level of optimism. First, we asked participants if "in the long run, the consequences of COVID-19 will change the European football ecosystem...":

(1) "... to the worse", (2) "... slightly to the worse", (3) "... not at all", (4) "... slightly to the better", or (5) "... to the better". Second, we asked if "the consequences of COVID-19 will accelerate the technological innovation within the European football ecosystem" and allowed participants to answer on a 5-point Likert scale from (1) "strongly disagree" to (5) "strongly agree". Last, given the special circumstances under which this survey was taken (i.e., in the midst of the COVID-19 crisis) and possible individual concerns, we also wanted to understand the potential impact of mood on the valuation behavior. For this purpose we applied a four-item version of the positive and negative affect schedule (PANAS) to capture participants' affective wellbeing (Schimmack, 2008). To derive affect balance (AB) scores prior to the lockdown (AB_{t1}) and during the lockdown (AB_{t2}), we asked participants to indicate how often they had positive experiences (happy) and negative experiences (angry, afraid, sad) in the respective period (Schimmack et al., 2008). As response option we offered a 5-point Likert scale from (1) "very rarely" to (5) "very often" and calculated the respective affect balance score by subtracting the average scores of the three negative items from the positive item (Schimmack, 2008).

2.3.6 Fuzzy clustering

To facilitate the evaluation of qualitative comments and structure the discussion of results, Tapio et al. (2011) suggest a grouping of projections based on their quantitative assessments. In this context, Roßmann et al. (2018) pointed out the benefits of the non-hierarchical fuzzy c-means algorithm (FCM) to create clusters of Delphi projections. Hence, we followed this approach and applied the FCM using the three quantitative dimensions EP, I, and D. Given that we collected EP in two different ways, i.e., for flexible and fixed projections, we transformed the assessments of this dimension in order to make both types of projections comparable. Therefore, we introduced three new response categories for EP: Short-term occurrence, mid- to long-term occurrence, and no occurrence. For flexible projections, we assigned every expert that indicated a most likely date of occurrence until the end of 2022 to the first group (short-term occurrence). All participants that

indicated a projection would never occur, were assigned to the last group (no occurrence) and the rest was assigned to the second group (mid- to long-term occurrence). For fixed projections, we assigned participants that expected a projection to occur until the end of 2022 with a probability of more than 50% to the first group (short-term occurrence) and those that indicated a probability equal or lower than 10% to the last group (no occurrence). We included the 10% assessments to account for the fact that participants tend to avoid extreme ends of the scale (de Jong et al., 2008). Again, the remaining experts were assigned to the second group expecting a mid- to long-term occurrence. According to this logic, we generated new EP values per participant and projection, following the coding scheme presented in Figure 2.2. Based on this data, we calculated the mean EP for each projection, which was then used for the FCM to derive meaningful clusters including both flexible and fixed projections.

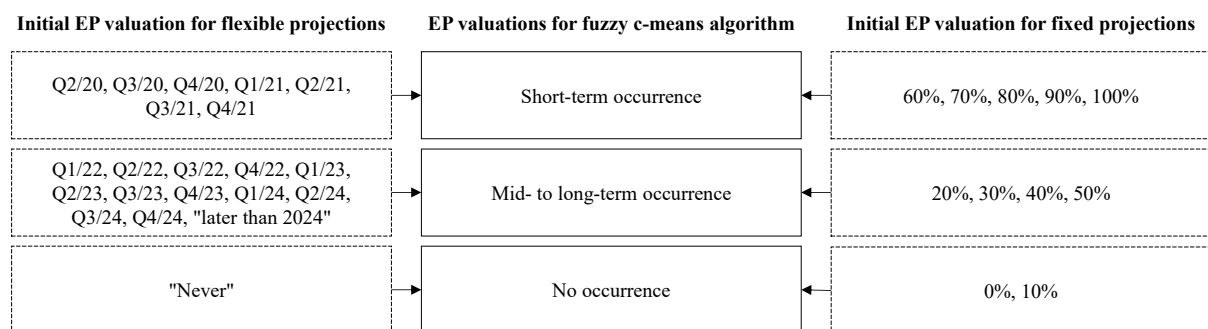


Figure 2.2 EP valuations for fuzzy c-means algorithm.

2.4 Results

2.4.1 Descriptive statistics

To ensure a reliable data quality for further processing, all expert inputs were checked for errors before analysis (Häder, 2009). Also, we tested for the existence of a potential non-response bias by splitting participants into two groups (first 20 respondents and last 20 respondents). Given the not normally distributed data, we then conducted post-hoc Mann-Whitney-*U* tests for all relevant dimensions of our survey (Belton et al., 2019). Since the results did not show significant differences between these groups, we conclude that no extensive non-response bias is present.

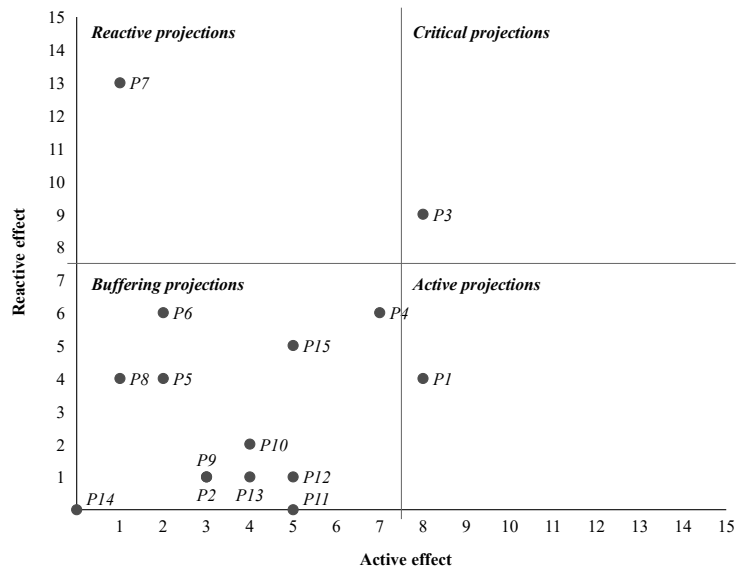


Figure 2.3 Results of cross-impact analysis.

On a qualitative level, the experts shared 3,414 written statements in total. An average of 31 comments per participant indicates a thorough and profound examination of the projections that were provided. To analyze the formal quality of inputs, we adapted the assessment scheme presented by Foerster and von der Gracht (Förster & von der Gracht, 2014) and illustrated the results in Table 2.1. Regarding syntax, the vast majority of comments (87.4%) were shared as whole sentences, which supports the statement that participants were highly engaged in the Delphi discussion process. In terms of content, half of the written statements contained beliefs (50.1%), followed by differentiations (19.3%) and cause and effect relationships (16.2%). The evaluation of comments in the cross-impact analysis shed light on the interaction effects between projections. In this regard, Figure 2.3 shows the categorization of projections where only projections 1 (disaster regulations) and 7 (player contracts) ranged outside the buffering category. This insight is relevant for the discussion of results as it allows to generally treat the projections as independent from each other except for the two projections mentioned above, which will be explicitly discussed in the scenario analysis.

Table 2.1 Syntax and content analysis of written statements.

Statement type	Total amount	Percentage share
<i>Syntax analysis</i>		
Whole sentences	2,984	87.4%
Phrases	355	10.4%
Catchwords	75	2.2%
<i>Content analysis</i>		
Beliefs	1,710	50.1%
Differentiation	658	19.3%
Cause-effect relationship	554	16.2%
Example	249	7.3%
Historical analogy	73	2.1%
Experience	67	2.0%
Trend	47	1.4%
No information	36	1.1%
Figures	10	0.3%
Misunderstanding	10	0.3%

The quantitative results of the Delphi survey are displayed in Table 2.2. Experts rated eleven out of 15 projections with a mean impact greater than 3.0, thus indicating a substantial effect on the European football ecosystem in case of occurrence (Roßmann et al., 2018). In this context, projection 3 (*salary cap*) is expected to have the highest impact with an average I of 4.2, followed by projection 5 (*broadcasting revenues*) with an average I of 4.0. Among the four projections that were rated with a mean impact below 3.0, projection 14 (*remote training*) is expected to have the least influential effect. However, with an average I of 2.5 it still has a non-negligible impact on the European Football ecosystem (if occurred), which is why all 15 projections were included in subsequent analyses.

Table 2.2 Qualitative Delphi results.

Projection	EP (mean)	IQR	EP (mode)	Mode's frequency	I (mean)	IQR	D (mean)	IQR
<i>Regulatory</i>								
1: Disaster regulations	-	-	Q3/21	30%	3.1	2	2.4	1.75
2: Match calendar	24%	20	-	-	3.4	1	3.0	2
3: Salary cap	-	-	Never	52%	4.2	1	3.2	2
<i>Economic – revenue</i>								
4: Investors' shares	54%	40	-	-	3.6	1	2.4	1
5: Broadcasting revenues	-	-	Never	30%	4.0	1	1.8	1
6: Sponsorship revenues	-	-	Q3/22	32%	3.6	1	3.5	1
<i>Economic – cost</i>								
7: Player contracts	-	-	Never	24%	3.3	1	3.5	1
8: Transfer fees	-	-	Q3/21	19%	3.5	1	2.8	2
9: Number of employees	41%	30	-	-	2.9	1.25	1.7	1
<i>Social</i>								
10: Stadium attendance	41%	60	-	-	3.6	1	1.6	1
11: Clubs' bankruptcy	66%	30	-	-	3.5	1	1.4	1
12: Social responsibility	59%	40	-	-	2.9	2	4.2	1
<i>Technological</i>								
13: eSports activities	-	-	>2024	38%	2.6	1	2.9	2
14: Remote training	43%	50	-	-	2.5	1	2.6	1
15: Personalized advert.	-	-	>2024	22%	3.0	2	3.4	1

Note. EP = expected probability of occurrence (0-100%); IQR = interquartile range; I = impact in case of occurrence; D = desirability of occurrence; Consensus (IQR for EP(mean) ≤ 25%, mode's frequency for EP(mode) ≥ 50%, IQR for I and D ≤ 1.25) is marked in bold.

Regarding the desirability of occurrence, the results show a wide spread, which indicates that the projections covered a spectrum of potentially pleasant and unpleasant developments caused by COVID-19. With an average D of 4.19, projection 12 (*social responsibility*) reached the highest desirability score among the experts. The two least desirable projections were projection 11 (*clubs' bankruptcy*) with an average D of 1.44 and projection 10 (*stadium attendance*) with an average D of 1.61. All these three projections with a strongly pronounced opinion towards desirability reached agreement among participants if we set a threshold of 1.25 (25% of the 5-point Likert scale) as the maximum value to indicate consensus (Warth et al., 2013). Remarkably, all three projections stem from the subset of socio-cultural projections.

As indicated in the methodology section, the expected probability of occurrence of flexible and fixed projections was analyzed separately. Starting with flexible projections, the results show a mode's frequency above 50% for projection 3 (*salary cap*), thus, indicating a consensus among experts that a salary cap will never be implemented within the European football ecosystem (Chakravarti et al., 1998; Schweizer et al., 2020). While there is no other flexible projection meeting the consensus criterion of a mode's frequency above 50%, a visual inspection of the results gives further insights into the experts' judgement on these potential developments (see Figure 2.4). For projection 5 (*broadcasting revenues*), more than 45% of the participants expected no short-term decrease in broadcasting revenues. In fact, 30.1% assumed they will never decline. Also, with respect to the revenue impact of eSports activities, participants' responses indicate a rather clear opinion. Almost all experts anticipated eSports revenues to become a relevant source of revenue at some point, however, the largest share of participants (37.5%) expected this to occur later than 2024. Similarly, experts judged projections 8 (*transfer fees*) and projection 15 (*personalized advertising*) to become reality, but the visual inspection does not allow to draw a clear conclusion as to when this will be the case. A somewhat clearer picture emerges for projection 6 (*sponsorship revenues*). The results show a bell-shaped distribution and indicate that one third (33.7%) of the experts

expected sponsorship revenues to reach pre-COVID-19 level by Q3/2022. Finally, projection 1 (*disaster regulations*) and projection 7 (*player contracts*) draw a rather bipolar picture with a group of experts arguing that these projections will occur rather short-term until end of 2021 and another group of experts expressing that these projections will never become reality.

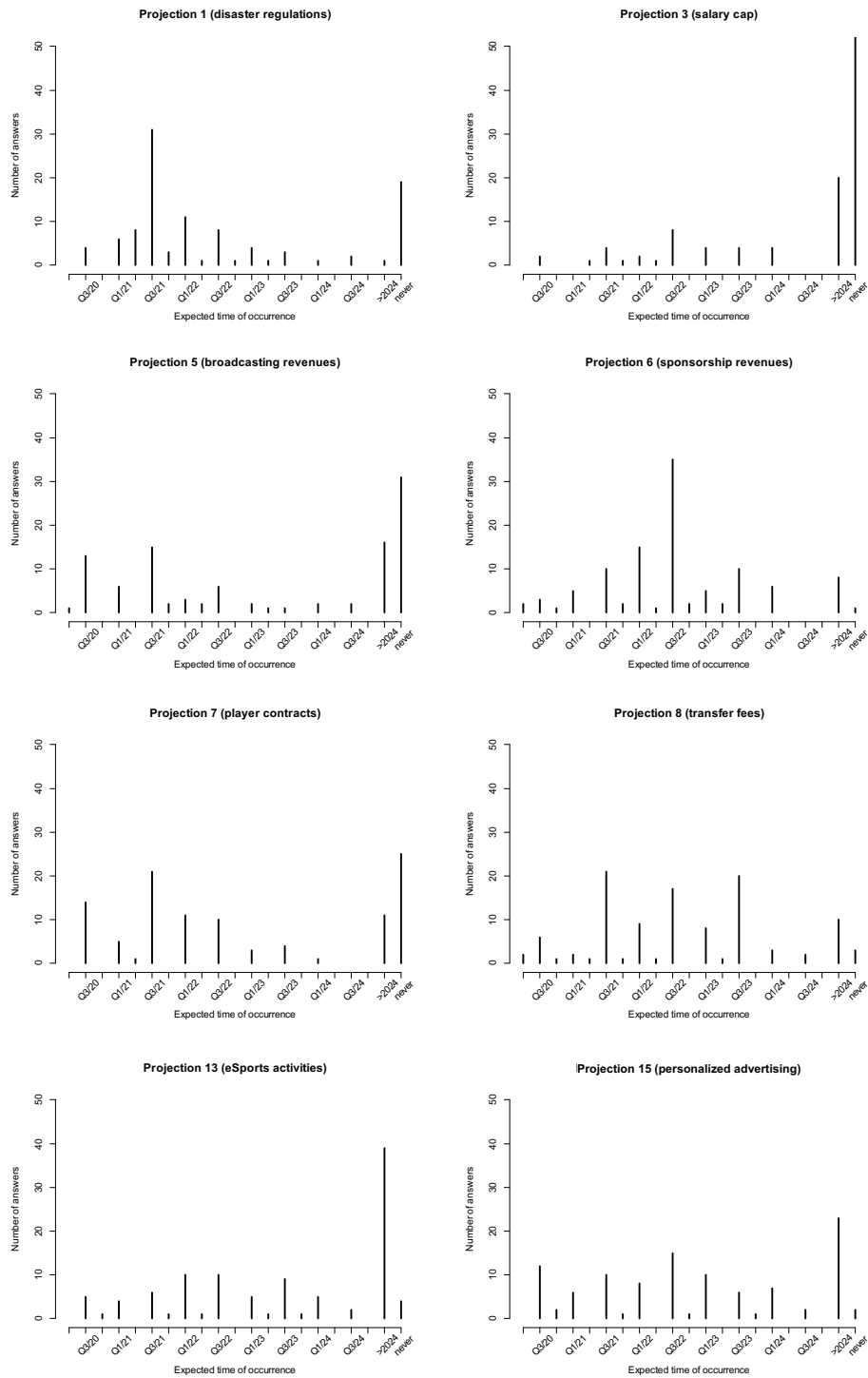


Figure 2.4 Histograms of flexible projections.

Among the fixed projections that were tested for an expected probability to occur until end of 2022, only projection 2 (*match calendar*) reached consensus with an EP of 23.9% and an interquartile range of 20. This is in line with previous research stating that projections with a strong trend to one of the two ends are more likely to reach consensus (Ogden et al., 2005). Except for projection 11 (*clubs bankruptcy*) with an average EP of 66.3%, all other projections showed a mean EP in the range of 40-60%, indicating that the impact of COVID-19 in these dimension is still difficult to assess (von der Gracht & Darkow, 2010). Therefore, the subsequent dissent and sentiment analyses are also supposed to generate more insights into these domains.

2.4.2 Dissent analysis

2.4.2.1 Desirability bias analysis

Previous research has shown that the desirability of a certain event can have a positive influence on an individual's likelihood judgement (Ecken et al., 2011; Krizan & Windschitl, 2007). Therefore, we calculated Pearson's product-moment correlation coefficients between all fixed projections and the respective desirability assessments. The results showed statistically significant correlations for four out of the seven fixed projections. Hence, we applied a post-hoc procedure introduced by Ecken et al. (2011) to derive adjusted EP values for all fixed projections by considering the correlation between participants' desirability and probability assessments. While we found some differences with respect to average expected probabilities, the adjustments did not lead to consensus for additional projections (see Table 2.3). Since the time horizon of the projections at hand is rather short (i.e., end of 2022), this result is in line with prior work pointing out that desirability bias in Delphi studies is generally higher "in case of long prospect horizons" (Winkler & Moser, 2016, p.68).

Table 2.3 Dissent analysis – desirability bias.

Projection	<i>r</i>	<i>df</i>	<i>t</i>	<i>p</i>
<i>Regulatory</i>				
1: Disaster regulations	-.24	82	-2.20	.031
2: Match calendar	.18	105	1.87	.065
3: Salary cap	.39	29	2.26	.032
<i>Economic – revenue</i>				
4: Investors' shares	.27	101	2.80	.006
5: Broadcasting revenues	.26	54	1.97	.054
6: Sponsorship revenues	-.32	87	-3.18	.002
<i>Economic – cost</i>				
7: Player contracts	.11	67	0.92	.359
8: Transfer fees	.06	93	0.56	.580
9: Number of employees	.16	103	1.68	.097
<i>Social</i>				
10: Stadium attendance	.23	100	2.42	.017
11: Clubs' bankruptcy	.05	102	0.48	.632
12: Social responsibility	.29	106	3.18	.002
<i>Technological</i>				
13: eSports activities	-.21	58	-1.66	.103
14: Remote training	.60	105	7.74	<.001
15: Personalized advert.	.22	78	1.99	.049

Note. Statistics describe correlation between expected probability and desirability of each respective projection. Projections with statistically significant correlations ($p < .05$) are marked in bold.

For the flexible projections, standard correlation tests were not applicable, since the answer options were non-metric, including the two text options "later than 2024" and "never" (Schweizer et al., 2020). Instead, we took a two-step approach to analyze potential desirability biases for these projections. In a first step we created a dichotomous variable to indicate whether experts assessed a respective projection to occur at all or if they expected the projection not to occur (i.e., if they indicated "never"). Given that variables were not normally distributed, we then applied the Mann-Whitney-*U* test to analyze variations with respect to desirability between these two groups. The results show significant differences for four out of the eight flexible projections, all indicating that the average desirability was higher for the subgroup of experts that assumed the respective projection to become reality (see Table 2.3). In a second step we explicitly analyzed the subgroup

of experts that indicated the respective projections to occur in the short to medium term (i.e., until the end of 2024). In this case, the response options were metric, which is why we applied standard correlation tests to identify the relationship between probability and desirability assessments. We found significant correlations for four out of eight flexible projections, however, one half indicating a positive and the other half indicating a negative correlation (see Table 2.3), thus not indicating a consistent desirability bias effect.

2.4.2.2 Outlier analysis

The goal of an additional outlier analysis is to identify EP scores that differ significantly from the remaining data, thus leading to a potential distortion of mean values (Aggarwal, 2015). To eliminate this eventuality, we identified all standardized EP values exceeding the 99% confidence level (i.e., z-score above or below 2.58). Based on this criterion, only projection 2 (*match calendar*) revealed to have outliers. With three outliers in total, the amount of datapoints exceeded a commonly accepted limit of 1% above which it is assumed that outliers can affect average scores (Field et al., 2012). To account for this potential effect, we excluded the three identified outliers only for this particular analysis and re-calculated the EP score and IQR value (Warth et al., 2013). While the IQR remained constant (20), the expected probability dropped by 1.4 percentage points to 22.5%, indicating that the experts rated the potential reduction of the match calendar (projection 2) even more unlikely after the outlier adjustment. Despite this small correction, it can be concluded that there is no significant impact of outliers on the Delphi results at hand, which is underpinned by the fact that the three outliers also did not contribute qualitative comments that diverged significantly from the rest of the experts' opinions.

2.4.2.3 Bipolarity analysis

In the absence of consensus on mean EP scores, Dajani et al. (1979) identified bipolarity as a potential explanation for dissent and thus valid outcome of a Delphi study. Therefore, we tested all projections for potential opposing poles, that is two separate groups of experts estimating EP

with a high score and a low score, respectively (Warth et al., 2013). First, we checked for potential bimodal distributions in EP assessments and found no case in which two or more answer options had the same mode frequency (Scheibe et al., 1975). As an alternative approach, we conducted a visual inspection of histograms for all projections (Warth et al., 2013). As mentioned earlier, the two flexible projections 1 (*disaster regulations*) and 7 (*player contracts*) indicated a tendency towards bipolarity. Noteworthy, these two projections were the only ones not to be classified as buffering projections in the cross-impact analysis. Hence, one reason for bipolarity regarding these topics might be a different view of two opposing cohorts of experts on the interaction effects of these projections. Another reason might be related to the background of experts, which is subject of analysis in the following subchapter.

For the fixed projection, no bipolarity could be observed. The same holds true for the impact and desirability assessments of all projections, so that we conclude that bipolarity does not significantly drive dissent in our Delphi results.

2.4.2.4 Stakeholder-group analysis

In their work on a dissent-based approach for multi-stakeholder scenario development, Warth et al. pointed out that "diverging interests of the panelists may cause dissent" (2013, p. 573). This assumption could also be valid in the context of our Delphi study at hand. Therefore, we analyzed the four different stakeholder groups: Clubs, leagues and associations, academia, and football-related adjacencies. Results of this analysis are presented in Table 2.4.

With regard to expected probabilities of fixed projections, the results did not reveal statistically significant differences ($p < 0.05$), however, at a 10% significance level, marginally significant differences between groups become apparent (see Table 5). For projection 2 (*match calendar*), the conducted Mann-Whitney- U test indicated a marginally significant difference between participants from adjacencies and academia. Particularly academics consensually (IQR of 20) expected the match calendar not to be reduced (average EP of 18.6%).

Table 2.4 Stakeholder group analysis.

Projection	Clubs			Leagues and associations			Academia			Football-related adj.		
	EP	I	D	EP	I	D	EP	I	D	EP	I	D
<i>Regulatory</i>												
1: Disaster regulations	Q3/21 ^a	3.0	3.4	Q3/21 ^a	2.8	3.7	Q3/21 ^a	3.4	3.4	Q3/21 ^a	3.0	3.0
2: Match calendar	24% ^b	3.3	2.9	23% ^b	3.5	3.1	19% ^b	3.4	3.0	21% ^b	3.5	3.1
3: Salary cap	Never ^a	4.2	3.3	Never ^a	4.0	3.0	Never ^a	4.2	2.7	Never ^b	4.2	3.8
<i>Economic – revenue</i>												
4: Investors' shares	52% ^b	3.6	2.3	53% ^b	3.6	2.6	54% ^b	3.8	2.3	24% ^a	3.6	2.4
5: Broadcasting revenues	Never ^a	3.8	1.7	Never ^a	3.9	1.8	Never ^a	4.4	2.1	Never ^b	4.3	1.9
6: Sponsorship revenues	Q3/22 ^a	3.5	3.8	Q3/22 ^a	3.5	3.6	Q3/22 ^a	3.7	3.5	Q3/22 ^a	3.6	3.4
<i>Economic – cost</i>												
7: Player contracts	Q3/21 ^a	3.2	3.4	Never ^a	3.4	3.7	Q3/22 ^a	3.3	3.6	Never ^a	3.3	4.7
8: Transfer fees	Q3/21 ^a	3.7	2.8	Q3/21 ^a	3.4	2.6	Q1/22 ^a	3.7	3.1	Q3/23 ^b	3.2	2.8
9: Number of employees	40% ^b	2.9	1.6	44% ^b	3.4	1.7	35% ^b	3.0	1.6	43% ^a	2.5	1.9
<i>Social</i>												
10: Stadium attendance	34% ^b	3.6	1.4	49% ^b	3.7	1.8	38% ^b	3.7	1.4	48% ^a	3.5	2.0
11: Clubs' bankruptcy	66% ^b	3.5	1.3	77% ^b	3.8	1.6	61% ^b	3.6	1.4	63% ^a	3.3	1.7
12: Social responsibility	62% ^b	3.2	4.2	58% ^b	2.7	4.2	55% ^b	2.9	4.2	56% ^a	2.6	4.0
<i>Technological</i>												
13: eSports activities	>2024 ^a	2.6	2.7	>2024 ^a	2.7	3.1	>2024 ^a	2.6	3.4	>2024 ^b	2.8	2.7
14: Remote training	34% ^b	2.7	2.3	42% ^b	2.2	2.8	55% ^b	2.7	3.2	39% ^a	2.4	2.2
15: Personalized advert.	>2024 ^a	3.1	3.3	>2024 ^a	2.8	3.3	>2024 ^a	3.0	3.6	Q3/21 ^a	3.0	3.5

Note. EP = expected probability of occurrence: ^a EP(mode), ^b EP(mean); I = mean impact in case of occurrence; D = mean desirability of occurrence; Consensus (IQR for EP(mean) ≤ 25, mode's frequency for EP(mode) ≥ 50%, IQR for I and D ≤ 1.25) is marked in bold.

Adjacency representatives, in turn, rated the projection with the highest average EP (29.1%) of all stakeholder groups, but did not reach intra-group consensus (IQR of 30). Another marginally significant difference was found with respect to projection 11 (*clubs' bankruptcy*). Participants from leagues and associations reached intra-group consensus (IQR of 20), assuming that it is rather likely (average EP of 76.5%) that at least one out of ten lower league clubs will go bankrupt due to the effects of COVID-19. All other subgroups failed to reach consensus but were less pessimistic in terms of clubs' bankruptcies. Projection 14 (*remote training*) was the last projection to show marginally significant differences, in this case between academics and club representatives. None of the subgroups reached intra-group consensus for this projection, but it could be observed that academics had the highest average EP value (55.2%), while experts working for football clubs were rather skeptical (average EP of 38.7%) that individual remote training of players will be established. Although the results of the Mann-Whitney-*U* test did not show significant differences for projection 9 (*number of employees*), it is noteworthy, that experts from clubs were the only stakeholder group to reach consensus (IQR of 20) on this topic. With an average EP of 40%, this subgroup was close to the overall assessment of all participants (average EP of 40.8%); only academics were on average more optimistic that the number of clubs' employees will not decrease until the end of 2022 (average EP of 34.8% and IQR of 45).

For all flexible projections we first tested if stakeholder groups differed in their binary assessment if projections would become true (i.e., any valuation except for "never"), or if they would not become reality. In this case, we found no significant differences among all four groups. Then we looked at all participants that rated a projection to occur in the short- to medium-term (i.e., any value except for "later than 2024" or "never") in order to compare assessments on a metric scale. In this case, we found statistically significant differences for the two projections 7 (*Player contracts*) and 13 (*eSports activities*). In both cases representatives from clubs and academia had significantly different views.

Table 2.5 Stakeholder group analysis – results of the Mann-Whitney U test.

Group comparison	Projection	Dimension	<i>U</i>	<i>p</i>
Clubs / Leagues and associations	9 (<i>number of employees</i>)	I	228.5	.045
	11 (<i>clubs' bankruptcy</i>)	EP ^a	273	.074
Clubs / Academia	7 (<i>player contracts</i>)	EP ^b	114.5	.026
	13 (<i>eSports activities</i>)	EP ^b	76	.018
	13 (<i>eSports activities</i>)	D	198	.005
	14 (<i>remote training</i>)	EP ^a	271	.056
	14 (<i>remote training</i>)	D	199.5	.002
Clubs / Football-related adjacencies	8 (<i>transfer fees</i>)	I	578.5	.025
	10 (<i>stadium attendance</i>)	D	306	.028
	11 (<i>clubs' bankruptcy</i>)	D	267	.006
	12 (<i>social responsibility</i>)	I	506.5	.026
Leagues and associations / Academia	1 (<i>disaster regulations</i>)	I	127.5	.037
	11 (<i>clubs' bankruptcy</i>)	EP ^a	273.5	.093
	14 (<i>remote training</i>)	I	135	.044
Leagues and associations / Football-related adjacencies	3 (<i>salary cap</i>)	D	128	.018
	9 (<i>number of employees</i>)	I	309.5	.001
	11 (<i>clubs' bankruptcy</i>)	EP ^a	307	.057
Academia / Football-related adjacencies	2 (<i>match calendar</i>)	EP ^a	311.5	.092
	3 (<i>salary cap</i>)	D	350.5	.008
	13 (<i>eSports activities</i>)	D	120	.008
	14 (<i>remote training</i>)	D	132	.005

Note. EP^a = expected probability of occurrence for fixed projections; EP^b = expected time of occurrence for flexible projections and valuation of short- to medium-term occurrence (i.e., before end of 2024); I = impact in case of occurrence; D = desirability of occurrence.

For player contracts, experts from clubs indicated that adjustments could be made sooner. In terms of eSports, however, clubs did not see a high chance that competitive gaming could contribute a significant share to their revenues, while half of the academics were positive that this could happen until mid-2023.

For the impact and desirability dimensions of our projections, the mean difference tests indicated significant deviations between groups, as depicted in Table 2.5. Especially for projection 9 (*number of employees*), the experts from leagues and associations assumed a significantly higher impact compared to all other groups. In terms of desirability, projection 3 (*salary cap*), projection 13 (*eSports activities*), and projection 14 (*remote training*) are to be highlighted, as in these cases the judgement of one group was different from two other groups. Adjacency representatives showed a significantly higher average desirability (D of 3.8) for a salary cap than participants from academia, leagues, and associations. For the technological projections 13 (*eSports activities*) and 14 (*remote training*), academics expressed the highest desirability among all subgroups of experts, while club representatives were most hesitant towards the rising importance of eSports and participants from adjacent organizations were most reserved towards individual remote-training.

2.4.3 Sentiment analysis

2.4.3.1 Experience and expertise

Experience is often related to years on the job instead of actual expertise. To account for the fact that there is still a scientific debate as to which indicator is more accurate, we tested for both (Burgman et al., 2011). In terms of years on the job our Delphi panel covers a range from one to 40 years, thus providing a heterogeneous sample including both rookie and veteran perspectives (Spickermann et al., 2014). Based on our dataset, statistical tests suggested that there are partially significant relationships between years on the job and projection-related assessments. For all projections and dimensions we only found two correlations indicating that experienced experts are

less concerned with regard to headcount reductions (correlation of D for projection 9 and years of experience: $r = .21, p = .03$) and assign less impact to potential bankruptcies of lower-league clubs (correlation of I for projection 11 and years of experience: $r = -.23, p = .02$).

To get another proxy for experience, we asked participants to assess their expertise in different topic areas. Based on the self-reported skillsets, we conducted non-parametric mean value comparisons to see if expertise in certain areas affected the valuation behavior. Table 2.6 shows all statistically significant variances in mean values. Experts with expertise in digital, for instance, differed on three dimensions from other participants. First, they saw a little less impact of potential bankruptcies of lower league clubs. Second, they expressed a significantly higher desirability for salary caps and third, they were far less concerned with a possible decrease in broadcasting revenues, which might indicate openness towards a potential change in the industry.

Another group with three distinguishing viewpoints were participants with knowledge in strategy. The results indicate that this group expected broadcasting revenues to decrease earlier and transfer fees to remain below the pre-COVID-19 level for a longer amount of time. Hence, it could be concluded that experts experienced in strategy tended to respond more reserved with regard to those two economic projections. In accordance with this perception, the subset on average rated the impact of a quick recovery of sponsorship revenues higher than their peers, which underpins their special attention to financials. In the same vein, sales experienced participants expressed an above average desire for sponsorship revenues to recoup, although they were far less optimistic that stadium attendance would reach pre-lockdown numbers quickly – perhaps because the effective stadium attendance demand in some European football leagues was already in decline before the lockdown (Schreyer, 2019), or because they anticipated a stigmatizing effect of the pandemic leading to a long-term avoidance of large crowds (Katafuchi et al., 2020; Kurita & Managi, 2020).

Table 2.6 Sentiment analysis - expertise.

Expertise area	Projection	Dimension	Expertise		No expertise		<i>U</i>	<i>p</i>
			<i>n</i>	mean	<i>n</i>	mean		
Digital	3 (<i>salary cap</i>)	D	22	3.7	82	3.0	619	.020
	5 (<i>broadcasting revenues</i>)	D	22	2.3	81	1.8	607	.015
	11 (<i>clubs' bankruptcy</i>)	I	22	3.1	86	3.6	1267	.001
Strategy	5 (<i>broadcasting revenues</i>)	EP ^a	37	Q3/21	19	Q1/22	477	.028
	6 (<i>sponsorship revenues</i>)	I	67	3.8	41	3.2	970.5	.005
	8 (<i>transfer fees</i>)	EP ^a	59	Q3/22	36	Q3/21	579.5	<.001
Sales	6 (<i>sponsorship revenues</i>)	D	24	4	72	3.4	622.5	.032
	10 (<i>stadium attendance</i>)	EP ^b	28	28%	79	46%	1554	.001
Sponsoring	4 (<i>investors' shares</i>)	EP ^b	30	45%	78	57%	1510.5	.018
	6 (<i>sponsorship revenues</i>)	EP ^a	27	Q1/22	72	Q3/22	1344.5	.003
Marketing	6 (<i>sponsorship revenues</i>)	EP ^a	33	Q1/22	66	Q3/22	1531	.001
	15 (<i>personalized advertising</i>)	I	32	3.2	72	2.9	891	.049
Internationalization	3 (<i>salary cap</i>)	EP ^c	35	63%	71	41%	969	.034
	4 (<i>investors' shares</i>)	EP ^b	36	65%	72	48%	775	.001
	7 (<i>player contracts</i>)	EP ^a	24	Q2/21	46	Q4/21	720.5	.034

Note. EP^a = expected time of occurrence for flexible projections and valuation of short- to medium-term occurrence (i.e., before end of 2024); EP^b = expected probability of occurrence for fixed projections; EP^c = expected probability occurrence for flexible projections; I = impact in case of occurrence; D = desirability of occurrence.

Not surprisingly, participants with expertise in sponsoring also had an exposed view on sponsorship developments. Together with marketing-savvy experts, they anticipated sponsorship revenues to return to pre-COVID-19 level earlier than the rest of the Delphi panel. Thus, the sponsoring subset appeared to be less concerned with potential revenue shortfalls, which might also explain why they judged an increase in investors' shares as rather unlikely. A subset of experts that, on the contrary, expected increased investors' shares in European football clubs to be rather likely is the one with expertise in internationalization. This group also assessed a salary cap as imaginable and saw player contracts to move quickly towards a performance-based model. A perception that could be explained by an increased exposure to non-European sports leagues like the US-based National Football League (NFL), which tend to have characteristics as explained above, i.e., franchise structures, salary caps, and performance-based player contracts.

Finally, with regard to technological developments, marketing experts attributed a higher impact to fully personalized advertising, which appears reasonable, assuming that this technology would provide more opportunities for marketers to position their brand effectively.

2.4.3.2 Level of confidence

While experience and expertise rather represent an expert's knowledge on a meta level, we also collected information about the subjective knowledge on each individual projection (Rowe et al., 2005). To understand the interrelation between the level of confidence and expected probability assessments, we conducted chi square tests for all flexible projections and calculated correlations for all fixed projections (von der Gracht, 2012). Among the flexible projections we only found one marginally significant difference ($p = .069$) for projection 3 (*salary cap*) showing that experts with high levels of confidence ($C > 3$) more frequently expected salary caps to never occur in European football. For fixed projections, in turn, we found three projections with positive correlation between C and EP, which were projections 4 (*investors' shares*, $r = .29$, $p = .003$), projection 11 (*clubs' bankruptcies*, $r = .37$, $p < .001$), and projection 12 (*social responsibility*, $r = .23$, $p = .017$). Thus,

experts with higher confidence for these projections expected a higher probability of occurrence. Noteworthy, for projection 11 (*clubs' bankruptcies*) experts with high confidence reached in-group consensus with an IQR of 20% and an average EP of 72.2%.

2.4.3.3 Level of optimism

To test for the impact of optimism on our Delphi assessments (Loye, 1980), we posed two dedicated questions at the end of the survey, which helped to distinguish between rather optimistic and rather pessimistic experts. Therefore, we calculated the sum of both responses for each participant to derive an overall score for the individual level of optimism. We then conducted a median split and assigned all participants with a sum equal or greater than eight to the optimistic subset ($n = 59$) and all experts with a sum smaller than the median value of eight to the rather pessimistic subset ($n = 50$) (Maxwell & Delaney, 1993).

Based on statistical mean value comparisons, we found a series of significant differences between both groups as displayed in Table 2.7. As an emerging pattern it could be observed that optimists consistently gave higher scores for all dimensions of the respective projections. These findings correspond with previous research, which found that "optimism has a positive influence on generalized outcome expectancies for future events" (Felton, Gibson, & Sanbonmatsu, 2003, p.34).

2.4.3.4 Positive and negative affect

Given the special situation of the COVID-19 lockdown, we also aimed to account for the subjective wellbeing of participants (Spickermann et al., 2014). Therefore, we first calculated the individual affect balances prior to (AB_{t1}) and during the lockdown (AB_{t2}) and found that participants on average reported a significantly more negative affect balance during the lockdown ($M_{diff} = 0.83$, $t(108) = 10.55$, $p < .001$). To conduct further statistical tests, we then calculated the affect balance difference ($AB_{diff} = AB_{t2} - AB_{t1}$) to understand if individual experts were more or less affected by the lockdown. With respect to expected probability we found that affect balance difference correlated positively ($r = .27$, $p = .005$) with the assessment of projection 12 (*social responsibility*). That means

the higher the affect balance difference, the higher participants estimated the likelihood that clubs and players would sustain a strong awareness for their social responsibility also beyond the acute phase of the COVID-19 crisis. Further correlations were found with regard to the impact assessments of projections 10 (*Stadium attendance*, $r = .24$, $p = .01$), 12 (*social responsibility*, $r = .31$, $p = .001$), and 13 (*eSports activities*, $r = .21$, $p = .04$), which were all positively correlated with the affect balance difference.

Table 2.7 Sentiment analysis – level of optimists.

Projection	Dimension	Optimists		Pessimists		<i>U</i>	<i>p</i>
		<i>n</i>	<i>M</i>	<i>n</i>	<i>M</i>		
3 (<i>salary cap</i>)	EP ^a	57	60%	49	35%	1048	.011
4 (<i>investors' shares</i>)	EP ^b	58	58%	50	49%	1130.5	.046
7 (<i>player contracts</i>)	I	54	3.5	50	3.0	1008.5	.017
9 (<i>number of employees</i>)	I	55	3.1	47	2.7	995.5	.034
12 (<i>social responsibility</i>)	EP ^b	59	67%	50	49%	843.5	<.001
	I	56	3.2	46	2.6	807	.001
	D	58	4.4	50	4.0	1105	.022
13 (<i>eSports activities</i>)	EP ^a	58	100%	46	91%	1218	.023
	D	57	3.1	46	2.7	1021	.043
14 (<i>remote training</i>)	D	59	2.8	48	2.3	1058.5	.021
15 (<i>pers. advertising</i>)	D	58	58%	50	48%	703.5	<.001

Note. EP^a = expected probability of occurrence for flexible projections; EP^b = expected probability of occurrence for fixed projections; I = impact in case of occurrence; D = desirability of occurrence.

2.5 Scenarios and discussion

The fuzzy clustering approach led to three clusters comprising five, four, and six projections, respectively. Table 2.8 shows the individual degrees of membership (between 0 and 1) for all projections and clusters, which are graphically displayed in Figure 2.5 (Bezdek et al., 1984).

Table 2.8 Degree of membership for FCM clustering.

Projection	Degree of membership and projection assignment		
	Cluster 1	Cluster 2	Cluster 3
<i>Regulatory</i>			
1: Disaster regulations	0.0035	0.0172	0.9793
2: Match calendar	0.0587	0.8209	0.1204
3: Salary cap	0.1587	0.5935	0.2478
<i>Economic – revenue</i>			
4: Investors' shares	0.4871	0.3718	0.1411
5: Broadcasting revenues	0.7824	0.1534	0.0642
6: Sponsorship revenues	0.0592	0.2281	0.7127
<i>Economic – cost</i>			
7: Player contracts	0.0132	0.0841	0.9028
8: Transfer fees	0.1447	0.5766	0.2787
9: Number of employees	0.7155	0.1848	0.0997
<i>Social</i>			
10: Stadium attendance	0.9477	0.0361	0.0163
11: Clubs' bankruptcy	0.8665	0.0831	0.0503
12: Social responsibility	0.0674	0.1983	0.7343
<i>Technological</i>			
13: eSports activities	0.1207	0.3635	0.5159
14: Remote training	0.2349	0.4286	0.3365
15: Personalized advert.	0.0086	0.0390	0.9524

Note. Projection assignment is marked in bold.

A visual inspection indicates that the clusters are strongly characterized by the corresponding rating on the desirability dimension. We consider this insight in the following discussion.

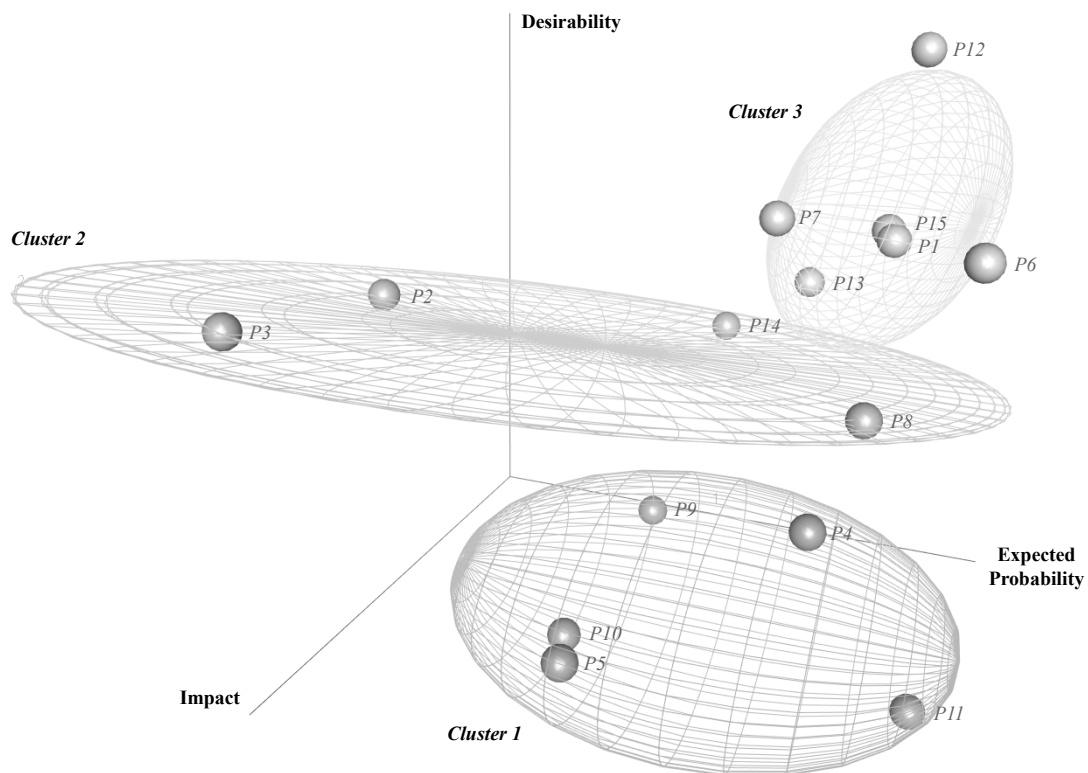


Figure 2.5 Clusters based on fuzzy c-means algorithm.

2.5.1 Cluster 1: Potential threats arising from COVID-19

The first cluster contains five projections (*4: investors' shares, 5: broadcasting revenues, 9: number of employees, 10: stadium attendance, 11: clubs' bankruptcies*) which were all valued with a low degree of desirability. Therefore, these topics can be seen as potential threats to the European football ecosystem caused by the consequences of COVID-19. A view on the impact axis of the three-dimensional visualization also reveals that the first cluster centroid is positioned higher than the others, thus indicating that participants expected a higher impact if these threats became reality. This finding is in line with existing research stating that negative events tend to be more salient and induce a higher amplitude in response (Ito et al., 1998).

Looking at the specific projections of this cluster, it is evident that it includes neither a projection from the regulatory dimension nor from the technological topic area. Instead, experts

anticipated COVID-19 to mainly threaten the economic and social level of the European football ecosystem. In a realistic but very undesirable scenario (EP of 66.3% and D of 1.4), financial threats might lead to bankruptcies for about 10% of the lower league clubs. According to Delphi experts, smaller clubs face higher risks, because they are often sponsored by local small and medium-sized enterprises, which could refrain from sponsorships in order to secure their core business. Some participants hoped for solidarity within the system to save clubs, as they otherwise see an increased chance of investors to acquire more shares in European football clubs; a scenario which was also not preferred by experts (EP of 53.5% and D of 2.4). To allow for solidarity, steady incomes would be important. Therefore, a decrease in broadcasting revenues would pose a severe problem to the ecosystem, which participants confirmed with the second highest impact valuation of all projections (I of 4.0). At the same time, expert rated the occurrence of a decrease in broadcasting income rather unlikely, arguing that broadcasting will even become more important in a more digital future. Hence, unless media companies start to struggle immensely, participants estimated this source of income to be stable and reliable. In the same vein, participants on average did not anticipate a long-term decrease in stadium attendance due to the consequences of COVID-19, although social distancing measures have to be considered as major short-term challenges for clubs and leagues when dealing with spectators as economically relevant stakeholders in the industry (Yoo & Managi, 2020). Consequently, as long as the main revenue streams from media and matchday are not severely at risk in the long run, clubs should be able to maintain their number of employees. Although some experts saw a need for improved efficiency through a reduced headcount, the majority argued that organizations at the core of the ecosystem, like clubs and leagues, would not lay off employees for two different reasons. On the one hand, experts argued that the monetary lever is anyhow limited, comparing the commercial staff payroll to the player payroll. On the other hand, there would be ways to reallocate employees to other tasks or overcome the crisis with governmental aids until things went back to normal.

In conclusion it can be said that the Delphi panel saw most of the post COVID-19 threats on an economic dimension. If the system is able to handle financial challenges well, the negative effect on the social level could be contained.

2.5.2 Cluster 2: Ambiguous effects caused by COVID-19

The second cluster that emerged from the FCM includes four projections (*2: match calendar, 3: salary cap, 8: transfer fees, 14: remote training*) that are unified by a very similar average evaluation of desirability, indicated by the flat shape of the ellipsoid in Figure E. Among the contained projections there are two with regulatory implications. That is the reduction of fixed games in the international match calendar and the introduction of a salary cap for European football clubs. Experts rated both projections as rather unlikely to occur. With respect to the match calendar, experts argued that there will be some inevitable adjustments in the short term, however, by 2022 things will be back to normal. As predominant theme for this judgement participants mentioned the financial interests of relevant international stakeholders like FIFA and UEFA that might even lead to an increase in fixed games in the future. Similarly, experts could not imagine a salary cap to be introduced, because this would need uniform regulations across European football leagues and a common interest among more and less wealthy clubs, which seemed doubtful to our experts. In fact, it was the fixed projection with the lowest average value for EP of 23.9%. Noteworthy though, experts rated the introduction of a salary cap as the most impactful with a slightly positive desirability.

An above average impact (I of 3.5) was also assigned to projection 8 (transfer fees). Experts estimated transfer fees to reach pre-COVID-19 level by mid-2021, arguing that competition for the best players will remain fierce, thus leading to a quick increase of transfer volumes after a small dip in 2020. However, some participants also envisioned a steady and long-term decrease in transfer volumes particularly for clubs that are not in the top tier of European football. In these cases, experts

argued subliminally that clubs should rather build cash reserved than taking financial risks through high transfer fees.

The last projection in the first cluster relates to individual remote training and most experts agreed that the implementation of such technologies would not have a dominant impact on the ecosystem. As mentioned earlier, only the subgroup of academics showed strong engagement with this idea, whereas all other stakeholder groups were skeptical in terms of probability and desirability. The majority of experts had concerns regarding the efficiency of remote trainings and pointed out the importance of training as a team. If at all, the experience with individual remote training during the COVID-19 lockdown might support injured players during recovery in the future or supplement workout plans, which could be interesting for coaching staff of national teams to interact with player more frequently with remote technologies.

In sum, experts did not expect too much change related to the topics addressed in cluster 2. Reasons for this might be conflicts of interest when it comes to regulatory developments or simply an anticipated return to the past, given the established structures and habits within the industry.

2.5.3 Cluster 3: Potential opportunities arising from COVID-19

The last cluster comprises six projections (1: disaster regulations, 6: sponsorship revenues, 7: player contracts, 12: social responsibility, 13: eSports activities, 15: personalized advertising) that represent potential opportunities for the European football ecosystem across all dimensions of the REST framework. From a regulatory angle, experts would appreciate rules that require clubs to guarantee administrative operations in case of unforeseen disasters (average D of 3.4) and a majority also expected short-term action. This was underpinned by the results of our cross-impact analysis in which we saw that new regulations would reinforce other subjects such as flexible player contracts or socially and economically sustainable structures in clubs. As possible measures participants mentioned new or adjusted conditions in the licensing procedure or a mandatory insurance coverage

for clubs. However, opposing votes also argued that clubs might protest against such regulations and that it should be the leagues to ensure financial provision in emergency situations.

In terms of economic effects of COVID-19, experts were positive about a quick recovery of sponsorship revenues, particularly for clubs in the highest domestic divisions. While participants expected that some sponsors would reduce their sponsoring budget in the near future, they also anticipated new brands to enter the sports sponsoring market with innovative sponsoring approaches. Thus, clubs would need to be open for new approaches, such as fully personalized advertising, for instance. Although experts could not agree as to when such a technology would become reality, the vast majority assumed it would be possible at some point and the clubs that would be best prepared, could generate significant revenues from this innovation. Similarly, eSports activities could be a way to diversify the revenue portfolio (Holzmayer & Schmidt, 2020b). However, as already mentioned, experts do not see a significant turnover through competitive gaming in the near future. In particular eFootball – that is competitive gaming with football simulations such as FIFA or Pro Evolution Soccer – was judged with skepticism by the Delphi panel, due to limited cash volumes. Other eSports titles, such as League of Legends or Dota2, have much higher revenue and sponsorship pools, but would mean an engagement that is less related to the core business of football clubs. In these cases, experts were doubtful if clubs would really be able and willing to invest short-term, given the financial pressure evoked by the consequences of the lockdown.

On the cost-side of economic effects, experts expressed a bipolar picture with regard to player contracts. While a group of participants argued that performance-based player contracts would reduce risks for clubs and allow for higher flexibility, others countered that players and their agents had the highest bargaining power in the ecosystem, thus being able to determine contract details. Financial Fairplay or domestic regulations also played a role in the Delphi discussion, however, the majority did not see a common ground to force performance-based clauses into player contracts. One way or the other, flexible player contracts could be a reactive response either due to new regulations,

or due to limited financial resources, which goes hand in hand with the results of our cross-impact analysis (see Figure C).

On a social level, experts strongly hoped that clubs and their players would maintain a higher awareness of their social responsibility compared to pre-COVID-19 and expressed this with the highest average desirability among all projections (D of 4.2). While a majority of experts argued that the disease initiated a shift in mindset, others expressed the concern that things could get back to normal quickly and that the increased focus on social activities within the industry would vanish. However, constant societal expectations, not to say pressure, was named by many participants as one way to keep the awareness high.

All aspects considered, the Delphi panel identified opportunities for the European football ecosystem to overcome the crisis and potentially emerge stronger with respect to financial and social sustainability.

2.6 Conclusion

This paper presents multifaceted insights into the question of how COVID-19 will impact the European football ecosystem in the short, medium, and long-term. The Delphi-based scenario approach allowed to both investigate 15 future-oriented projections in detail and discuss three overarching future scenarios. The results reveal a set of topics clustered into "potential opportunities arising from COVID-19". While most of these potential developments with regard to regulatory, economic, social, and technological changes are desirable in the view of our expert panel, not all participants assess them as very likely to occur. Against this backdrop, we provide a comprehensive data base for decision makers to further discuss these areas of interest and to develop strategies of how to accelerate or facilitate these favorable future developments. Similarly, for the cluster of "potential threats arising from COVID-19", we initiate a dialogue on how to prevent or mitigate negative effects of the pandemic outbreak.

As a matter of course, our research is not without limitations. In view of the unique situation caused by COVID-19, it is difficult to account for all factors that might have influenced our experts' valuation behavior. For instance, the severity of the pandemic outbreak differed from country to country during the survey period with particularly high death rates in Italy, Spain, France, and the United Kingdom (Stöhr & Stolz, 2020). Among other reasons, this might explain a relatively low response rate from these countries. Hence, we were not able to conduct country comparisons within our analyses, which might have revealed additional insights. However, despite a disproportionately high share of experts originating from Germany, we could not identify significant differences between German and non-German subsets of our sample. Moreover, we did not have dedicated crisis researchers or virologists in our sample, however, we included consultants and academics with educational background in healthcare and the medical sector.

Another limiting aspect worth mentioning is the fact that the results of the Delphi survey might be hard to generalize. Yet, some projections (especially from the social dimension) might be transferred to other contexts like the gastronomy, travel, or event industry. Also, the results present a snapshot of the COVID-19 outbreak, which means that participants could not confidently anticipate the development of vaccines, for instance. Therefore, further research on shifting assessments due to new insights about the virus and its socio-economic impact worldwide would be valuable (Gharehgozli et al., 2020; Mandel & Veetil, 2020).

In general, the conduction of this research during the time of the COVID-19 outbreak (i.e., a time of highest ambiguity for all stakeholders of the European football ecosystem) delivered both practical and theoretical insights regarding the application of future-oriented research under uncertainty. On the one hand, the Delphi technique enabled an online discussion in the midst of the crises, connecting subject matter experts from diverse backgrounds and generating positive feedback from all participants (Reed et al., 2009). Thus, a sophisticated handling of this methodology can bring advantages for policy makers and organizations to improve their crisis response and

preparedness (Carmeli & Schaubroeck, 2008; Fowler et al., 2007). In this regard, the European football ecosystem could indeed serve as a role model as it was among the pioneers for advanced hygiene concepts and flexible event planning capabilities. This holds true not only for other sports, but also for other industries that build their business model on the gathering of larger crowds. On the other hand, the Delphi-based scenario development offers a concise summary of our findings, allowing a wider audience to engage in the discourse both with a practical and theoretical motivation.

Besides the contextual contribution, this paper also adds methodological insights. To the best of our knowledge, no other paper exists that contains and combines the various analytical angles on a Delphi-based dataset including content analysis, cross-impact analysis, dissent analysis (containing analyses of desirability bias, outliers, bipolarity, and stakeholder groups), sentiment analysis, and scenario analysis. This also leads to implications for future research, where we see three main aspects emerging: First, the impact of individual sentiments on expert valuations should be continuously examined in Delphi studies, as we were among the first to operationalize these insights. While we tried to find a balance between scientific correctness and practical feasibility to gain information about participants' deep-level characteristics, the set of associated questions could be further expanded. Second, Delphi-based scenarios should be used both in research and practice to include heterogeneous stakeholder views in a relatively short amount of time. This is especially valuable in periods of high uncertainty. Given the ever-increasing pace of technological change and digital transformation of the world, this becomes progressively important. Last, sports should become a subject of investigation for broader socio-economic research questions as the industry not only established in terms of economic significance in many parts of the world, but also entails a high public awareness and social relevance.

3 Paper II: Preparing, Conducting, and Analyzing Delphi Surveys: Cross-disciplinary Practices, New Directions, and Advancements²

3.1 Method Basics and Co-Submitted Research

3.1.1 Basics of the Delphi study

The Delphi technique is a scientific method to organize and manage structured group communication processes with the aim of generating insights on either current or prospective challenges; especially in situations with limited availability of information (Dalkey & Helmer, 1963; Kendall, 1977; Rowe & Wright, 2011; Scheibe et al., 1975). As such, it has been frequently used in various scientific disciplines ranging from health care (Boulkedid et al., 2011; Ferri et al., 2005; A. C. Lee et al., 2011; Mokkink et al., 2010), medicine (Dellinger et al., 2008; Jones & Hunter, 1995; Morley et al., 2013; Sinha et al., 2011), education (Bulger & Housner, 2007; Robertson et al., 2000; Stitt-Gohdes & Crews, 2004), business (Czinkota & Ronkainen, 1997; von der Gracht & Darkow, 2016; White, 2017), engineering and technology (Bokrantz et al., 2017; Schweizer et al., 2020), social sciences (Bishop et al., 2017; Strauss & Zeigler, 1975), to information management (Akkermans et al., 2003; R. Schmidt et al., 2001), and environmental studies (Seuring & Müller, 2008). Irrespective of the focus in time or content, the Delphi technique builds on the anonymity of participating experts who are invited to assess and comment on different statements or questions related to a specific research topic (Keeney et al., 2001; McKenna, 1994). Quantitative assessments traditionally include probability, impact, and desirability of occurrence, but are not limited to these. Further dimensions could refer to innovativeness, urgency, or (technical) feasibility, for instance. Moreover, participant-related

² Beiderbeck, D., Frevel, N., von der Gracht, H. A., Schmidt, S. L., & Schweitzer, V. M. (2021a). Preparing, Conducting, and Analyzing Delphi Surveys: Cross-disciplinary Practices, New Directions, and Advancements. *MethodsX*, 8, 101401. <https://doi.org/10.1016/j.mex.2021.101401>

information such as confidence or expertise can be collected (Devaney & Henchion, 2018; Förster & von der Gracht, 2014; Spickermann et al., 2014). In addition, especially in medical and clinical research, Delphi studies make use of rank-order questions, rating scales, or open questions, while often being designed to examine levels of consensus among experts (Boulkedid et al., 2011; Robertson et al., 2000; Sinha et al., 2011). In a Delphi survey, the aggregated group opinion is fed back to participants across multiple discussion rounds of the same set of theses. During this multi-round procedure, the rounds can be performed sequentially, or – with the help of dedicated software – immediately (so-called real-time Delphi) (Aengenheyster et al., 2017; Gnatzy et al., 2011; T. Gordon & Pease, 2006). After each round, panelists have the possibility to review the aggregated results and to reconsider their assessment based on the added quantitative and qualitative information (Bolger & Wright, 2011; Linstone & Turoff, 2011). This structured group communication process is supposed to lead to a convergence – or divergence – of opinions, hence, producing more accurate results than traditional opinion-polling techniques (McKenna, 1994). Moreover, the Delphi method has advantages over in-person techniques such as group discussions or brainstorming sessions, as it rules out personal sensitivities among the experts and therefore avoids potentially destructive group dynamics (P. L. Williams & Webb, 1994). The results of a Delphi survey can deliver stand-alone insights but are increasingly linked to scenario analytics, to fulfill idea-generation, consolidation, or judgment functions (Nowack et al., 2011).

3.1.2 Co-submitted research

The technical paper at hand builds on a Delphi study including scenario analysis, which is dealing with the impact of COVID-19 on the European football ecosystem (Beiderbeck et al., 2021b). The study included 110 international experts and was conducted amid the COVID-19 outbreak between April and May 2020. In times of deep uncertainty, participants evaluated the regulatory, economic, social, and technological implications of the pandemic on the European football ecosystem (Watson et al., 2019). In this context, the study served two main purposes: on the one hand, it facilitated an expert discussion that was valuable for all participants as they faced

a similar level of unprecedented ambiguity and thus shared common challenges. On the other hand, it aimed to advance the Delphi technique from a methodological point of view by offering a comprehensive analysis and combine cross-disciplinary features. For example, the authors conducted dissent analyses from the field of risk and emergency preparedness, while introducing a sentiment analysis of the field of psychology. The latter was of particular importance in times of crisis in order to interpret the experts' assessments against the backdrop of their individual situation or constitution. All in all, the Delphi method proved to be a suitable technique to manage a systematic online dialogue among experts while at the same time assuring scientific rigor to derive accurate results.

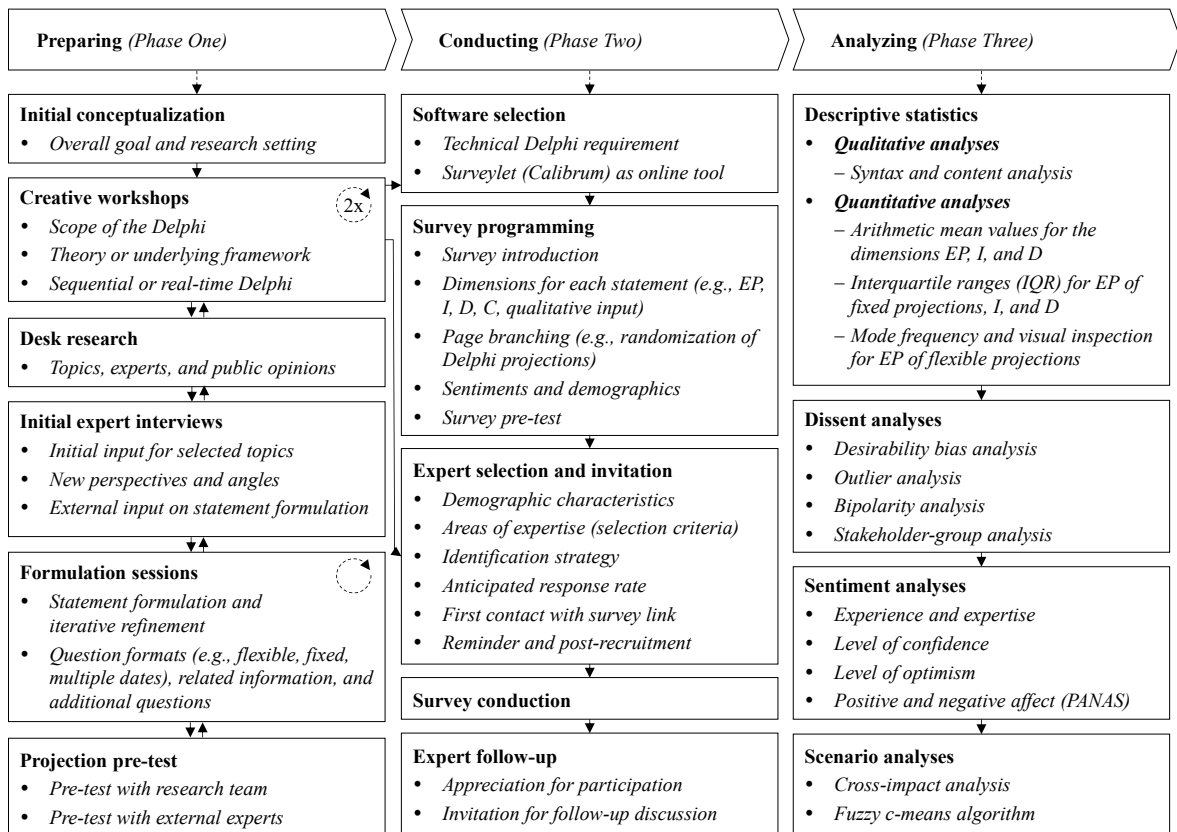


Figure 3.1 Three Phases of Delphi-based Research.

3.1.3 Structure and aim of this paper

We structure this technical paper following the three major phases of a Delphi-based research project: preparing, conducting, and analyzing. Each phase consists of different steps (as depicted in Figure 3.1), which will be thoroughly explained in this paper.

Table 3.1 Overview of Potential Delphi Features.

Phase	Step	Potential Feature				Source		
Preparing	(Primary) Research goal	Practical contribution (e.g., strategy, decision-making, risk-management, emergency-preparedness)		Theoretical contribution (e.g., consensus on definitions, terminology)		(Bañuls & Turoff, 2011; Clayton, 1997; Markmann et al., 2020; Simon et al., 2014)		
	Research setting	Present-related (e.g., clinical trial, experiment, concepts)		Future-related (e.g., forecast)		(Diamond et al., 2014; Flostrand et al., 2020; Okoli & Pawlowski, 2004)		
	Delphi format	Conventional (i.e., sequential)	Real-time (i.e., continuous)		Modified (e.g., nominal group technique)	(Bulger & Housner, 2007; Delbecq et al., 1986; Gnatzy et al., 2011; Graefe & Armstrong, 2011; Kluge et al., 2020)		
	Delphi statements	Expert-based		Framework-based	Theory-/ Literature-based		(Loveridge, 2002; Markmann et al., 2020; Münch & Gracht, 2021; Robertson et al., 2000)	
	Delphi questionnaire	Statement-related (e.g., expected probability, impact, desirability, urgency, feasibility, relevance)	Expert-related (e.g., confidence, surface/deep-level expertise)	Context-related (e.g., COVID-19)	Relative (e.g., rank-order, rating scales)		(Mullen, 2003; R. Schmidt et al., 2001; Spickermann et al., 2014)	
Conducting	Software selection*	eDelfoi	GFIS	RAHS	Surveylet	Welphi	(Aenghenyester et al., 2017)	
	Survey flow	Constant order			Randomized order		(Beiderbeck et al., 2021b)	
	Expert selection	Predefined panel		Expert nomination		Free access	(Bishop et al., 2017; Devaney & Henchion, 2018; Mauksch et al., 2020)	
	Expert motivation	No extrinsic motivation		Non-monetary motivation (e.g., pre-access to survey results)		Monetary motivation (e.g., vouchers, prizemoney)	(Kawamoto et al., 2019)	
	Feedback format	Qualitative comments (e.g., unstructured, clustered, rank-ordered)		Quantitative statistics (e.g., mean values, interquartile range)		Visual feedback (e.g., boxplot, histogram, cockpit)	(Belton et al., 2019; Bonaccorsi et al., 2020)	
	Survey conduction - Termination criteria	Time-related		Participant-related	Consensus-related		Stability-related	(Barrios et al., 2021; Dajani et al., 1979; Fink et al., 1984; von der Gracht, 2012)
Analyzing	Qualitative analyses	Syntax analyses (e.g., sentences, semantics)		Content analysis (e.g., coding, lines of argumentation)		Frequency analysis (e.g., word cloud)	(Allen et al., 2021; Förster & von der Gracht, 2014; Roßmann et al., 2018)	
	Quantitative analyses	Descriptive statistics (e.g., mean values, mode frequency, interquartile range)		Inferential statistics (e.g., Chi-square, Wilcoxon, Kendall's W)		Visual analysis (e.g., histogram, raincloud plot)	(Hasson et al., 2000b; Murphy et al., 1998; von der Gracht, 2012)	
	Dissent analyses	Bias analysis (e.g., desirability bias)	Outlier analysis	Bipolarity analysis	Stakeholder-group analysis	Discontinuity analysis	(Bonaccorsi et al., 2020; Ecken et al., 2011; Schirrmeister et al., 2020; Warth et al., 2013; Winkler & Moser, 2016)	
	Sentiment analyses	Experience and expertise		Level of optimism	Level of confidence		Personality traits (e.g., PANAS, locus of control)	(Loye, 1980; Mauksch et al., 2020)
	Scenario analyses - Clustering	Subjective		Fuzzy	Cluster method (e.g., hierarchical, k-means, PAM)	Cross-impact analysis		(Bañuls & Turoff, 2011; Kluge et al., 2020; Muskat et al., 2012; Nowack et al., 2011)
	Scenario analyses - Illustration	Descriptive table		Narrative	2D scatterplot		3D plot	(Akkermans et al., 2003; Fergnani & Jackson, 2019; Hirschingner et al., 2015)

Note. Features marked in bold were used in co-submitted research Beiderbeck et al. (2021).

*Selected software tools, without any claim to completeness.

In this context, we provide a comprehensive overview of potential features and recent advancements in all three phases (see Table 3.1) and therefore complement and substantially extend recent methodic publications such as Schmalz et al. (2021). Thereby, we aim to support the research community in utilizing the Delphi technique for their respective disciplines by following a replicable, but still highly customizable approach.

3.2 Preparing a Delphi study (Phase One)

Thorough preparation is critical to ensure the validity and accuracy of a Delphi study (Kastein et al., 1993; Schmalz et al., 2021). In general, this phase pursues four different goals: (1) *Definition of research goals*, (2) *definition of Delphi format*, (3) *definition of Delphi statements*, and (4) *definition of additional questions* (see Figure 3.2). To achieve these goals, we started with an initial conceptualization phase followed by two creative workshops in order to define our *research goals* and the *Delphi format*. Simultaneously, we conducted desk research to understand the current body of research and to identify the major challenges in the industry. Given the topicality of events around the pandemic, the existing body of research on the impact of COVID-19 on sports industries was scarce. Therefore, we decided to involve experts early in the process to define our overarching topics and thus our *Delphi statements*. To refine these, we conducted 17 formulation sessions with the research team and fed back the proposed statements as well as *additional questions* to our experts. Eventually, we also tested our statements with previously not involved researchers and experts to ensure the comprehensibility of our statements. To allow the research community to thoroughly understand and adapt this research process, we will describe each step in more detail below.

3.2.1 Initial conceptualization

The initial conceptualization was necessary to define the overarching *research goal*, which – in our case – was twofold. On the one hand, we wanted to facilitate an expert discussion in the European football industry amid the COVID-19 crisis to thus provide practical added value to all

participants who faced unprecedented challenges due to the pandemic. On the other hand, we wanted to gain accurate insights on the short-, mid-, and long-term effects of COVID-19 on European football by conducting a state-of-the-art Delphi study. To achieve these two goals, we compiled a research team with expertise in terms of content (i.e., European football) as well as methodology (i.e., Delphi technique). Given the urgency, we also developed a tight timeline for preparing and conducting our research – with roughly 5 weeks from initial conceptualization in mid-March 2020 to the actual survey launch in mid-April 2020.

Technical recommendation for "3.2.1 Initial conceptualization"

- *We deliberately included researchers with different expertise in terms of industry specifics, methodological experience, and statistical knowhow. We made good experience with this composition and motivate researchers to include methodological and statistical expertise in the research team as this significantly accelerates the research process.*
- *We encourage scholars to put dedicated effort into defining a research direction as well as reviewing and assessing the suitability of the Delphi technique and potential software solutions.*

3.2.2 Creative workshops

The creative workshops were used to define the *Delphi format*. For us, the *Delphi format* includes three central elements: (1) *scope*, (2) *theory/framework*, and (3) *sequential or real-time conduction*. In terms of *scope*, we decided to focus on the European football ecosystem both because we wanted to include experts from different backgrounds, organizations (i.e., clubs, leagues and associations, academia, football-related adjacencies), and from all of the five core European football markets (i.e., Germany, United Kingdom, Spain, France, Italy). This helped us to cover a broad range of perspectives and allowed us to get an international perspective on the impact of the pandemic.

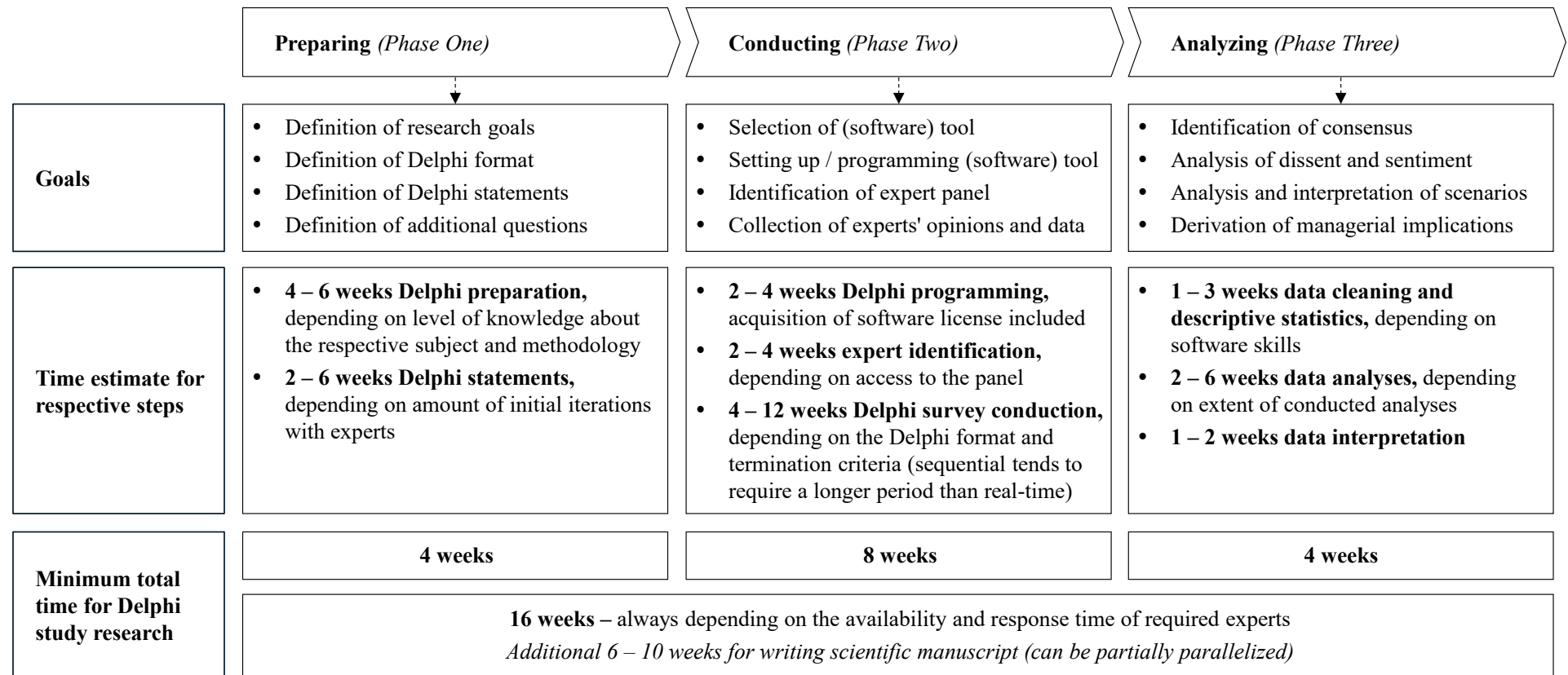


Figure 3.2 Goals and Time Estimates for Delphi Phases.

From a *theory/framework* perspective, we conducted a literature review to identify an adequate structure on which we could base our research. To cover a wide range of potential effects of COVID-19 on the European football ecosystem, we decided to build on the PEST framework (political, economic, socio-cultural, technological) (Ho, 2014) and extended the political dimension with a regulatory perspective, which appeared to be more suitable in the context of football, so that we introduced the REST framework (Regulatory, Economic, Social, Technological) for our context (Merkel et al., 2016; Nowack et al., 2011). In our second workshop, we discussed this framework with five previously not involved industry experts to obtain additional and unbiased perspectives. As a result, we decided to split the economic angle of our REST framework into two separate buckets focusing on revenue-related and cost-related economic effects. This modification towards a REEST structure (Regulatory, Economic – revenue, Economic – cost, Socio-cultural, Technological) helped us to refine our *Delphi format* by putting more emphasis on the economic pressure that many football-related organizations felt during the first lockdown in April 2020 and therefore increased the relevance of our study. We encourage researchers to not blindly follow existing frameworks but to adjust them to their needs as appropriate.

The decision for a *sequential or real-time Delphi* was made in favor of the real-time format due to the ambitious timeframe of the actual survey conduction and due to the improved user experience for participants, which often results in higher participation and lower drop-out rates (Aengenheyster et al., 2017; T. Gordon & Pease, 2006). For a more detailed discussion on the decision criteria between sequential or real-time Delphi see Gnatzy et al. (2011).

Technical recommendation for "3.2.2 Creative workshops"

- *Defining a framework for the initial list of Delphi statements helped to structure our thinking and to involve experts for different topic areas. In addition, it contributes to the completeness of the set. We therefore highly recommend using a framework to structure and cluster Delphi statements.*

- *If a framework is not applicable for specific research contexts, it is advisable to anchor the Delphi research based on existing theories. A good example of this is Winkler et al. (2015), who used the "organizational information processing theory (OIPT)" as a foundation for their Delphi study to analyze decision making in emerging markets.*
- *The real-time Delphi format allowed us to involve a larger number of experts in a shorter amount of time. We observed that much more than 50% of the experts joined the Delphi discussion after three weeks of the initial launch and then engaged vividly in the discussion. The sequential approach tends to complicate participation for late joiners so that we would recommend a real-time format in case the schedule is tight.*

3.2.3 Desk research

Dedicated desk research was performed in between and after the two creative workshops. As Schmalz et al. (2021) conclude, a thorough literature review is indispensable for a Delphi study. However, this does not necessarily need to be limited to the scientific body of research – particularly in the case of prospective, forecast studies for which existing literature might be scarce. In the special case of our co-submitted research, for example, there was almost no existing research on the consequences of COVID-19 at the beginning of the crisis. Therefore, we also focused on the popular press to identify the most urgent issues for the European football ecosystem. To do so, we screened international newspapers and pertinent sports management magazines to get a first idea for potential *Delphi statements*. This initial long list of statements was captured in Microsoft Excel and shared with the five above-mentioned experts who participated in our second workshop. Their input was used to further expand the statement long list which then served as a basis for our initial expert interviews.

Technical recommendation for "3.2.3 Desk research"

- *The desk research should be structured based on a framework or theory, too. The lack of a proper foundation jeopardizes not only the quality of desk research but also the comprehensiveness of the literature review that should be part of all scientific publications.*

3.2.4 Initial expert interviews

Based on the modified REEST framework, we decided to conduct three initial expert interviews for each of our five framework dimensions, following a semi-structured approach (Adams, 2015). The panel was meant to represent all stakeholders within the European football ecosystem, which is why we interviewed subject matter experts from all five European target countries as well as the four stakeholder groups. In total, we contacted 21 experts via email or directly via phone and achieved a final response rate of 71 percent. We recommend activating contacts from (wider) personal networks to increase the response rate and to speed up the process so that two weeks from first inquiry to final interview becomes a realistic target.

We scheduled all interviews for 60 minutes and spent roughly 15 minutes explaining our *research goals* as well as the characteristics of a Delphi survey. We then spent 30 minutes discussing the main challenges caused by COVID-19 for the expert's respective area of expertise and developed/refined potential *Delphi statements* and saved the last 15 minutes for open questions and follow-up information. The latter included an invitation to the actual Delphi survey as well as an inquiry to nominate a list of potential experts as proposed by Belton et al. (2019). After each interview, members of the research team reviewed the findings and conducted formulation sessions, which are described in the next section. The results of these sessions were then used for the next interview so that we iteratively developed our *Delphi statements*. At the end of the process, we shared the short list of statements in Microsoft Excel with all experts and received their proposed prioritization which helped us identify our final set of 15 statements.

Technical recommendation for "3.2.4 Initial expert interviews"

- *We made a very good experience involving experts outside the research team early in the process. However, the amount of 15 initial experts was surely the upper limit. For most prospective Delphi studies, 5 to 8 initial experts should be sufficient.*
- *Contacting experts from the closer network, accelerated our process significantly, since we were able to speak to most experts on short notice with a very high response rate. However, research teams should bear in mind potential biases and homogeneous thinking within the close network.*

3.2.5 Formulation sessions

The accurate wording of statements is central to the quality of Delphi studies as it can reduce biases and increase response variance (Ecken et al., 2011; Markmann et al., 2020). Therefore, we conducted regular formulation and review sessions (17 iterations in total) with at least two participants (one permanent and four alternating research team members). This setup guaranteed that the core research team member was aware of all information while being challenged by others in terms of subjective biases (Winkler & Moser, 2016). The goal of our formulation sessions was not only to define the final set of *Delphi statements*, but also to decide on question formats, related information, and *additional questions*.

For the formulation of *Delphi statements*, we followed the guidelines by Markmann et al. (2020) and iteratively shaped the wording with our experts. To balance the trade-off between the gain of insight and participation effort, we included 15 statements (three for each dimension of our REEST framework) in our study. Moreover, we discussed the question format and decided to query the expected probability (EP) of occurrence as our main variable, given the prospective nature of our Delphi. Moreover, we used desirability (D) and impact (I) of occurrence as complementary variables, and confidence (C) in assessing the respective statement as a bias control variable. For the dimensions D, I, and C we chose a traditional five-point Likert scale from very low (1) to very

high (5). The EP dimension, in turn, can have different question formats, such as fixed formats (e.g., Liker-scale, or 0-100 percent scale to assess the expected probability of occurrence by a certain time) or flexible formats (e.g., assessment of time when occurrence is most likely, or assessment of expected probability of occurrence at several points in time in the future). For the co-submitted research, we decided to mix fixed and flexible statements, because we wanted to have both a focus on short-term effects of COVID-19 (which we tested with fixed statements with the end date 2022, e.g., "*in 2022, (strategic) investors got more shares in European football clubs due to COVID-19*") and an indication for medium- to long-term consequences of the pandemic (which we tested with flexible statements, e.g., "*A salary cap for professional football players has been introduced*"). We also discussed relevant information associated with our statements and decided to present two exemplary pro arguments as well as two exemplary contra arguments for each statement as initial conditions (Gnatzy et al., 2011). This information provided a common basis for all experts and was supposed to motivate participants to think of both supporting and opposing arguments, which is a way to mitigate biases such as framing, anchoring, or desirability bias (Bonaccorsi et al., 2020). For the same reason, we asked participants to separately share qualitative comments in favor and against the occurrence of the respective statement. To gain further insights, we also included an open-comment option for the impact of occurrence. To keep the survey length reasonable, we decided to dispense free-text fields for the desirability and confidence dimensions.

Last, we used the formulation sessions to agree on *additional questions*. These included classic demographic questions such as gender, age, country of residence, type of organization, and years of work experience within the European football industry. In addition to these surface-level criteria, we also asked for deep-level characteristics, because we wanted to learn about the values and beliefs of participating experts, which might affect their opinions (Loye, 1980; Spickermann et al., 2014). These consisted of the respective area(s) of expertise (e.g., strategy, sponsoring, marketing, digital, legal) as well as personality-related information (Loye, 1980). The latter included

COVID-19-related questions to assess experts' level of optimism and a short version of the positive affect negative affect scale (PANAS) to judge on experts' sentiments (Schimmack, 2008; Thompson, 2007; Watson et al., 2019). In conclusion, the formulation sessions eventually determined the *Delphi format*, *Delphi statements*, and *additional questions*, which is why we want to emphasize the importance of this step within a Delphi research project.

Technical recommendation for “3.2.5 Formulation sessions”

- *While we conducted 17 formulation iterations, we think that fewer sessions would be sufficient. Also, these formulation sessions can be very informal.*
- *We recommend involving at least 3 researchers in the process of formulation in order to avoid subjective perspectives and biases.*
- *The mix of fixed and flexible statements complicated subsequent analyses significantly (as described in the respective lessons learned in the analysis section). Therefore, we recommend sticking to consistent scales for each individual dimension of assessment (i.e., expected probability, desirability, and impact).*
- *Three open-text questions per Delphi statement seemed to be the maximum for our amount of 15 statements. We experienced that responses in the impact-related commentary field often referred to aspects that were mentioned in the probability-related comments before. Therefore, we argue that one or two open-text questions per Delphi statement are suitable to get enough qualitative input, while not risking increased survey fatigue.*
- *We understand that in other disciplines qualitative feedback might not be at the core of investigation. Therefore, also larger amounts of statements (up to 100) with few questions (e.g., importance and relevance) can be suitable (Bulger & Housner, 2007).*

- *We made a good experience illustrating only one Delphi statement per webpage, in order to avoid the necessity to scroll online. From our experience, this style of presentation prevented experts from overlooking free-text fields and allowed participants to get accustomed to a consistent format. In order to guide participants through the survey, we added an overall progress bar and included a "half-time message", indicating that 50 percent of the survey was completed.*
- *We highly encourage researchers to include additional questions, because they can help to learn more about experts' personal predispositions. For more details see section "4.3 Sentiment Analysis".*

3.2.6 Survey pre-tests

In between the last two formulation sessions, we selectively pre-tested our *Delphi format*, *Delphi statements*, and *additional questions* with fellow researchers and experts from the creative workshop in order to ensure clear comprehensibility and guarantee high reliability (Okoli & Pawlowski, 2004; Oksenberg et al., 1991). Based on these pre-tests, we slightly adjusted our final wording. In the co-submitted paper itself, we referred to our *Delphi statements* as *Delphi projections*, which is particularly common in the context of foresight. For the remainder of this technical paper, we stick to the broader expression of *Delphi statements*.

Technical recommendation for "3.2.6 Survey pre-tests"

- *While we put the main focus of our pre-tests on the content of our study, we would highly recommend researchers to also pre-test the average time to complete the survey, as survey length is known to be a critical factor with regard to survey fatigue and elevated drop-out rates (Hasson & Keeney, 2011). Based on feedback from participants we learned that our survey length was about 45 minutes and therefore at the upper limit for the context of our field of study. However, reasonable durations*

might be shorter or longer for other settings, which should be pre-tested with representatives of the respective expert panel.

3.3 Conducting a Delphi study (Phase Two)

In terms of the actual conduction of the Delphi survey, this technical paper will focus on software selection and programming as well as the identification and interaction with experts. To the best of our knowledge, real-time Delphi software has only been applied in business and forecasting studies so far. We encourage scholars of all other disciplines to consider such applications during the survey design in future research endeavors.

3.3.1 Software selection

As mentioned earlier, we decided to conduct a real-time Delphi in order to account for the ambitious timeframe and to allow participating experts to review the most recent results at any point in time. In general, we advise defining the type of Delphi (i.e., sequential or real-time) early in the research process. Based on the respective *research goals*, one or the other type might be more suitable. While web-based software is strictly required for real-time Delphi surveys, sequential studies can still be distributed via mail or even phone; although this is rather an exception nowadays (Boulkedid et al., 2011). In terms of web-based software, Aengenheyster et al. (2017) compared state-of-the-art providers regarding features, data output, user-friendliness, and ease of administration. Based on their assessment and our own market screening, we decided to choose *Surveylet* as our preferred platform. The provider, *Calibrum*, offers different service packages, which range from pure platform access to full-service support. For the co-submitted research, we acquired a medium package including basic service support and individualization options.

Technical recommendation for "3.3.1 Software selection"

- *Surveylet offers a variety of options, which might even go beyond the relevant set of functions for most Delphi studies. It also allows for individualization options and service support, which typically require more expensive contracts. Thus, we recommend checking occurring costs. Setting up an account takes roughly one week and should therefore be initiated sufficiently earlier than the actual survey programming.*
- *Meanwhile, there might also be additional online Delphi platforms available beyond the scope of the review of Aengenheyster (2017). A more recent example is the BOHEMIA Delphi (Beyond the Horizon – Foresight in Support of the Preparation of the EU's Future Policy in Research and Innovation) (Gheorghiu et al., 2017).*

3.3.2 Survey programming

While software selection and preparations can be performed early in the process, we highly recommend finishing phase one (i.e., definition of *Delphi format*, *Delphi statements*, and *additional questions*) before starting the actual survey programming. Subsequent changes to format and statements lead to extra effort and significantly increase the error-proneness. Therefore, we captured and refined all relevant text modules in Microsoft Excel, prior to programming the survey. These included the survey introduction, the actual statements, pro and contra arguments, as well as all additional questions and an outro.

Special attention should be paid to the survey introduction, particularly in web-based Delphi studies, as a proper understanding of the process is crucial for panelists. We recommend a short, but very concise introduction, including (1) *the purpose and anticipated duration of the study*, (2) *contact details of the research team*, and (3) *information about the Delphi process*. For the explanation of the Delphi process, we recommend mentioning the anonymity of participants and the iterative character of the method. In this context, we encouraged participants to also share (and

review) qualitative comments. Moreover, we explicitly draw attention to potential biases, that might affect participants' evaluations. By addressing these issues, we aimed to sensitize participants to deliberately avoid these biases (Bonaccorsi et al., 2020). Eventually, we offered a link to a short online tutorial (approximately 90 seconds), that explained the overall Delphi process with visual support.

In terms of *Surveylet* as the software of choice for our co-submitted research, we made good experience with the following settings and programming steps: First, we recommend tracking all possible statistics, which include more than 30 variables such as mean values, standard deviations, and interquartile ranges. These should generally be displayed to the survey administrator and can selectively be displayed to the participants. While more data result in more information for the experts, they can also trigger biases, so that we decided to only share mean values with our participants (Bonaccorsi et al., 2020). We refrained from using real-time text analyses, as these were – at the time of our survey – not fully mature, causing significantly longer loading times of the website. An option that appeared quite useful to us was the randomization of statements. That is, every *Delphi statement* along with the related questions was presented in randomized order, which prevented the risk that experts put more effort into early statements or get collectively biased due to previous answers.

Technical recommendation for "3.3.2 Survey programming"

- *When it comes to survey programming, we recommend enough preparation time (at least 2 weeks). For novice users, we also recommend basic service support for the first Delphi study or more preparation time to understand the most important features.*

3.3.3 Expert selection and invitation

The initial identification of experts can be a challenging task, depending on the subject that is supposed to be explored (Devaney & Henchion, 2018; Förster & von der Gracht, 2014). Based on the existing body of literature and the experience from our co-submitted research, we suggest considering five aspects when composing a Delphi expert panel: (1) *Size of the panel*, (2) *level of expertise*, (3) *level of heterogeneity*, (4) *level of interest*, and (5) *access to the panel*.

While the specific context of investigation will surely have an impact on the panel composition, it is always advisable to address all five aspects early in the process. In our co-submitted research, we wanted to gain an understanding of prospective developments and aimed to include different stakeholder groups to obtain a comprehensive view of an entire ecosystem. Therefore, the *size of the panel* needed to be rather large. In general, we recommend a larger number of participants for more holistic topics (as often found in management research) and a more condensed set of experts for specialized topics (as often found in the clinical context). For statistical purposes, it is advisable to have at least 15 to 20 experts in any given sub-group of experts, if significant differences between these sub-groups are supposed to be statistically analyzed. Moreover, we learned that the variety in additional qualitative comments typically decreases from a quantity of 30 to 40 participants. Similar to the size of the panel, the *level of expertise* depends on the subject. While there might be a need for specific domain knowledge in some cases, other Delphi surveys might benefit from a broader more generalist perspective of participants. In any case, it is necessary to predefine criteria for level of expertise, such as age, years of work experience, occupation, academic degree, or the number of publications in a certain field of research. These criteria then help to justify the panel selection and potentially allow to distinguish between groups based on expertise. Another important aspect of panel composition is the *level of heterogeneity*. Especially in more holistic – often future-related – settings, a heterogeneous sample can mitigate cognitive biases (Bonaccorsi et al., 2020). Moreover, a variety of backgrounds offers room for inter-

group analyses. Possible categories for preselection include dedicated experts from academia, politics, the broader public, and obviously the specific industry that is supposed to be evaluated. Based on our past experience, we also encourage researchers to assess the *level of interest* that certain participants might have with regard to the survey results while bearing the risk of a potential self-selection bias in mind (Heckman, 1990). Time and attention of subject matter experts are scarce and therefore personal investment of participants can increase response rates and quality of comments. Similarly, *access to the panel* should be evaluated early in the process. While there are always experts for each and every topic, it is not always easy to reach out to them directly.

To invite experts, the software tool *Surveylet* offers a variety of options. Based on the *size of the panel*, we recommend either pre-populated links (i.e., one individual link for each participant based on the participant's e-mail address) for smaller panels with available contact details or in case of larger panels an open link, in which each expert has to insert his or her e-mail address as a unique identifier. At this point, it is important to assure participants that the e-mail address purely serves as an identifier to revise previous inputs.

Technical recommendation for "3.3.3 Expert selection and invitation"

- *A first and crucial step is to define the criteria on how to measure expertise for the research endeavor. This holds especially true for Delphi studies, where it is rather not about the representativeness of a population but the identification and inclusion of the highest-level of expertise in the panel. A systematic review of expert identification methods can, for example, be found in Mauksch et al. (2020).*
- *Our goal was to include more than 80 participants in our survey because we wanted to differentiate between four sub-groups of experts (with at least 20 participants per sub-group). We argue that for a holistic prospective, forecasting Delphi survey with at least three sub-groups of experts, a quantity of 80 participants is sufficient. With a conservative average response rate of 10% (we had 16.2% in our co-submitted*

research), this would require an initial set of 800 invited experts, which might already be a prohibitively high number for some fields of research. In these cases, we recommend aiming for smaller samples and more focused statements.

- *For larger samples, we recommend examining the panel composition on a regular basis during the survey. If necessary, it can be helpful to additionally invite targeted experts to ensure balanced sub-groups of experts (e.g., from industry, politics, and academia).*
- *For smaller samples, we recommend creating individualized links (if applicable), because this offers maximum convenience to participants. We used such links to invite our initial experts to participate in the survey and also created individual links if we had the respective contact information.*
- *Our chosen Delphi software allowed adjusting the "landing page" by altering the URL. In this specific case, we highly recommend asking for participants' e-mail addresses only. On the one hand, this allows users to not share their full names. On the other hand, the e-mail address serves as a unique identifier for the platform, thus allowing participants to access the survey from different devices. If the e-mail address is not requested, participants can only review their given responses, if they use the same device (and did not clear their cache).*

3.3.4 Survey conduction

With regard to the actual survey conduction, we recommend an a priori definition of (cascaded) termination criteria. Typically, termination criteria are either time-related, participant-related, or consensus-related. Time-related criteria might include the number of rounds for sequential Delphi studies, or a certain time period for real-time Delphi studies (Diamond et al., 2014). Participant-related criteria could refer to the number of experts that participated in the study and – within the real-time format – revisited the survey at least once. If the Delphi study addresses

consensus, also dedicated measures such as agreement thresholds (e.g., interquartile range, mode frequency), or stability measures (e.g., coefficient of variation, nonparametric χ^2 test) can serve as termination criteria (Barrios et al., 2021; von der Gracht, 2012). Particularly with regard to the set of stability and agreement criteria, Dajani et al. (1979) proposed a theoretical hierarchical model to stop or adjust the Delphi process. Von Briel (2018) and Culot et al. (2020) represent examples of this approach.

While there is a common notion that Delphi studies in principle follow a consensus-building purpose, we argue that similarly, disagreement among experts is a valid and very insightful outcome, especially in prospective studies. Therefore, we applied a cascaded termination logic with agreement and stability thresholds on the first level and a time-related criterion (maximum 8 weeks) on the second level. Since we did not reach consensus on all statements after 8 weeks, we terminated the survey and included all participants who re-visited at least once in our analysis. Over the course of our survey period, we sent out reminder emails twice: After 3 weeks we contacted all experts that had not yet participated and after 6 weeks we sent a reminder to all participants who answered the survey and asked to review and revise their inputs. For this purpose, our selected Delphi software offered a function to address different groups of participants (e.g., based on their progress within the survey) separately, which can be a helpful service.

Technical recommendation for "3.3.4 Survey conduction"

- *Given our real-time format with more than 100 participants, it was difficult for participants to grasp all qualitative inputs shared by their peers. To help participants distinguish between pro and contra arguments concerning the expected probability of statements, we included two separate text boxes. However, there is always a trade-off between the amount of requested information and required time spent by the experts. Thus, we recommend using less qualitative input fields for more practical-oriented studies.*

3.3.5 Expert follow-up

In order to inform all participants about our initial results, we shared an overview of our descriptive statistics 6 weeks after the termination of the survey. In doing so, we aimed to enrich the practical discussion without having to wait for the scientific publication, which typically consumes several months including revisions. While this step is particularly important for urgent topics, we generally recommend some kind of expert follow-up in order to appreciate the time and effort that participants put into the study.

Technical recommendation for "3.3.5 Expert follow-up"

- *There is a risk of revealing results before analyzing them thoroughly. Therefore, we decided to share descriptive statistics after we completed the analyzing phase, but well before the actual research paper was published. To reward participants for their time and effort, we would highly recommend sharing basic results as early as possible. This is particularly important in the context of urgent and up-to-date topics.*

3.4 Analyzing a Delphi study (Phase Three)

The possibilities of analyzing Delphi-based datasets are manifold. In our co-submitted research, we split our analyses into four different categories: (1) *Descriptive statistics*, (2) *Dissent analyses*, (3) *Sentiment analysis*, and (4) *Scenario analysis*. To analyze our dataset, we used the open-source software *R*. We made a very good experience with this software because it allows conducting almost any relevant analysis with publicly available software packages.

3.4.1 Descriptive statistics

Descriptive statistics of Delphi-based datasets typically include qualitative and quantitative analyses. We also motivate researchers to include a post-hoc Mann-Whitney *U* test at the beginning of the descriptive statistics to check for non-response bias (Sheikh & Mattingly, 1981).

3.4.1.1 Qualitative analyses

Qualitative analyses particularly focus on experts' comments and can reveal insights about the participants' level of engagement as well as potential interrelations between different *Delphi statements*. For data type transparency, we highly recommend conducting a *syntax and content analysis* as suggested by Förster and von der Gracht (2014). In terms of syntax, we labeled all comments as either whole sentences, phrases, or catchwords. A high percentage of whole sentences generally indicates a solid level of engagement in the discussion and should therefore serve as a quality measure (Roßmann et al., 2018). To analyze content, we had two researchers coding the comments as beliefs, differentiations, cause-effect relationships, examples, historical analogies, experiences, trends, figures, no information, or misunderstandings. To assure concordance, we calculated the level of agreement between the two coders. With an agreement rate of more than 80%, we inferred acceptable interrater reliability (Lombard et al., 2002).

To gain further insights from participants' comments, we recommend performing a *cross-impact analysis* (for additional illustration, see e.g., Bañuls & Turoff, 2011; Panula-Ontto et al., 2018) in order to understand potential interaction effects between statements. Therefore, we assessed the active and reactive effects among our statements by considering the results of our content analysis. We then plotted the results and categorized statements as buffering (limited active or reactive effect), active, reactive, and critical (strong active and reactive effect) statements. These insights helped us to interpret our results in the scenario analysis and validated our effort to formulate largely independent *Delphi statements*.

3.4.1.2 Quantitative analyses

For our basic quantitative analyses, we calculated *arithmetic mean values* and *standard deviations* for our three statement-related dimensions expected probability, impact, and desirability. To assess consensus, we used *interquartile ranges* due to their robustness as a statistical measure. While there are multiple interpretations in literature, we argue that a threshold of a maximum of

25% of the respective scale (e.g., 25 on a scale from 0-100, or 1.25 on a scale from 1-5) can serve as an indicator for consensus. For our flexible projections, in turn, we utilized *mode frequency* and a visual inspection of *histograms* to infer information about consensus, or potential dissent schemes, as explained in the subsequent section.

Technical recommendation for "3.4.1 Descriptive statistics"

- *Although time-consuming, we made a good experience with two coders for all qualitative analyses. Insights from participants' comments are a valuable input for the analyses and discussion. Although often underreported in many Delphi-based journal articles, we argue that the qualitative part of the methodology should not be ignored.*
- *Despite the fact that there are various quantitative measures for consensus and stability, we made good experience with interquartile ranges as a measure of choice. Alternative approaches (e.g., fuzzy statistics) can be suitable under special circumstances, but would not have revealed extra insights in our case (P.-T. Chang et al., 2000).*

3.4.2 Dissent analyses

The major aim of the Delphi method is to systematically structure a group communication process (Linstone & Turoff, 2011)). This process might lead to consensus, but as with for example Policy-type Delphi studies (see e.g., de Loë et al., 2016), researchers could be more interested in the dissent of the panel. Especially for prospective studies, we argue that dissent can reveal valuable insights for the practical and academic discussion. Therefore, we present how we applied a series of potential dissent analyses in our co-submitted research, which were initially introduced by Warth et al. (2013).

3.4.2.1 Desirability bias analysis

In many forecast surveys, participants tend to assess desirable developments as more likely than undesirable ones (Winkler & Moser, 2016). Therefore, we tested for a potential desirability bias, following the approach presented by Ecken et al. (2011). It includes a post hoc adjustment of expected probability values based on the desirability assessments of experts. As the calculations for this method require a restructured dataset in the long format (i.e., one row per participant per statement), it takes quite a lot of effort. Based on our experience, we would recommend using a less time-consuming technique to account for a potential desirability bias (e.g., by partializing out the influence of desirability on expected probability, or by conducting simple correlation analyses).

3.4.2.2 Outlier analysis

Outliers can have a significant effect on statistic variables, such as the interquartile range (Aggarwal, 2015). Therefore, we identified and eliminated outliers to test if these had an impact on the group's consensus. In our co-submitted research, we found no significant effect, however, we would recommend running this analysis and interpreting the results. Especially if the respective outliers shared out-of-the-norm qualitative comments, these might deliver valuable insights. Alternatively, they could also point towards (systematic) misunderstandings, which would be a potential reason to either delete the specific participant from the dataset, or to double-check the comprehensibility of the specific statement.

3.4.2.3 Bipolarity analysis

The bipolarity analysis accounts for the fact that there might be opposing groups of experts with respective intra-group consensus (Scheibe et al., 1975). To test for this effect, we checked for bimodal distributions and visually inspected histograms of expected probability assessments for all statements. While we had little indication for strong bipolarity in our co-submitted research, this simple analysis should always be conducted as part of the result evaluation. Bipolarity – if present – almost prohibits consensus. Therefore, it is even more important to study the two extremes to

understand if these are close together or rather far apart from each other. Either constellation could reveal valuable insights.

3.4.2.4 Stakeholder-group analysis

A classical dissent analysis that can be found in multiple disciplines is the stakeholder-group analysis. For the co-submitted research, we distinguished four stakeholder groups based on their occupation. To identify opposing views, we conducted Mann-Whitney U tests between the four groups for all 15 statements and reported (marginally) significant differences between groups. Although this analysis requires substantial time effort, it is fairly easy from a methodological point of view and we highly recommend differentiating stakeholder groups, as it provides valuable insights with practical relevance.

Technical recommendation for "3.4.2 Dissent analyses"

- *We see consensus and dissent analyses as two sides of the same medal. Although both directions might ask for different analysis steps, measures, and thresholds, we recommend applying both perspectives to the Delphi dataset. Especially for dissent, which is often neglected, we see high value and additional insights in analyzing the potential reasons for diverging opinions.*
- *When planning the expert panel, it is advisable to think about potential stakeholder-group analyses early in the process. To obtain reliable results and bearing statistical requirements in mind, each subset should consist of at least 15 to 20 participants. This should be considered in the panel composition.*
- *In addition to analyzing pre-defined stakeholder groups, an explorative group analysis based on participants' assessment patterns inherent in the data could be beneficial. There might be strong dissent across identified groups such as technology optimists, sustainability pessimists, or transformation skeptics.*

3.4.3 Sentiment analyses

While the importance of considering participants' sentiments in prospective studies was pointed out in the 1980s, especially the personality dimension is rarely found in Delphi-based studies in the past decades (Loye, 1980; Spickermann et al., 2014). However, detailed information about the personality of participants can shed a different light on results and should therefore be considered in all Delphi studies, irrespective of the individual discipline. While there is a myriad of possibilities to cover personality and expert-related information, we covered four dimensions for sentiment analysis: (1) *Expertise and experience*, (2) *Level of confidence*, (3) *Level of optimism*, as well as (4) *Positive and negative affect*.

3.4.3.1 Expertise and experience

To assess expertise and experience, we asked for our experts' years of professional experience within the industry we examined. Based on this information, we calculated correlations between years of experience and expected probability assessments and reported significant effects. Moreover, participants were able to indicate their knowledge in specific topic areas such as strategy, marketing, sales, and digital. This served as the foundation for subset comparisons, similar to the stakeholder-group analysis.

3.4.3.2 Level of confidence

In our co-submitted research, we collected information on our experts' subjective knowledge on each statement, by asking for confidence in assessing the respective topic. We used a five-point Likert scale from 1 (very low) to 5 (very high) and then calculated correlations between confidence and expected probability for statements with linear intervals and chi-square tests for statements with non-linear intervals. While we only reported our results verbally, there are also insightful ways to illustrate these analyses, as exemplarily depicted in Figure 3.3.

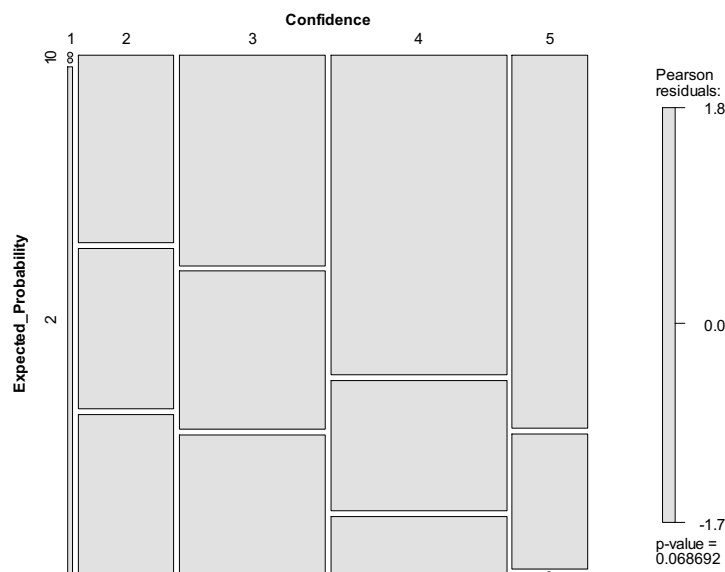


Figure 3.3 Visualization of Relationship between Confidence and Expected Probability³.

3.4.3.3 Level of optimism

While experience, expertise, and confidence find more frequent application in Delphi-based manuscripts, we rarely find other indicators for deep-level expert characteristics in use (Spickermann et al., 2014). Therefore, we included the level of optimism as an indicator for a personality trait that is relevant for future predictions (Loye, 1980). We posed two dedicated questions with respect to the overall future developments within the industry of investigation. Based on the responses we conducted a median split and created two subsets of rather optimistic and rather pessimistic experts. We then conducted Mann-Whitney *U* tests and reported significant differences between these two groups.

3.4.3.4 Positive and negative affect

Given the circumstances of the COVID-19 outbreak, we also wanted to account for the subjective wellbeing of our experts, which might have affected their respective assessments.

³ This mosaic plot is based on the data of Beiderbeck et al. (2021b). It shows the relationship between confidence (measured with a five-point Likert scale from 1 = very low to 5 = very high) and expected probability (0 = statement will never occur; 1 = statement will occur long-term; 2 = statement will occur short-term). Size of the respective mosaic represents number of participants with respective confidence and expected probability assessment.

Therefore, we used a shortened version of the PANAS (Positive and Negative Affect Schedule) (Thompson, 2007) and asked experts to evaluate a four-item construct for two points in time: prior to the crisis and during the crisis. This helped us to calculate differences to see which expert was more or less affected by the pandemic in terms of his or her subjective wellbeing. Again, we used this information to calculate correlations and present significant effects.

Technical recommendation for "3.4.3 Sentiment analyses"

- *Instead of "level of optimism" it could also make sense to test for other deep-level characteristics of participants. These can be adapted based on the respective field of research. In the context of technology forecasting, for example, it could be worthwhile to test related constructs such as the trust in technology (McKnight et al., 2011), affinity for technology interaction (Franke et al., 2019), or attitudes towards using technology (Teo & Zhou, 2014). In this context, the inclusion of underlying theories like the technology acceptance model (Y. Lee et al., 2003) might also be an interesting avenue for future research.*
- *To account for the individual wellbeing of participants there are numerous alternatives to PANAS, such as the "profile of mood states" or "circumplex model of affect" (Russell, 1980). While these constructs allow for a more nuanced differentiation of affect, we still decided to use PANAS, because it offered a four-item short version and therefore mastered the trade-off between quality of insights and amount of effort for the participants.*
- *Another dimension of the sentiment analysis could be "locus of control" – which also offers a short version – to determine participants' perceptions on heteronomy and self-determination (Kovaleva et al., 2012).*

3.4.4 Scenario analysis

Particularly for prospective studies, Delphi-based insights can serve as a basis for scenario analyses (Nowack et al., 2011). While there are multiple ways of building and illustrating scenarios, we decided to apply the *fuzzy c-means algorithm* for our co-submitted research. With a significantly high number of experts and assessments, this method yields feasible results. Moreover, it is relatively easy to execute and visualize with *R*. In the case of smaller samples, *hierarchical clustering* might be more appropriate (Kluge et al., 2020). With dedicated software, the *latent class analysis* offers a further possibility to generate related groups of statements (Warth et al., 2013).

With the help of the c-means algorithm, we created three groups and plotted the clusters on a 3D coordinate system with the axes expected probability, desirability, and impact to gain a visual impression of our results. In general, we recommend 3D visualizations, because they help the reader grasp the interrelation between three (or more) outcome variables.

Technical recommendation for "3.4.4 Scenario analysis"

- *To cluster statements, we needed a comparable output for each individual dimension. In this regard, the different output formats for expected probability required us to introduce a new logic in order to transform and unify the two scales. In our case, this aggregation led to a loss of informational value, because the unified scale consisted of three categories only. Hence, we recommend to not change the format of a scale within one particular dimension of the Delphi survey (e.g., expected probability) or to consider a possible transformation logic upfront.*

3.5 Conclusion and future research avenues

In this technical paper, we illustrate a comprehensive Delphi preparation, conduction, and analysis process. We offer room for flexibility in adapting the research process for individual needs while sticking to a consistent framework that allows for replicability.

We encourage researchers from all disciplines to use the Delphi technique in order to organize structured expert discussions around both current and prospective challenges in the respective field of study. From a methodological point of view, we want to support the research community by offering technical recommendations from our Delphi study on the impact of COVID-19 on the European football ecosystem. At the same time, we advocate for further innovative developments of the technique, specifically with regard to the role of experts' personality traits, thinking patterns, and situational concomitant. As with any research, scholars should conclude their research articles with a critical limitations section. During our study of literature, we came across the report of Sackman (1974), obviously one of the early critical reflections of the Delphi method. Each Delphi study should include a careful elaboration on its validity and reliability (see e.g., von der Gracht, 2008, section 3.7 for a review on quality criteria in Delphi surveys), while following evolving quality frameworks, such as described in Jünger et al. (2017), Belton et al. (2019), and Murphy et al. (1998).

4 Paper III: The Impact of Technology on the Future of Football – A Global Delphi Study⁴

4.1 Introduction

When it comes to the world's most popular sports, football (also referred to as soccer) evidently takes the top rank with approximately 4 billion people around the globe following the game and 250 million people playing it across more than 200 countries (Ayaz, 2021; Worldatlas, 2021). Irrespective of the ongoing debate about whether sport in general – and thus football in particular – can be seen as a classic industry or not, the field is subject to comparable evolutionary steps (Gammelsæter, 2021). One of the more recent developments the sports industry has in common with other industries is the increased impact of (digital) technologies. On the one hand, this development applies to the business perspective, but on the other hand, also effects the game itself (Ferreira et al., 2020; Ratten, 2020; Turner, 2007). Scholars regularly investigated these technological advancements from a retrospective angle; including the video assistant referee (Carlos et al., 2019), digital training tools (Armenteros et al., 2013), or broadcasting innovations (Turner, 2007), for instance. However, prospective studies on the impact of technology on the future of football – especially those involving decision-makers and stakeholders within the field – are scarce (Beiderbeck et al., 2021b; Merkel et al., 2016). Yet, given the increasing speed of technology development, we see a rising need for future-oriented technology implementations in the sphere of global football (S. L. Schmidt, 2020a).

In practice, the control and planning of technological game-related innovations generally falls under the responsibility of the *Fédération Internationale de Football Association* (FIFA). As the global governing body of association football, FIFA unites 211 national associations,

⁴ Beiderbeck, D., Evans, N., Frevel, N. & Schmidt, S. L. (2023). The Impact of Technology on the Future of Football – A Global Delphi Study. *Technological Forecasting and Social Change*, 187, 122186. This research was funded by FIFA. <https://doi.org/10.1016/j.techfore.2022.122186>

subdivided into six regional confederations. Therefore, the non-profit organization has to consider diverse perspectives and interests when it comes to the assessment and potential diffusion of new technologies. Research has shown that, for instance, different societal and economic boundary conditions heavily affect the development of sport in the respective countries (Andreff, 2001; Musa, 2006). Therefore, not only FIFA, but all globally operating football-adjacent businesses must consider diverging expectations, desires, and subjectively perceived threats regarding technological progress in different parts of the world.

To address the challenge of covering this multitude of regional perspectives on the impact of technology on football, our study offers a consolidated view on ten future-oriented projections that describe potential technological developments up until the year 2026. To achieve this, we conducted an online two-round Delphi study, presented in three different languages to allow representatives from all six FIFA confederations to share and discuss their opinion (Schmalz et al., 2021; von der Gracht, 2012). This methodological approach enables experts to discuss critical topics in a structured and anonymous manner that demonstrably increases acceptance, validity, plausibility, and consistency of future-oriented studies (Belton et al., 2019; Linstone & Turoff, 2011). In cooperation with FIFA's department for Football Research and Standards, we surveyed 85 technical directors, offering an unprecedented overview of similarities and differences regarding potential technological advancements in football, collecting both quantitative and qualitative data (Förster & von der Gracht, 2014). Following recent literature, we also covered participants' individual sentiments and overarching beliefs to analyze the effect of psychological patterns on evaluation behavior and to thus provide a more comprehensive picture of how future-oriented assessments are formed (Beiderbeck et al., 2021a; Loye, 1980; Spickermann et al., 2014).

Our research contributes to the present body of literature by offering a multi-faceted view on the future impact of technology on different stakeholders in global association football. Thereby, we go beyond previous retrospective investigations of technological advancements by taking a prospective lens and thus address the rising scholarly interest in corporate foresight while

providing valuable insights for sports practice (Fergnani, 2020). Hence, we pose our research question as follows: How will technology impact the future of association football considering the effect on players and staff?

4.2 Background

4.2.1 Technology in Sports and Football

The diffusion of technology into various areas of sports has been widely studied over the past decades (Dellaserra et al., 2014; Loland, 2002; Ratten, 2020). In this context, a variety of possible applications of technology in sports has been under investigation with both retrospective and future-oriented approaches. Frevel et al. (2020) structured these technology applications along two dimensions: A technology angle and a user angle. While the first distinguishes different types of technologies (hardware, software, communication), the latter focuses on potential users of these technologies. According to the *SportsTech Matrix*, these include athletes, consumers, and management (Frevel, Beiderbeck, et al., 2020).

Existing research on technology in football – as a subsample of work on technology in sports in general – has focused on all of these angles both in terms of technologies (Ai, 2021; Pifer, 2019; Wood et al., 2021) and with respect to different users (Borges, 2019; McGuckian et al., 2018; Rogers et al., 2019). However, a holistic and prospective view on the impact of different technologies on directly game-related stakeholders – i.e., players, coaches, and technical directors – is still missing.

4.2.2 FIFA's role in technology diffusion in football

While different aspects of technology in football have been studied and implemented in the past, there has always been a (public) debate as to whether an increased use of technology is beneficial or detrimental for the game. While FIFA is carefully dealing with this question, the actual governance for the so-called "rules of the game" lie with "The International Football Association Board" (IFAB). FIFA currently holds 50% of the voting power with the IFAB,

however, to agree on potential adjustments of the law, a three-quarter supermajority vote is required, which shows that FIFA plays a vital, but not sole role in the incremental development of the game (Dunmore, 2011; Statutes of the IFAB, 2019).

To account for the responsibility for the game, FIFA employs dedicated staff in the contest of football research and standards. As such, the group explores new technological opportunities, supervises research, and ultimately generates global standards to offer guidance for stakeholders within the industry.

4.3 Research Methodology

Given the global approach of our study, we used a sequential two-round Delphi format (Schmalz et al., 2021). The Delphi technique was originally invented in a military context in the late 1940s and has gained amplified importance in business and social science research in the early 2000s (Dalkey & Helmer, 1963; Flostrand et al., 2020). It allows to manage and organize structured group communication processes while adhering to four fundamental characteristics: (i) anonymity, (ii) iteration, (iii) controlled feedback, and (iv) statistical group response (von der Gracht, 2012). In general, Delphi is a particularly useful tool when experts cannot meet physically (Rowe & Wright, 1999). In such contexts, the technique has shown to be superior to other traditional opinion-polling techniques, delivering more accuracy and avoiding potentially destructive group dynamics and biases, such as bandwagon or anchoring effects (Bonaccorsi et al., 2020; McKenna, 1994; P. L. Williams & Webb, 1994).

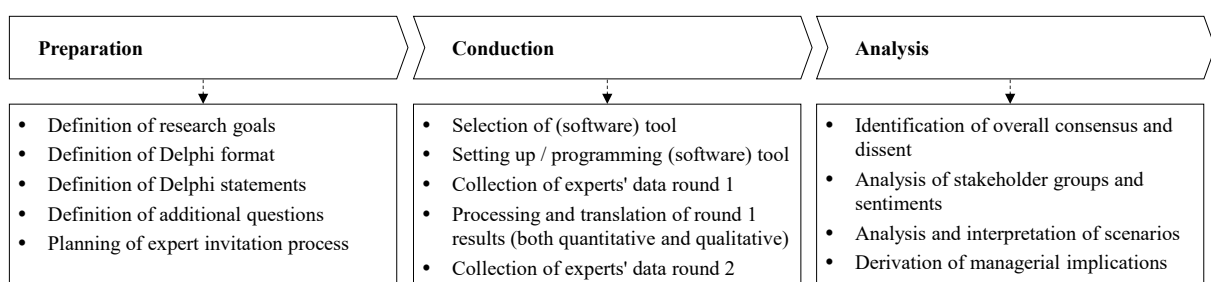


Figure 4.1 Process of Delphi Survey Conduction based on Beiderbeck et al. (2021a).

For our study at hand, the Delphi technique was the most suitable option to engage multiple experts from around the globe in one overarching discourse on the impact of technology on the future of football, which constitutes a unique contribution to the field. To ensure rigor in our execution, we followed the three phases of Delphi-based research (see Figure 4.1) presented by Beiderbeck et al. (2021a). In the preparation phase, we defined the scope of our study and decided to specifically target the technical directors (TDs) of all 211 FIFA member associations, as their role is to combine expertise on both the sporting and business side when it comes to technological advancements in football (Avella, 2016). This combination of expertise was particularly valuable for our research question and moreover, the group represented an elite set of experts that is difficult to reach collectively without a collaboration with FIFA's central functions. To account for varying language skills and preferences among the panelists, we decided to conduct the survey in three different languages: English, French, and Spanish (i.e., three out of the four official FIFA languages except for German, assuming that German-speaking TDs would be sufficiently familiar with English). Therefore, we opted for the classic sequential Delphi format, which consists of two consecutive rounds (T. Gordon & Pease, 2006; Schmalz et al., 2021). In the first round, participants evaluated a set of future-oriented projections, in terms of their respective expected probability (EP), subjective desirability (D), and estimated impact (I) in case of occurrence – both quantitatively and qualitatively. Therefore, we created ten projections based on desk research, expert interviews with FIFA representatives, and multiple formulation sessions. In the second round, participants got the chance to revise and adjust their initial evaluations based on statistical means of round one as well as a collection of qualitative arguments from round one, which were translated back and forth from and into the three survey languages. To ensure accuracy in translation, we involved official FIFA translators that were familiar with the topic at hand. As a last step of the conduction phase, we collected participants' surface- and deep-level characteristics to allow for more differentiated statistical investigations in the subsequent analyzing phase (Beiderbeck et al., 2021a; Spickermann et al., 2014).

4.3.1 Preparation Phase

In the preparation phase we started with an initial research question of how technology would impact the future of football considering different stakeholder groups. Following the SportsTech matrix presented by Frevel et al. (2020), we differentiated between three potential user angles, including athletes, consumers, and management. Given our specific interest in the effect of technology on association football and its immediate stakeholders, we decided to exclude the consumer perspective, also because it has been studied extensively by scholars in the past (D. Lee & Schoenstedt, 2011; Merkel et al., 2016; Rogers et al., 2019; S. L. Schmidt, 2020a). Hence, we put our focus on both the athlete and management angle; more precisely, we formulated projections for players and staff, where the staff perspective specifically included technological impact on coaches and TDs. To narrow the horizon of our prospective study, we decided to formulate all projections up to the year 2026. At the time of our study conduction, this horizon was six years into the future and therefore focused on mid-term impacts of technology on football (i.e., up until the year of the 2026 FIFA World Cup, which will be hosted in Canada, Mexico, and the United States of America).

Starting from an initial list of more than 30 desk researched topics, we conducted an expert workshop with two European TDs to prioritize and develop a first set of projections. In subsequent steps, we revised and condensed these projections. Thereby, we followed latest research findings on the formulation of Delphi projections and ensured methodological rigor by including three previously not involved researchers to check both quality and comprehensibility of our final set of projections (Landeta, 2006; Markmann et al., 2020; Salancik et al., 1971). While the categorization of projections into the three user angles is not one hundred percent selective, it helped structuring the projection development process as recommended by methodological papers on the Delphi technique (Beiderbeck et al., 2021a; Markmann et al., 2020; Schmalz et al., 2021). In total, we derived ten projections, which are presented in detail below.

4.3.1.1 Player-related projections

By the year 2026, the majority of professional football players will come from the so-called Generation Z (i.e., born after 1996). Research by Gould et al. (2020) has shown that athletes among this age cohort are setting very high performance-expectations for themselves, while tending to be primarily motivated extrinsically. Scholars additionally found that Generation Z athletes are better educated and more tech-savvy than prior generations on the one hand, but also have lower levels of personal responsibility, shorter attention spans, and fewer abilities to handle adversity and communicative challenges on the other hand (Gould et al., 2020; Schroth, 2019). Based on the above-mentioned characteristics of Generation Z athletes, we aimed to investigate the impact of technology on football players with regard to their motivation to use technology, their sense of ownership and responsibility for personal data, as well as their ability to change behavior based on technology-based insights. Hence, we derived the three following projections:

Projection 1: In 2026, players are more involved and interested in data-driven decisions around their physical and tactical performances (*player involvement*)

Projection 2: In 2026, players have access to and control over all of their individual performance and player data and own a proprietary digital avatar (*digital avatar*)

Projection 3: In 2026, the availability of technology and insight models has had an impact on the playing style of players (*playing style*)

4.3.1.2 Coach-related projections

The possibilities for coaches to use technologies has increased tremendously over the past decade and there has been a fair amount of academic work on both beneficial and detrimental effects of specific technologies on coaching outcomes (Appelbaum & Erickson, 2018; Booroff et al., 2016; Islam, 2020; Nash, 2014; Rein & Memmert, 2016; Thatcher et al., 2020). To differentiate technologies on a higher level, we again draw from the SportsTech Matrix by Frevel et al. (2020) and distinguish three so-called tech angles. These comprise communication-related technologies,

data-related technologies, and hardware-related technologies. To cover all three dimensions, we derived projections four to six as presented below. Additionally, we included structural implications, as previous research has shown that the need for more specialized training in sports is growing – particularly with regard to digital capabilities (Bennie & O’Connor, 2012; Gruettner, 2019). This aspect is reflected in projection seven:

Projection 4: In 2026, due to real-time analysis the quality of communication from coaching staff to players and tactical changes on the pitch has increased significantly (*communication quality*)

Projection 5: In 2026, artificial intelligence is an important tool that supports all game-related coaching decisions (*coaching decisions*)

Projection 6: In 2026, coaches frequently use intelligent equipment/hardware within their training routines (*intelligent equipment*)

Projection 7: In 2026, the number of members of coaching staff with digital capabilities in a team has increased significantly (*coaching staff*)

4.3.1.3 TD-related projections

When it comes to the role of TDs in football associations, they most commonly bear the responsibility for the sustainable long-term success and development of their teams (Parnell et al., 2018). This includes not only the ultimate responsibility for sportive success (as the technical director is typically appointing the head coaches), but also decision-making authority when it comes infrastructure investments. While such decisions were arguably based on experience and gut feeling in the past, the increased availability of information has allowed, but also forced, TDs to implement more structured and traceable decision-making processes (Sarma et al., 2020). In light of these developments, we derived the following three TD-related projections for our survey:

Projection 8: In 2026, the public accountability of coaches and technical directors towards fans and stakeholders has increased significantly (*public accountability*)

Projection 9: In 2026, increasingly standardized data sets and analysis tools allow for more objective and effective data-driven remote scouting systems (*remote scouting*)

Projection 10: In 2026, technological equipment for the improvement of playing performance has become a key cost driver for football associations (*technology cost*)

4.3.2 Conduction Phase

For our survey conduction, we chose *Surveylet* as one of the leading professional software tools for Delphi-based research (Aengenheyster et al., 2017). The tool allows to run one survey in multiple languages, which was particularly helpful for our case, because we wanted one consistent set of quantitative assessments despite the three different languages. Assuming that our expert panel would not be familiar with the Delphi technique, we provided a detailed introduction about the research method – both in written and audio-visual form. To reduce the risk of cognitive biases, we also informed the participants about common unconscious mechanisms that might affect their subsequent valuation behavior (Bonaccorsi et al., 2020).

The data collection of our study took place between July and September 2021 for round one and between November and December 2021 for round two. In total, 104 TDs from 211 member associations participated in the survey (participation rate of 49%). $N = 85$ participants completed the Delphi in both rounds and were therefore included in the final sample (completion rate of 82%). Demographic details about this sample are presented in Figure 4.2. In the actual survey, we asked participants to evaluate our ten projections both quantitatively and qualitatively. On the quantitative side, we provided a metric scale from 0% to 100% (in 10% increments) for the expected probability (EP) and 7-point Likert-scales for both the desirability of occurrence (with 1 = *not desirable at all* and 7 = *very desirable*) and the impact in case of occurrence (with 1 = *no impact at all* and 7 = *very strong impact*). On the qualitative side, participants could share their reasoning for each projection as open text and were motivated to find both supporting and refuting

arguments to develop a reflected view on their assessment (Winkler & Moser, 2016). To account for potential survey fatigue, we randomized the display order of our projections.

<p>Total set of panelists</p> <ul style="list-style-type: none"> • 211 technical directors invited • 104 technical directors participated (49%) • 85 technical directors completed (82%) 	<p>Gender</p> <ul style="list-style-type: none"> • Male experts (n = 80) • Female experts (n = 3) • Prefer not to say (n = 2)
<p>Confederation</p> <ul style="list-style-type: none"> • UEFA (n = 28) • CONCACAF (n = 12) • CONMEBOL (n = 10) • CAF (n = 22) • AFC (n = 10) • OFC (n = 3) 	<p>World-Ranking</p> <ul style="list-style-type: none"> • 1-50 (n = 30) • 51-100 (n=18) • 101-211 (n=37)

Figure 4.2 Sample Demographics (N = 85).

4.3.3 Analysis Phase

With regard to descriptive statistics, we primarily focused on the analysis of quantitative data. In total, we collected 2,550 projection-related numeric estimates as well as 1,032 additional data points on participants' technology-related and personality-related sentiments. Based on the projection-related estimates, we assessed panel consensus for each dimension of our ten projection using interquartile ranges (IQR) as established consensus-indicator for Delphi studies (von der Gracht, 2012). To derive further insights, we conducted a stakeholder-group analysis, comparing different sub-groups of panelists (Warth et al., 2013). Moreover, we used the above-mentioned information on technology and personality sentiments to calculate correlations between deep-level characteristics and assessment behavior, as inspired by Loye (1980), Spickermann et al. (2014), and Beiderbeck et al. (2021a). For this purpose, we focused on three participant-related deep-level characteristics: (1) Technology sentiment in general, (2) technology sentiment in football, and (3) openness to experience. For the first characteristic we used a short version of the established "affinity for technology interaction" (ATI-S) scale (Wessel et al., 2019). The technology sentiment in football was measured with two self-developed items while the openness to experience was derived from two items related to the big five personality traits (McCrae, 1993; Rothmann &

Coetzer, 2003). All items were measured with a 7-point Likert-scale from 1 = *strongly disagree* to 7 = *strongly agree* and are displayed in Figure 4.3. To test the relationship between sentiments and projection-related assessments, we used standard correlation tests.

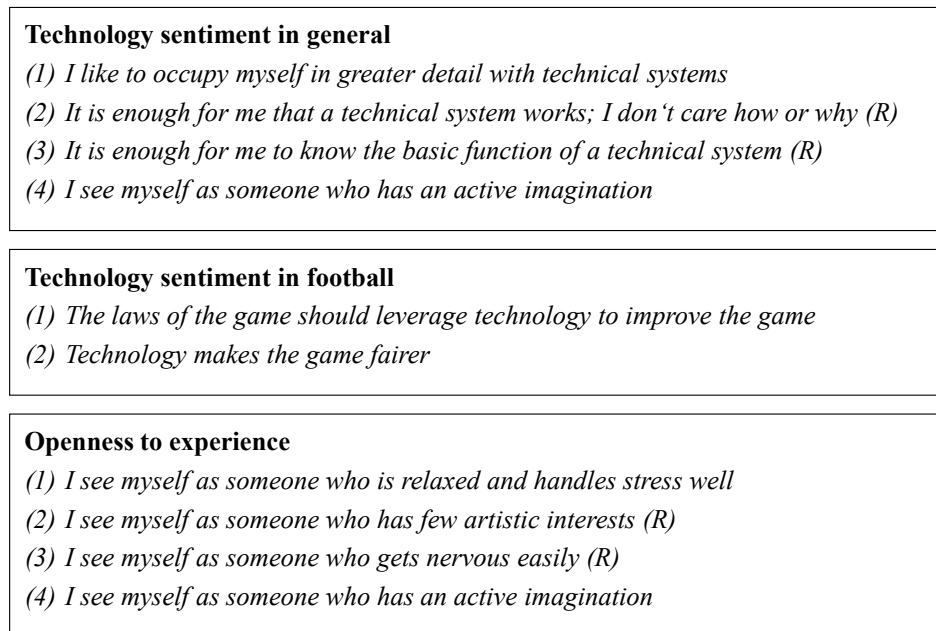


Figure 4.3 Additional Questions for Sentiment Analyses.

To conclude our analysis, we followed Tapio et al. (2011) who suggested to combine qualitative and quantitative information in Delphi processes by grouping projections according to their quantitative assessments. This approach allows for an integrated perspective and discussion on an aggregated level. Therefore, we used a non-hierarchical fuzzy c-means algorithm to generate clusters of projections – an approach that proved viable in prior Delphi-based studies (Beiderbeck, Frevel, et al., 2020; Roßmann et al., 2018).

4.4 Results

4.4.1 Descriptive statistics

As sufficient data quality is the basis for reliable results, we tested all inputs for potential formal and semantic errors or misunderstandings prior to our analysis and examined outliers for all quantitative analyses (Belton et al., 2019; Häder, 2009; Warth et al., 2013). In the context of qualitative results, we analyzed the syntax of all comments that our experts shared (Förster & von der Gracht, 2014). In total, these were 690 written statements, which represents an average of 8.1 comments per participants. Given our ten projections, this results in a comment rate of 81.2%, which demonstrates the active discussion of our experts on the projections at hand. The results of the syntax analysis underpin this notion as they revealed that 537 comments (77.8%) were written as complete sentences consisting of at least ten words, again demonstrating the reflected thoughts that participants shared in their projection-related comments.

Table 4.1 presents the descriptive quantitative results of our survey. Concerning the subjective impact in case of occurrence (I), our experts rated all ten projections with a mean value greater than 5.3 (out of 7), hence underpinning the relevance of all presented topics. In this context, the experts rated projections 4 (*communication quality*), 6 (*intelligent equipment*), and 7 (*coaching staff*) as particularly impactful with an average I of 6. Setting a threshold of 1.75 for the IQR as the upper limit to indicate consensus (i.e., 25% of the 7-point Likert-scale), none of these three projections reached full agreement (Warth et al., 2013). However, with an IQR of 2, we can infer partial agreement among the experts for these projections. The same holds true for the impact of projection 10 (*technology cost*) while all other projections reached consensus with an IQR of 1.

Table 4.1 Quantitative Delphi Results.

Projection	Round 1		Round 2		I (mean)	IQR	D (mean)	IQR
	EP (mean)	IQR	EP (mean)	IQR				
<i>Player-related projections</i>								
1: Player involvement	73%	30	73%	20	5.5	1	5.5	1
2: Digital avatar	75%	30	75%	22.5	5.5	1	5.5	1
3: Playing style	74%	30	72%	20	5.4	1	5.3	1
<i>Coach-related projections</i>								
4: Communication quality	83%	15	83%	15	6.0	2	5.8	2
5: Coaching decisions	68%	20	69%	20	5.3	1	5.2	2
6: Intelligent equipment	83%	10	83%	10	6.0	1	6.0	2
7: Coaching staff	83%	20	83%	12.5	6.0	1	5.9	2
<i>TD-related projections</i>								
8: Public accountability	75%	20	74%	20	5.4	1	5.7	2
9: Remote scouting	80%	20	80%	20	5.7	1	5.5	1
10: Technology cost	79%	30	79%	30	5.8	2	5.6	2

Note. EP = expected probability of occurrence (0-100%); IQR = interquartile range; I = impact in case of occurrence; D = desirability of occurrence; Consensus (IQR for EP(mean) ≤ 25%, IQR for I and D ≤ 1.25) is marked in bold.

In terms of desirability of occurrence (D), the results reveal a relatively small spread with average values between 5 and 6. Hence, we can infer that the sample generally voted in favor of the projected effects of technology on the future of football, which allows us to differentiate nuances between projections. Strongest desirability was expressed for projections 6 (*intelligent equipment*) and 7 (*coaching staff*), while the experts showed less desire for projections 5 (*coaching decisions*) and 8 (*public accountability*). With regard to consensus, the full sample reached agreement for four out of ten projections. Again, the six projections without formal agreement reached an IQR of 2, thus indicating partial consensus.

For the expected probably of occurrence (EP) the sample reached consensus for nine out of ten projections; that is all except for projection 10 (*technology cost*). Again, following Warth et al. (2013), we interpreted an IQR lower than 25% of the initial scale as indication for agreement. With an average EP of 83%, experts rated three projections as most likely to occur until 2026. These were congruent with the three projections that received the highest impact ratings, which were projections 4 (*communication quality*), 6 (*intelligent equipment*), and 7 (*coaching staff*). On the contrary, the experts assessed projection 5 (*coaching decisions*) with the lowest EP of 69%, yet substantially higher than 50% and therefore still likely to materialize to some extent until the year 2026.

4.4.2 Stakeholder-group analyses

Inspired by previous research investigating the correlation between economic underdevelopment and sport (Andreff, 2001), we wanted to find out whether the results above apply equally to different stakeholder-groups among the FIFA member states. Therefore, we distinguished three different tiers of football associations based on their respective position in the FIFA/Coca-Cola World Ranking. Tier 1 included all associations from the top rank to rank 50, tier 2 included associations from rank 51 to 100, and tier 3 included all associations that ranked lower than 100 at the time of our survey conduction. Table 4.2 illustrates the results for our stakeholder-group analyses on all three dimensions of our Delphi survey.

Table 4.2 Stakeholder-group analysis.

Projection	Tier 1			Tier 2			Tier 3		
	EP	I	D	EP	I	D	EP	I	D
<i>Player-related projections</i>									
1: Player involvement	75%	5.5	5.4	71%	5.7	5.5	73%	5.5	5.6
2: Digital avatar	76%	5.6	5.3	75%	5.5	5.6	74%	5.4	5.5
3: Playing style	68%	5.0	4.8	76%	5.8	5.7	74%	5.5	5.7
<i>Coach-related projections</i>									
4: Communication quality	85%	6.0	5.8	82%	6.2	6.1	82%	5.9	5.7
5: Coaching decisions	69%	5.4	5.1	69%	5.3	5.1	68%	5.3	5.2
6: Intelligent equipment	85%	6.1	6.0	81%	5.9	5.9	82%	5.9	6.0
7: Coaching staff	82%	5.9	5.7	87%	5.9	6.1	83%	6.1	6.1
<i>TD-related projections</i>									
8: Public accountability	71%	5.2	4.5	74%	5.5	5.6	75%	5.5	5.1
9: Remote scouting	78%	5.5	5.3	80%	6.1	5.8	80%	5.8	5.9
10: Technology cost	78%	5.9	5.5	84%	5.9	5.8	77%	5.8	5.5

Note. EP = expected probability of occurrence (0-100%); IQR = interquartile range; I = impact in case of occurrence; D = desirability of occurrence; Consensus (IQR for EP(mean) ≤ 25%, IQR for I and D ≤ 1.25) is marked in bold.

When it comes to expected probability (EP), the results indicate no statistically significant differences between our three sub-groups of associations. However, in terms of desirability, the analyses of variance (ANOVAs) indicate significant inter-group differences for projections 3 (*playing style*), 8 (*public accountability*), and 9 (*remote scouting*). In all three cases, representatives from tier 1 associations expressed less desirability for the projection to occur than TDs from lower tiers. Similar analyses for the impact dimension reveal only one significant inter-group difference related to projection 3 (*playing style*) where – again – the top tier experts saw less impact in case of occurrence of this projection. Table 4.3 displays the results of Tukey's post-hoc tests for the projections mentioned above.

Table 4.3 Tukey's post-hoc tests of projections with significant between-group differences.

Comparisons	$M\Delta$	95% CI		p
		LL	UL	
Desirability				
<i>Projection 3: Playing style</i>				
Tier 1 vs Tier 2	0.84	0.08	1.61	.026
Tier 1 vs Tier 3	0.88	0.25	1.51	.003
Tier 2 vs Tier 3	-0.04	-0.77	0.70	.992
<i>Projection 8: Public accountability</i>				
Tier 1 vs Tier 2	1.12	0.17	2.07	.016
Tier 1 vs Tier 3	0.61	-0.15	1.38	.141
Tier 2 vs Tier 3	0.51	-0.41	1.42	.386
<i>Projection 9: Remote scouting</i>				
Tier 1 vs Tier 2	0.53	-0.14	0.59	.151
Tier 1 vs Tier 3	0.59	0.03	1.15	.035
Tier 2 vs Tier 3	-0.06	-0.71	0.59	.975
Impact				
<i>Projection 3: Playing style</i>				
Tier 1 vs Tier 2	0.78	0.01	1.54	.045
Tier 1 vs Tier 3	0.49	0.01	1.12	.161
Tier 2 vs Tier 3	0.29	-0.44	1.03	.614

Note. This table only displays Tukey's post-hoc tests for those projections and dimensions that showed significant results in the respective ANOVA. Significant tests are marked in bold. CI = confidence interval; LL = lower limit; UL = upper limit.

4.4.3 Sentiment analyses

Regarding sentiments, we find significant correlations between projection-related assessments and both participants' sentiments for technology in general as well as participants' sentiments for technology in football. On an aggregated level (i.e., across all projections and dimensions) we see that sentiments for both technology in general (for EP: $r = 0.27, p = .01$; for D: $r = 0.26, p = .02$; for I: $r = 0.25, p = .03$) and technology in football (for EP: $r = 0.36, p = .001$; for D: $r = 0.32, p = .004$; for I: $r = 0.4, p < .001$) correlate positively with the overall assessments of experts – that is the average score of a participant for all projections along our three assessment

dimensions. This is generally in line with very early research on optimism and pessimism consistency in Delphi studies (Martino, 1970). For openness to experience we only find a significant correlation related to projection 5 (*intelligent equipment*), indicating that experts with more inventive and curious personality traits tend to express an elevated desire for intelligent hardware/equipment to become part of training routines in the future ($r = 0.33, p = .002$). Moreover, we find that openness to experience correlates positively with the technology sentiments in general ($r = 0.27, p = .02$).

4.5 Scenarios and Discussion

Based on the fuzzy clustering approach, we generated distinct clusters of projections to discuss our findings on an aggregated level (Bezdek et al., 1984; Tapio et al., 2011). As the result in Figure 4.4 reveals, we detected an optimal number of two clusters, containing five projections each (Nowack et al., 2011; Xie & Beni, 1991). An initial visual inspection shows that Cluster 1 contains projections that generally scored lower in terms of expected probability, desirability, and impact of occurrence, while projections in Cluster 2 scored higher on all three dimensions. Bearing this notion in mind, we will examine the two clusters separately below and conclude this chapter with an overarching discussion.

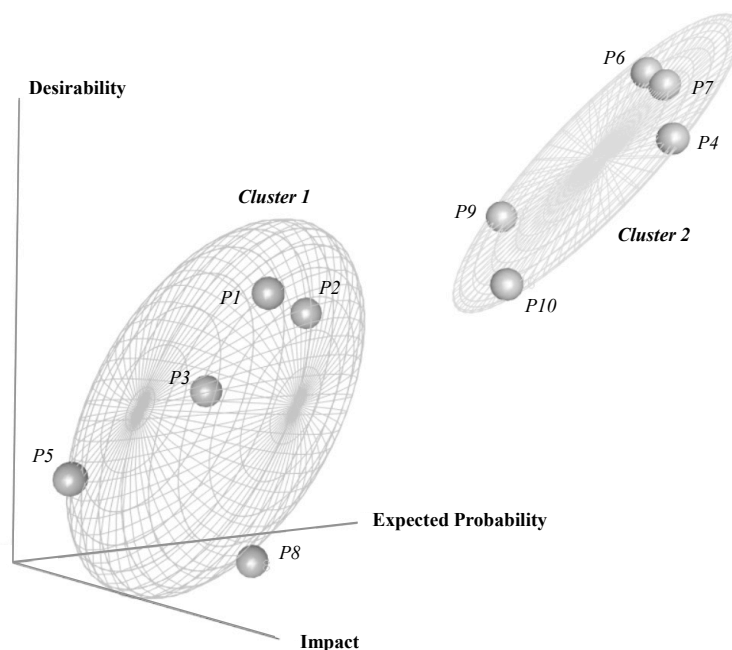


Figure 4.4 Clusters based on fuzzy c-means algorithm.

4.5.1 Cluster 1: Technology and game-related capacities – in 2026 the game is still an art

The five projections in Cluster 1 include projection 1 (*player involvement*), 2 (*digital avatar*), 3 (*playing style*), 5 (*coaching decisions*), and 8 (*public accountability*). Strikingly, this set comprises all three player-related projections. Hence, we can infer that the panel of global experts does not expect technology to have the largest impact on the core of the game; that is the players and their playing style. However, to calibrate this notion, it has to be emphasized that the overall assessment on the expected probability as well as desirability and impact of these projections is still high, also compared to results from other Delphi studies in the realm of sports (Beiderbeck et al., 2021b; Mallen et al., 2010; Merkel et al., 2016). Therefore, a possible interpretation of Cluster 1 might be that despite the tech-savviness of younger players – which was often stressed in the qualitative comments of our experts – this rather decentralized group of stakeholders within the system will have a slightly delayed advantage from technological advancements. Especially on a global scale, the Delphi panelists raise the concern of how to establish a solid data platform for all players. This might explain why TDs from Tier 2 associations anticipate a higher impact of player-related scenarios if technology would really affect the playing style of their teams (*projection 5*). On the same note, participants express a latent fear of losing the pure and artistic character of the game, which might explain the more reserved evaluation of these player-related projections. This conception is in line with the evaluation of the coach-related projection 5 which stated that "*in 2026, artificial intelligence is an important tool that supports all game-related coaching decisions*". While experts agree that also coaches continuously have to build up knowledge on how to use technology to increase a player's or team's performance, they also share the view that the human part of coaching will remain at the core. Accordingly, the panel rated projection 5 (*coaching decisions*) with the lowest probability average (EP = 69%) and the second-lowest desirability (D = 5.2). The lowest desirability (D = 5.0), in turn, was expressed for the last topic in Cluster 1, which is projection 8 (*public accountability*). The fact that data will become even more accessible in the future might lead to a scenario in which "*the public accountability of coaches and technical directors towards fans and stakeholders increases*

significantly." However, many Delphi experts utter the concern that the ever-growing amount of data will allow fans and stakeholders to draw their desired subjective conclusions irrespective of the actual objective meaning of the data. Without proper education of the public, this scenario could be a threat to decision-makers within the industry. Overall, Cluster 1 comprises projections that received less support from the panel, thus underpinning the viewpoint that football is and will remain an art in which technology is there to facilitate but not entirely shape the game.

4.5.2 Cluster 2: Technology and game-related processes – technology is there to support

According to the aforementioned viewpoint on technology in football, projections in Cluster 2 – that is projection 4 (*communication quality*), 6 (*intelligent equipment*), 7 (*coaching staff*), 9 (*remote scouting*), and 10 (*technology cost*) – mainly address game-related processes and could therefore be interpreted as facilitators for the game. Evidently, the expert panel anticipates beneficial use cases for technology to support both coaches and TDs, with Cluster 2 containing three out of four coach-related and two out of three TD-related projections. Some potential developments covered in these projections (e.g., wearable technology) have already been studied and implemented in other sports like American Football, for instance (Li et al., 2020). Association football, in contrast, has been rather cautious about the large-scale integration of technology in the past – and rightly so, according to some of the Delphi experts' comments. However, the panel also acknowledges the fast-paced development of technological gadgets and appreciates the ever-increasing availability of data related to the game as well as the physical and mental capacities of the athletes (Giblin et al., 2016; Patel et al., 2020). Therefore, an anticipated technological evolution with respect to projections 4 (*communication quality*), 6 (*intelligent equipment*), and 9 (*remote scouting*) appears plausible. Projections 7 (*coaching staff*) and 10 (*technology cost*) could be seen as consequences arising from increased availability of data and technology. Noteworthy though, these consequences are not seen as an inevitable burden, but rather as desirable and impactful developments stand alone. While this might appear understandable for the increase of coaching staff to acquire more specialized knowledge, it might similarly surprise for the anticipated increase of technology cost, which –

according to the panelists – is also a likely and desired future development. However, considering the fact that the majority of experts does not believe that technology will eventually decide on winners and losers, it could be inferred that an increase in technology cost might go hand in hand with professionalization of organizations and structures – a scenario that would evidently be in the interest of most TDs in global association football.

4.6 General Discussion

The paper at hand presents a unique global perspective on the impact of technology on the future of football. By engaging TDs from 85 FIFA member associations in an online Delphi discourse on ten selected future-oriented topics related to technology in football, we find out that the majority of participants expresses an expectant desire to further explore and implement technology to support the game. This notion is consistent across different tiers of associations and therefore across different parts of the world. We also show that the panel has some reservations when it comes to technology for game-related capacities (Cluster 1) - that is innovation impacting the players at the core of the game. In contrast, technology to improve game-related processes - that is communication, training, or scouting (Cluster 2) - is highly promoted.

To put the overall results of our Delphi survey into perspective, it is worth discussing potential explanations for different stakeholder groups within the larger football ecosystem. From our cluster analysis, we learn that there are indeed two groups of projections that differ in terms of their overall support by the TDs. In this regard, we find that Cluster 1 projections (1: *player involvement*, 2: *digital avatar*, 3: *playing style*, 5: *coaching decisions*, and 8: *public accountability*) receive generally lower scores while still scoring above the respective scale center on all dimensions. As mentioned earlier, this pattern is not common in Delphi-based studies. However, it is in line with research on the adoption of technology and the general tendency to overestimate adoption rates in foresight studies (Atanu et al., 1994; Schirrmeister et al., 2020). Similarly, we find a strong correlation between all three assessment dimensions for all projections. While this could be

explained with a classic desirability bias, it might also be the case that TDs have a consistent view on the most relevant areas in which technology could deliver impact and that these areas are the ones that are being pursued with highest priority, thus having the highest probability to become reality by 2026 (Bonaccorsi et al., 2020). In accordance to this logic, Cluster 2 would comprise projections on the most pressing technological developments (4: *communication quality*, 6: *intelligent equipment*, 7: *coaching staff*, 9: *remote scouting*, and 10: *technology cost*). Irrespective of the angle of explanation, the overall results strongly support the hypothesis that technology will continuously affect the football ecosystem – and that globally.

On that note, participants expressed concerns in their written comments about how to enable technology adoption on a global scale. While developed countries certainly have more financial resources and arguably more knowledge about technology, our results reveal that the desire for football-related innovation is even higher in Tier 2 and Tier 3 associations. One reason for this result might be an elevated hope to being able to catch up on leading nations by implementing more technology. Another reason might be the hope that smaller associations could serve as training ground for global technology companies to test both hardware and software, thus giving smaller countries an advantage – despite the fact that the size of an organization does not generally indicate a higher speed in technology adoption (Andreff, 2001; Baker, 2011). Whether or not these are the underlying reasons, the results stresses again that associations from all parts of the world put both hope and expectations into technology.

4.6.1 Implications

In terms of implications, we can infer that the results of this study underpin the globally present desire for technology in football. At the same time, we learn about nuanced perspectives on different technological use cases and understand the challenge that technology has to be available on a global level. For stakeholders and decision-makers in the immediate realm of football, this means to further evaluate technologies that are scalable, affordable, and eventually customizable for

the different needs of football associations around the globe. This strict governance remains important, because the current perception among TDs that technology does not decide on winners and losers in football must not be jeopardized. Still, progress needs to be facilitated and the diffusion of technical innovation has to be supported by ongoing education and training. For the wider football-related ecosystem (e.g., technology service providers, equipment manufacturers) the results display a call for action to develop and offer technological solutions on both ends of the price spectrum. Our results show that there is a universal desire for new technology in football and also an awareness that dedicated budgets are required. Still, associations face different external environments and currently do not have similar levels of availability when it comes to technology.

4.6.2 Limitations and Further Research

Despite or rather because of the unique constellation of the expert panel, our research shows limitations. Foremost, we gathered a prospective view provided by a rather homogeneous set of participants – not in terms of their geographic origin, but in terms of gender, background, and profession. For Delphi-based surveys, this generally poses a challenge, because the discussion might be based on entrenched opinions without disruptive outside-in perspectives on the topics at hand (Belton et al., 2019; Bolger & Wright, 2011). Moreover, we conducted our survey in three different languages. Despite the fact that this procedure has been applied in other Delphi studies before, there is an ongoing debate as to whether it is possible to translate qualitative comments without losing informative value (Barrios et al., 2021; Markmann et al., 2020). We still opted for the multi-language approach in order to allow participants from various regions to engage in the discussion, knowing that some of the experts might not be fluent in any of our offered languages. However, to minimize the above-mentioned caveat, we attempted to use simple language, translated by official FIFA translators into three out of for official FIFA languages.

To gain more insights, future research could focus on dedicated technologies and their prospective opportunities and challenges, while considering differences between associations in

terms of organizational, environmental, and individual circumstances. Although TDs are the eventual decision-makers when it comes to the implementation of technology, also other perspectives (e.g., coaches, players, referees, spectators) might offer additional findings.

4.7 Conclusion

The paper at hand presents a unique global perspective on the impact of technology on the future of football. By engaging TDs from 85 FIFA member associations in an online discourse on ten selected future-oriented topics related to technology in football, we find out that the majority of participants expresses an expectant desire to further explore and implement technology to support the game. This notion is consistent across different tiers of associations and therefore across different parts of the world. We also show that the panel has some reservations when it comes to technology for game-related capacities - that is innovation impacting the players at the core of the game. In contrast, technology to improve game-related processes - that is communication, training, or scouting - is highly promoted.

5 Paper IV: Keep Your Employees Committed – How Leader Behavior Shapes Work Outcomes during Times of Increased Remote Work in Sports Organizations⁵

5.1 Introduction

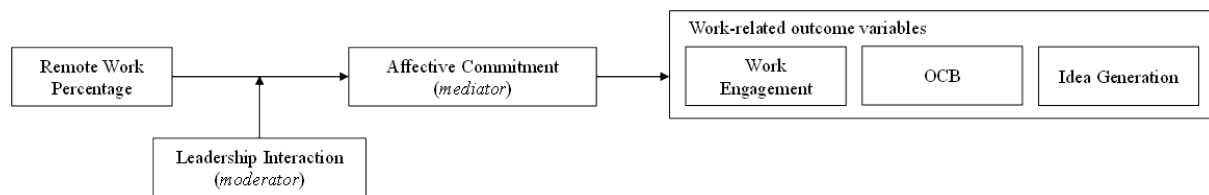
Human resources are one of the most important success factors in professionalized sports organizations and provide competitive advantages in an increasingly global and fast-paced market (Doherty, 1998; N. L. Smith & Green, 2020). In that regard, a central focus of research is organizational behavior which constitutes attitudes and behaviors of employees as indicators of organizational effectiveness. Extant research in the field of sports management has focused on topics such as leadership, commitment, and performance, but while doing so did not yet account for modern changes in work environments (Hwang & Jang, 2020; Nowy et al., 2015; Parnell et al., 2018; Schoenberg et al., 2016). Especially in the light of global markets and diversification of sports organizations, flexibility in work arrangements is required to stay competitive (Holzmayer & Schmidt, 2020a). A central facet of flexible work environments that became increasingly relevant and feasible due to technological advancements and the recent external shocks caused by the COVID-19 pandemic is remote work (Larson et al., 2020; Ozimek, 2020; B. Wang et al., 2020). While scholars and practitioners have frequently called for awareness of the dark side and possible adverse consequences for employees' well-being and health (e.g., burnout, work-family conflicts, less detachment, Koehne et al., 2012; Moss, 2018), there is also evidence arguing for a bright side of remote work as it has the potential to benefit organizational effectiveness via increased commitment or job satisfaction (Charalampous et al., 2019; Felstead & Henseke, 2017).

⁵ Beiderbeck, D., Frevel, N. & Schmidt, S. L. (2022). Keep Your Employees Committed – How Leader Behavior Shapes Work Outcomes during Times of Increased Remote Work in Sports Organizations. *Unpublished Working Paper*.

As these divergent perspectives indicate, there is still a lack of knowledge regarding mechanisms underlying and explaining the effects of remote work. Moreover, the somehow contradictory findings suggest that there are certain boundary conditions that shape and influence the effects of remote work on organizational effectiveness. While studies identified stable personality traits such as self-discipline as facilitators of successful remote work (Wang et al. 2020), more malleable mechanisms that determine whether remote work is beneficial or detrimental for employees and organizations remain unclear (Felstead & Henseke, 2017). However, scholars draw from organizational behavior theory to assume that leaders and managers play an important role for how well their employees deal with remote work arrangements (Cascio, 2000; Neufeld et al., 2010; B. Wang et al., 2020).

As mentioned before, the role of remote work for organizational behavior in sports organizations has been largely overlooked by research. However, current developments in the sports industry as well as the COVID-19 crisis require us to fill this research gap as remote work arrangements become more and more prevalent and relevant (Bartik et al., 2020; Brynjolfsson et al., 2020). Thus, we aim to uncover what makes or breaks remote work and how leaders in sports organizations can adapt their behavior to leverage organizational effectiveness. More specifically, we make use of findings on affective commitment to investigate how remote work percentage relates to common aspects of organizational behavior as indicators of organizational effectiveness (i.e., work engagement, organizational citizenship behavior, and creativity) in sports organizations during a period of intensified remote work (i.e., during early phases of the COVID-19 crisis). In that regard, we also focus on leader interaction frequency as a boundary condition for the above-mentioned mechanism (Hernández Baeza et al., 2009; Kirkman et al., 2004; Napier & Ferris, 1993). As previous research argues, the interaction frequency of leader and follower reflects the perceived closeness of the leader (Antonakis & Atwater, 2002) which is closely tied to their organizational commitment (Avolio et al., 2004). Moreover, the theoretical framework of leader distance also

argues that the interplay of leader interaction frequency and remote work needs to be considered when predicting work-related outcomes (Antonakis & Atwater, 2002).



Note. OCB = organizational citizenship behavior.

Figure 5.1 Proposed Conceptual Scheme for Moderated Mediation Model.

Our findings add to the discussion around current and future implications of COVID-19 for sports organizations (Bryson et al., 2020; Deutscher et al., 2020; Parnell et al., 2020). First, we examine the impact of the crisis on the sports ecosystem through a human capital lens. We argue that committed employees perform better (in terms of work engagement, organizational citizenship behaviors, and idea generation) and thus provide a competitive advantage for their organizations (Luthans & Youssef, 2004; Taris & Schreurs, 2009). Hence, we complement existing research (Beiderbeck et al., 2021b; Parnell et al., 2020) by adding insights on the elevated relevance of individual psychological processes in sports organizations during COVID-19. Second, we investigate how remote work can be an opportunity for organizations to successfully handle disruptions. Third, we draw from leader distance theory to focus on how the interplay of leader interaction frequency and remote work has the potential to equip employees with the necessary resources to deal with the crisis (Antonakis & Atwater, 2002; Avolio et al., 2004). Considering the anticipated increase and lasting relevance of remote work also beyond the sports industry, this study aims to address a broad audience from both science and practice (Dahik et al., 2020).

5.2 Background and Hypotheses

Evidently, the percentage of remote work has been drastically increased due to the consequences of COVID-19 (Brynjolfsson et al., 2020). Given the fact that working from home – also referred to as remote working, homeworking, or teleworking – has been a trend over the past

decades, scholars have started to investigate the relationship between remote work and work-related outcomes (Felstead & Henseke, 2017). In this context, research initially examined detracting factors of remote working, including difficulties in relationship building or maintenance, blurring boundaries between work and non-work, or the risk of overworking (Grant et al., 2013; Kelliher & Anderson, 2010). On the contrary, Charalampous et al. (2019) more recently conducted a systematic review with focus on remote workers' well-being and found overweighting positive effects on employees' emotions, jobs satisfactions and cognitive comfort as flexible work arrangements potentially increase employees' perceived level of autonomy with regard to place, time, and work-life balance. For example, Anderson et al. (2015) conducted a study with more than 100 employees in the US and found that these expressed more positive work-related emotions on days working from home than working in the office. With a larger sample of 1,000 employees from UK, De Menezes and Kelliher (2017) found that job satisfaction and organization commitment were positively related to remote work percentage, irrespective of the employees' industrial sector. Therefore, we formulate the following hypothesis:

Hypothesis 1: Remote work percentage is positively related to employees' work-related outcomes (1a: Work engagement, 1b: OCB, 1c: Idea generation).

5.2.1 The Mediating Role of Affective Commitment

As argued above, remote work provides employees with flexibility and autonomy. These work characteristics typically lead to employees being more committed to their organization, which is also reflected in the review by Charalampous et al. (2019). In general, affective commitment has been studied as a key psychological factor to enhance employees' work performance and well-being (Meyer & Maltin, 2010; Rhoades et al., 2001; Vandenberghe et al., 2004). Especially in sports settings, where emotional attachment, positive organizational behavior and voluntary work have dominant roles, scholars assign an increased importance to employees' commitment (K. Chang &

Chelladurai, 2003; Engelberg et al., 2014; Hoye, 2007; Kim et al., 2019; Rocha & Chelladurai, 2011).

In terms of the effects of affective commitment, previous research has regarded a wide range of work-related outcomes as indicators of employee effectiveness. For the study at hand, we decided to opt for the three psychological constructs work engagement (i.e., having a positive motivational state with regard to the job, Call & Ployhart, 2020), organizational citizenship behavior (i.e., acting beyond the mandatory task area of the job, Williams & Anderson, 1991), and idea generation (i.e., showing creativity to master job-related challenges, Tierney et al., 1999). All three constructs display critical determinants of organizational functioning and cover a range from a positive motivational state over interpersonal extra-role behaviors to innovativeness, which all have an elevated importance for sports organizations in times of crises like the COVID-19 pandemic (French & Holden, 2012; Kim et al., 2017). The existing body of literature has generally proclaimed a positive effect of affective commitment on these work-related outcomes (DiPietro et al., 2020; McMurray et al., 2010). Based on previous research that suggests a positive effect of remote work on affective commitment which, in turn, is positively associated with work-related outcomes, we anticipated a mediating role of affective commitment; especially given the technical advancements and increasing familiarity of employees in sports organizations with digital tools (Frandsen, 2016; Xiao et al., 2017). Thus, we pose the following hypothesis:

Hypothesis 2: The relationship between remote work percentage and employees' work-related outcomes (2a: Work engagement, 2b: OCB, 2c: Idea generation) is mediated by affective commitment such that the indirect effect of remote work percentage on employees' work outcomes via affective commitment is positive.

5.2.2 The Moderating Role of Leader Interaction Frequency

For executives, maintaining and fostering commitment is particularly challenging in a remote virtual superior-subordinate relationship, which most sports organizations faced during the COVID-19 lockdown and which might become part of the new normal in the future (Bartik et al.,

2020; Golden & Veiga, 2008). Therefore, to better understand the mediation via affective commitment, we focus on how leader behavior can serve as a boundary condition that shapes the strength and direction of employees' psychological processes (Bartsch et al., 2020; Kirkman et al., 2004). In this context, leader interaction frequency has been identified as a factor that can potentially cause conditional effects (Hernández Baeza et al., 2009). Based on the leader distance theory by Antonakis and Atwater (2002) – that generally assumes that the perceived distance between employee and leader affects employee effectiveness – we follow the assumption that "higher frequency of interaction will be associated with leader closeness, whereas lower frequency of interaction will be associated with leader distance" (p. 687). Therefore, we anticipate a higher degree of perceived proximity to the leader to be particularly beneficial for employees with a high remote work percentage which normally would feel more distant from their leader due to the physical detachment. Thus, we expect leader interaction frequency to serve as a boundary condition that influences the association between remote work percentage and affective commitment and the related work outcomes and formulate our third hypothesis as follows:

Hypothesis 3: The association between remote work percentage and employees' work-related outcomes (3a: Work engagement, 3b: OCB, 3c: Idea generation) via affective commitment will be moderated by leader interaction frequency such that the association will be more positive for higher levels of leader interaction frequency and less positive for lower levels.

5.3 Methods

5.3.1 Participants and Procedure

With our study we exclusively targeted employees working for sports organizations. The sample comprised 246 participants (male: 196, female: 50) from different types of companies and sports with the majority (91%) originating from Germany (for further details on sample demographics see Figure 5.2). To elaborate on COVID-19-induced changes to their work environment, we not only collected information about the remote work percentage, but also about

short-term work settings and perceived job insecurity. In this context, 42% of all participants were directly affected by short-term work, working on average 48% of their contractual hours during the lockdown period ($SD = 23\%$). For remote work, the sample indicated an average of 85% of working time performed from home ($SD = 29\%$), which unsurprisingly represents a significant increase compared to the pre-COVID-19 level ($M = 14\%$, $SD = 24\%$).

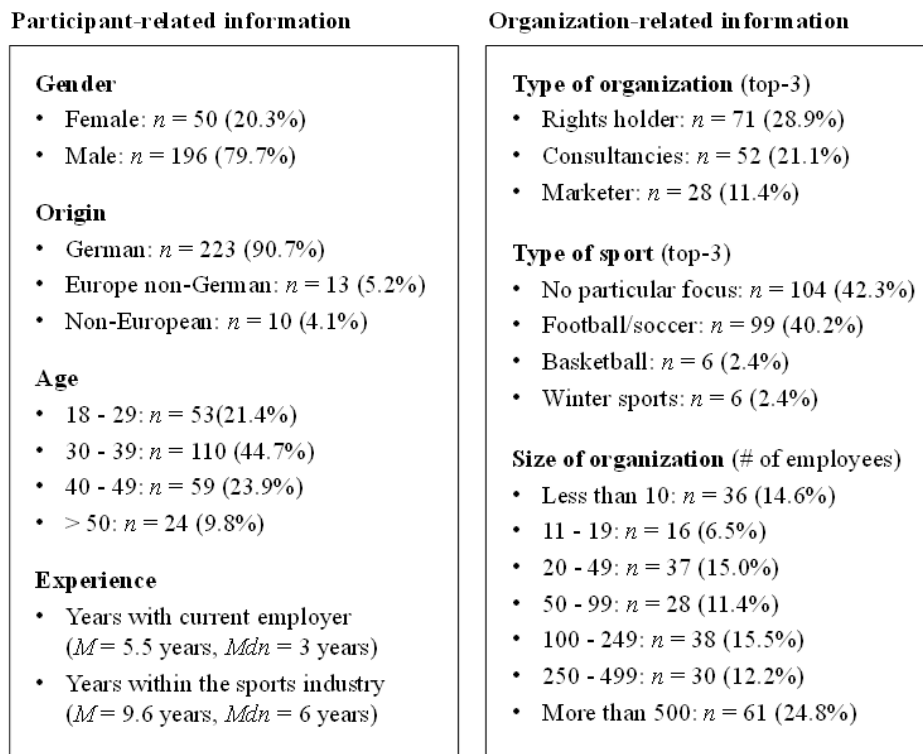


Figure 5.2 Sample Demographics ($N = 246$).

The survey was conducted in June and July 2020, thus in the midst of the COVID-19 crisis and during the time when first professional sports competitions started to resume (Reade et al., 2020c). To collect data, we used an online questionnaire and assured participants that the survey had a purely scientific motivation. Accordingly, participation was voluntary, and we guaranteed confidentiality of all responses.

5.3.2 Measures

In addition to demographics and work environment-related information, participants assessed the following measures:

Affective Commitment. Affective commitment was assessed by using a five-item measure ($\alpha = .91$) building on Meyer and Allen (1984). Responses were made on a seven-point scale (1 = strongly disagree, 7 = strongly agree).

Work Engagement. Work engagement was assessed by using a nine-item measure ($\alpha = .93$) proposed by Schaufeli et al. (2006) which builds on the Utrecht Work Engagement Scale (UWES-9). Participants rated their engagement on a seven-point scale (1 = strongly disagree, 7 = strongly agree).

Organizational Citizenship Behavior (OCB). OCB was assessed by a seven-item measure ($\alpha = .68$) building on C.A. Smith et al. (1983), who defined OCB as behavior that either benefitted an individual or an organization as a whole. Participants' assessments were collected on a seven-point scale (1 = strongly disagree, 7 = strongly agree).

Idea Generation. Idea generation was assessed by using a five-item measure ($\alpha = .85$) based on the creative process engagement construct from Zhang and Bartol (2010). For this study, we particularly focused on the idea generation dimension in which participants rated their behavior on a seven-point scale (1 = strongly disagree, 7 = strongly agree).

Leader Interaction Frequency. Leader interaction frequency particularly focused on the decrease or increase of interaction frequency. Given the fact that the absolute amount of interaction is always context-specific (Antonakis & Atwater, 2002), we focused on the perceived variation compared to the pre-COVID-19 level by asking the question: *Did you have fewer or more interactions with your leader during the COVID-19 restrictions than before the restrictions?* Participants were able to answer on a seven-point scale (1 = significantly less, 4 = neither less nor more, 7 = significantly more).

5.3.3 Data Analyses

To test our hypotheses, we first examined descriptive statistics to identify bivariate intercorrelations (Hypotheses 1). Then, we studied the result of path models to test the proposed mediation (Hypothesis 2) and then integrated leader interaction frequency as moderator variable into the model, before we tested for the first stage moderated mediation hypothesis (Hypothesis 3). Prior to our analyses, we mean-centered all continuous measures (Aiken & West, 1991).

Test of mediations. Hypothesis 2 suggests an indirect effect, in which the relationship between the independent variable (i.e., remote work percentage) and dependent variables (i.e., work engagement, OBC, idea generation) is transmitted by affective commitment. To test this mediation model, we estimated respective path models for each outcome and then conducted formal significance tests of the indirect effects, thus adapting an updated version of Baron and Kenny's (1986) multistep approach (Kenny et al., 1998; MacKinnon et al., 2002). Given that a normal distribution of *indirect effects (as they are a product of two direct effects)* cannot be assumed, we followed Preacher and Hayes (2004) to determine bootstrapped confidence intervals (CIs) in order to test the existence of indirect effects.

Test of moderated mediations. For the relationship between remote work percentage and affective commitment (mediator) we additionally anticipated that leader interaction frequency would play a moderating role (see Figure 1). Assuming this moderation to receive support, we further predicted that the indirect effect (mediation) between independent and dependent variables would be conditional on the value of the moderator (Hypothesis 3) (Cole et al., 2008; Preacher et al., 2007). To test this moderated mediation, we again followed a bootstrapped approach to calculate conditional indirect effects at lower and higher levels (i.e., one standard deviation below and above the mean) of the moderator. According to Preacher et al. (2007) we inferred the presence of a conditional indirect effect, if the corresponding confidence interval was either entirely above or entirely below zero.

5.4 Results

5.4.1 Descriptive Statistics

Descriptive statistics, including means, standard deviations, and intercorrelations for all variables are presented in Table 1. The results did not support Hypothesis 1, because we found no significant relationship between remote work percentage and any work-related outcome variable. With regard to affective commitment, in turn, we observed positive correlations with the three outcome variables work engagement ($r = .50, p < .001$), OCB ($r = .27, p < .001$), and idea generation ($r = .21, p < .001$).

Table 5.1 Descriptive Statistics and Study Variable Intercorrelations.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Short-term work percentage	21.46	29.12	–					
2. Remote work percentage	84.36	28.82	.05	–				
3. Affective commitment	5.20	1.43	.01	-.02	(.91)			
4. Work engagement	4.38	1.26	-.05	.10	.50***	(.93)		
5. OCB	5.53	0.82	.01	-.01	.27***	.39***	(.68)	
6. Idea generation	4.76	1.18	-.07	-.01	.21***	.34***	.36***	(.85)
7. Leader interaction frequency	3.84	1.51	-.07	.05	.24***	.26***	.11	.11

Note. Figures in parentheses are Cronbach's alphas. OCB = organizational citizenship behavior; * $p < .05$. *** $p < .001$.

In terms of further intercorrelations, we found that affective commitment was positively related to leader interaction frequency ($r = .24, p < .001$). Moreover, we observed positive relationships between all three outcome variables (work engagement, OCB, idea generation), where work engagement was additionally related to leader interaction frequency ($r = .26, p < .001$).

5.4.2 Test of Mediations

As Table 5.2 indicates, there was no significant association between remote work percentage and the work-related outcomes (i.e., no total effect) which again does not provide support for Hypothesis 1. Additionally, the direct effect of remote work percentage on affective commitment (i.e., the mediator) was not significant. However, affective commitment was positively related to work engagement ($B = 0.449, z = 8.653, p < .001$), OCB ($B = 0.145, z = 2.967, p = .003$), and idea

generation ($B = 0.171, z = 2.711, p = .007$). In line with this pattern of results, the indirect effects of remote work percentage on the three work-related outcomes were not significant as the bootstrapped 95% confidence intervals all included zero (Preacher & Hayes, 2004). Thus, Hypothesis 2 was not supported as there was no significant mediation.

5.4.3 Test of Moderated Mediations

In terms of the moderated mediation, the results of the path model (see Table 5.3) revealed a positive interaction between remote work percentage and leader interaction frequency, since the cross-product term was a significant predictor of affective commitment ($B = 0.01, z = 2.53, p < .05$).

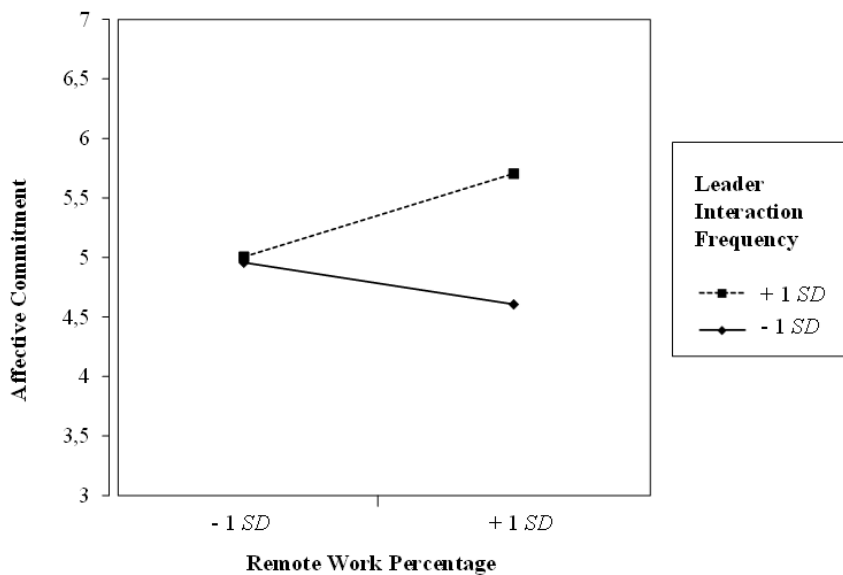


Figure 5.3 Moderating Effect of Leader Interaction Frequency on the Relationship between Affective Commitment and Remote Work Percentage.

Table 5.2 Regression Results for Mediations.

Predictor	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>
Mediator variable: Affective commitment												
Remote work percentage	-0.001	0.004	-0.305	0.761	-0.001	0.003	-0.315	0.753	-0.001	0.004	-0.304	0.761
	Dependent variable: Work engagement (Model 1)				Dependent variable: OCB (Model 2)				Dependent variable: Idea generation (Model 3)			
Affective commitment	0.449	0.052	8.653	< .001	0.145	0.052	2.967	0.003	0.171	0.063	2.711	0.007
Remote work percentage	0.005	0.003	1.909	.056	-0.001	0.002	-0.028	0.978	-0.001	0.003	-0.025	0.980
Bootstrap results for indirect effect												
	<i>M</i>	<i>SE</i>	LL 95% CI	UL 95% CI	<i>M</i>	<i>SE</i>	LL 95% CI	UL 95% CI	<i>M</i>	<i>SE</i>	LL 95% CI	UL 95% CI
Effect	0.001	0.002	-0.004	0.003	0.001	0.001	-0.001	0.001	0.001	0.001	-0.001	0.001

Note. OCB = organizational citizenship behavior; LL = lower limit; CI = confidence interval; UP = upper limit.

To further visualize the results of the test of Hypothesis 3, we plotted simple slopes (see Figure 5.3) of the relation of remote work percentage and affective commitment at one standard deviation above and below the mean of leader interaction frequency. We found a positive slope for increased interaction frequency and a negative slope for decreased frequency of leader interaction in case of high levels of remote work. By showing that the respective confidence intervals of the conditional indirect effects of remote work percentage on work-related outcomes via affective commitment (for higher and lower levels of leader interaction frequency) do not include zero, we inferred that leader interaction frequency is a significant boundary condition in our conceptual model (Preacher et al., 2007).

Table 5.3 Regression Results for Moderated Mediations.

Predictor	<i>B</i>	<i>SE</i>	<i>z</i>	<i>p</i>
Mediator variable: Affective commitment				
Constant	5.07	0.10	51.45	< .001
Remote work percentage	0.01	0.00	0.76	.446
Leader interaction Frequency	0.19	0.07	2.92	.004
Remote work percentage × Interaction	0.01	0.00	2.53	.011
Dependent variable: Work engagement (Model 1)				
Affective Commitment	0.48	0.06	8.04	< .001
Remote work percentage	0.005	0.003	1.74	.083
Dependent variable: OCB (Model 2)				
Affective Commitment	0.14	0.06	2.20	.028
Remote work percentage	-0.001	0.002	-0.43	.668
Dependent variable: Idea generation (Model 3)				
Affective Commitment	0.20	0.08	2.59	.010
Remote work percentage	0.003	0.003	1.05	.293

Note. OCB = organizational citizenship behavior.

Table 5.4 Bootstrap Results for Conditional Indirect Effects at Specific Values of The Moderator (Leader Interaction Frequency): ± 1 SD.

Dependent variable	Value of Leader Interaction Frequency	Conditional Indirect Effect	SE	95% CI	
				LL	UL
Work engagement	-1 SD (2.33)	-0.716	0.09	-0.898	-0.548
	+1 SD (5.33)	0.719	0.09	0.551	0.903
OCB	-1 SD (2.33)	-0.206	0.03	-0.402	-0.026
	+1 SD (5.33)	0.207	0.03	0.026	0.403
Idea generation	-1 SD (2.33)	-0.300	0.12	-0.515	-0.066
	+1 SD (5.33)	0.301	0.12	0.066	0.515

Note. CI = confidence interval; LL = lower limit; UL = upper limit; OCB = organizational citizenship behavior.

5.5 Discussion

In this study, we examined how COVID-19-induced changes to the work environment in sports organizations can affect work-related outcomes. In our conceptual model we analyzed the impact of remote work percentage on the three outcome variables and found no mediation via affective commitment. However, by examining leader interaction frequency as a moderator between remote work percentage and affective commitment, we learned that the indirect effect of remote work percentage on work-related outcomes was positive in case of increased leader interaction frequency and negative in case of decreased leader interaction frequency.

5.5.1 Theoretical implications

With our findings, we add to the existing body of research on organizational behavior and leader interaction in several ways: First, we unravel how COVID-19-related disruptions to the work environment (i.e., remote work percentage) relate to individual work-related outcomes of employees in sports organizations (Charalampous et al., 2019; Huang et al., 2017; H. J. Wang et al., 2015). Second, we uncover the mechanism behind the above mentioned relationship by showing that affective commitment is a conditional mediator via which remote work can affect work outcomes (Gardner et al., 2011; Rhoades et al., 2001). Third, we identify leader interaction

frequency as a boundary condition that determines whether remote work percentage is beneficial or detrimental for work-related outcomes (Hernández Baeza et al., 2009; Kirkman et al., 2004). Thereby, we add to the discussion around mechanisms and boundary-conditions for positive work-related outcomes, especially focusing on a concrete behavioral leadership indicator of leader proximity (i.e., interaction frequency) rather than general leadership styles (Antonakis & Atwater, 2002). In times of crises, this is particularly relevant, because interaction frequency can be adjusted much easier and more dynamically than a leadership style, which is typically more stable.

5.5.2 Practical implications

With respect to remote work, we learned that the indirect effect on work-related outcomes can be positively affected by increased leader interaction frequency. In terms of crisis management, this is a feasible way to boost affective commitment, as it does not require long-term leadership training. Still, it might require adapted processes that allow a more frequent superior-subordinate discourse, or just a setting with more frequent, but less time-consuming (digital) meetings. Given the fact that the majority of sport organizations will inevitably face a change process in the near future (either due to consequences of the pandemic, or already ongoing digital transformations), also structural adjustments (e.g., smaller manager-to-employee ratios) should be considered to preserve potential positive effects of remote work (Bartsch et al., 2020; Verhoef et al., 2019). Hence, despite the ambiguity of change, the findings at hand should motivate decision-makers to proactively model an organization that is designed to benefit from the new normal by enabling and facilitating leader interaction (Zakus & Skinner, 2008). This does not only apply for practitioners within the sphere of sports, but to all executives working in businesses that will face an increased percentage of remote work in the future (Bartik et al., 2020; A. C. T. Smith & Stewart, 2010).

5.5.3 Limitations and future research

Our research relies on quantitative survey responses and thus carries the typical limitations of survey data (e.g., self-reported subjective data). Especially in turbulent times of COVID-19, we had to find a balance between scientific depth in the questionnaire and reasonability (in terms of time investment and attention span) for participants. With regard to these participants, our sample primarily includes employees from Germany and therefore the results cannot account for socio-cultural differences. In general, we cannot infer causality from cross-sectional data, so that effective directions in our research model are theory based.

Beyond the above-mentioned limitations, we suggest trajectories for further research. For example, a longitudinal study design could test our results and evaluate the findings with robust statements on causal directions. Moreover, we based our study on a subjective self-assessment. Hence, more objective performance measures (e.g., supervisor evaluations) could be included in our conceptual model. In addition to a broader set of constructs, individual constructs could be analyzed from other angles. In this regard, it would be worthwhile to consider not only the employees' perspective, but also executives' perceptions and assessments, to create a more holistic view on the topics at hand. Moreover, an analysis of the leadership behavior during these interactions (e.g., interpreting content or categorizing task, relations, and change behavior by videotaping the virtual interaction) could be added to make an interesting contribution (Kauffeld & Lehmann-Willenbrock, 2012; Yukl et al., 2002).

5.6 Conclusion

With our research, we add to the recent discussion around impacts and challenges for the sports ecosystem as a consequence of the global COVID-19 pandemic. We build on empirical data gathered amidst the crisis and offer findings that go beyond the economic impact of the crisis and rather make a contribution to (1) the *human capital perspective*, (2) the discourse in *organizational behavior*, and (3) research on *leader interaction* as well as *leader distance*. By uncovering leader

interaction frequency as a boundary condition for the described psychological mechanisms, we resolve previous contradictive findings on the relation between remote work percentage and work-related outcomes, specifically in the case of externally enforced settings of working from home. In this context, we provide practical advice for executives within and beyond the sports industry.

6 Conclusion

6.1 Summary of Findings

In the dissertation at hand, I provided four stand-alone research papers to elaborate on the overall question of how *strategic foresight and leadership behavior can impact organizational success in the sports ecosystem*. By investigating this question *in the context of exogenous disruptions* (i.e., COVID-19 and technological advancements), I aimed to advance our understanding on how future-making practices and situation-specific leadership behavior can serve as catalysts for organizational success in the sports ecosystem (Wenzel et al., 2020). To cover both methodological and practical perspectives on the above-mentioned issue, this dissertation addressed three distinct, yet contextually linked research questions:

Research Question I: How do exogenous disruptions (i.e., COVID-19 and technological advancements) impact the international football ecosystem?

Research Question II: How can the Delphi method (as a strategic foresight process) be advanced to serve both theory and practice?

Research Question III: How does leadership behavior impact organizational success in times of increased remote work?

Research question I covered two different aspects of exogenous disruption, that is, the outbreak of COVID-19 and the accelerated diffusion of technology in the context of sports in general and football in particular. Therefore, I addressed this research question with two stand-alone studies: Paper I covering *the impact of COVID-19 on the European football ecosystem* and paper III covering *the impact of technology on the future of football*. Both papers and the respective key findings are summarized below.

Paper I presents a Delphi-based scenario analysis, investigating a total of 15 prospective projections related to regulatory, economic, social, and technological effects of the COVID-19

outbreak on the European football ecosystem in the short, medium, and longer term. To provide a holistic and multifaceted view, the study involved 110 industry experts in a real-time Delphi process, covering more than five nations and various stakeholder groups, including representatives of clubs, academia, leagues, associations, and other football-related organizations like media or equipment manufacturers, for instance. In this work, I present three different scenarios for potential effects of the pandemic on the football ecosystem. First, I show that experts see potential threats to the industry with regard to the financial stability of clubs, which could affect the amount of investor shares, we see in football as well as a decrease of headcounts in the administrative staff of football clubs. Second, I find an ambiguous view on the effect on salaries, transfer fees, and competition structures. Third, I identify potential opportunities for the ecosystem, including an increased sense of social responsibility within the industry and a flexibilization of player contracts. Next to the contextual results, I add a new perspective with regards to experts' sentiments to the Delphi method (Loye, 1980; Spickermann et al., 2014). In this context, I find significant differences in valuation behavior between participants with a rather optimistic attitude and participants with pessimistic stance. Similarly, I show that participants' subjective wellbeing has a significant effect on valuation behavior, thus, underpinning the need to include and further investigate the impact of experts' sentiments in the context of future-making practices.

Paper III picks up the aspects of sentiments and examines the impact of technology on association football in a global setting, accounting for participants' surface-level and deep-level characteristics; the latter including attitude towards technology in general, attitude towards technology in football, and openness to experience (McCrae, 1993; Rothmann & Coetzer, 2003; Wessel et al., 2019). In a sequential Delphi process, I surveyed 85 technical directors from international football associations to assess technological developments with regard to players, coaches, and management in the global context. I find that expected probability, desirability, and impact of occurrence of the 11 future-oriented projections that we tested differ hardly based on surface-level characteristics of participants. In general, experts see more potential in technology

to improve game-related support functions instead of game-related capabilities. Notably, participants from smaller associations on average express more desirability for technology in sports than technical directors from the top-50 football nations globally. Again, valuation behavior also differed based on experts' sentiments, underpinning the above-mentioned necessity to account for these factors in future prospective studies.

Research questions II was addressed by paper II, in which I provide a framework for the adequate use of the Delphi method in different research areas. The objective of this paper is to motivate a cross-disciplinary exchange to advance the Delphi method as a core future-making practice in the digital age by providing new directions and advice for the research community along the three major steps of any Delphi study – both in present-related and future-oriented research settings. Figure 6.1 illustrates a summary of key findings based on the graphical abstract of Beiderbeck et al. (2021a).

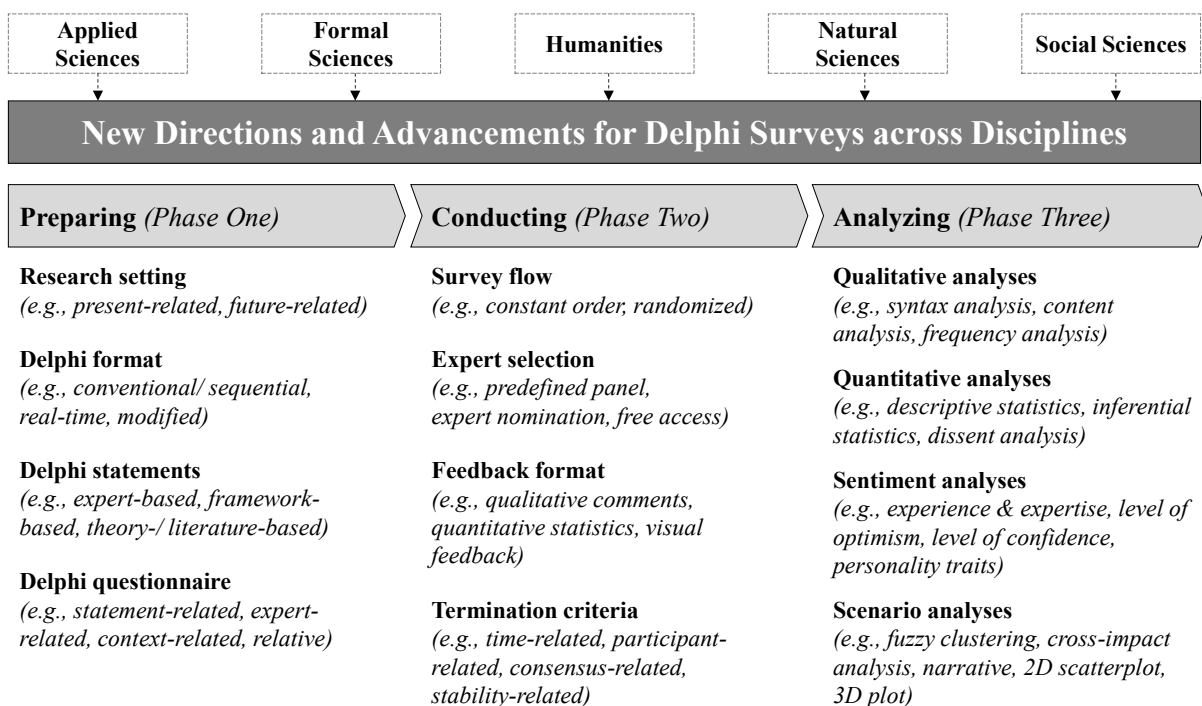


Figure 6.1 Summary of Findings from Paper II.

Research question III did not focus on the methodological aspects of future-making practices but rather the human role in preparing organizations for a disruptive future – more precisely, the role of leadership behavior in times of increased remote work. Similar to other industries, organizations in the sports sector faced an unprecedented exogenous shock caused by the COVID-19 pandemic. However, thanks to technological tools, a large proportion of the administrative work in the industry could be done from home. In fact, the circumstances caused by the pandemic showed almost every organization that there are risks but also opportunities associated with an increased level of remote work. Therefore, it is crucial to understand how to cope with such a disruptive situation, and paper IV addresses exactly this issue. In my research study with 246 employees from organizations in the sports industry, I show that leader behavior can have both beneficial and detrimental effects on the affective commitment and thus work-related outcomes of employees in remote work settings. More precisely, I show that an increased interaction frequency between leader and subordinate has a positive effect on employees' work engagement, their collegial organizational behavior as well as their capacity for idea generation.

6.2 Contributions and Future Research Avenues

Overall, this dissertation makes three contributions: First, by advancing research in the field of sports, management, and strategy. Second, by offering a comprehensive approach to advancing the Delphi technique as a viable research method across disciplines. And third, by offering guidance to practitioners on how to adjust organizational structures, capabilities, and behaviors to better prepare for a disruptive future.

In the context of sports, management, and strategy research, I demonstrate and underpin the relevance of future-oriented research approaches. Following the notion of Wenzel et al. (2020), becoming an advanced scholar in prospective studies requires the hands-on application of future-related research methods. In doing so, I aim to motivate the research community to embark on a still rather exploratory journey of future-oriented research – specifically in the sphere of sports.

However, I am convinced that today's disruptive world requires more forward-looking approaches in research to address the most pressing challenges in practice. Therefore, my second contribution with regard to the methodological advancements of the Delphi technique aims to improve the research quality in the field to ensure more rigor in the scientific use of the technique and thus allow for more precise implications in the practical context. All things considered, the four papers of this dissertation illustrate the relevance of organizational future-preparedness in today's disruptive times – both with regard to the utilization of future-making practices and in relation to individual leadership behavior. While researchers and academia could take away a more thorough understanding of how to use tools, such as the Delphi method, to investigate prospective developments and future scenarios, practitioners could learn from the results of this dissertation to sustainably improve their organizational structures, capabilities, and behaviors to better prepare for a disruptive future.

In fact, the usefulness of management research has always been a topic of debate (Mirvis, 2008; Mohrman et al., 2001). Against this backdrop, scholars also asked for more sophisticated and impact-driven approaches in prospective research (Gümüşay & Reinecke, 2021). I personally agree with this notion and would like to highlight the importance of actionable management studies within and beyond the context of sports business. I see a strong need for more forward-looking research to explore potential future scenarios that cannot be anticipated by an extrapolation of historic trends. Hence, an advancement of future-making practices and related research is becoming more relevant than ever. Therefore, scholars should focus on improving relevant research methodologies. One way of doing so is to further explore experts' sentiments in the context of quantitative and qualitative future research to identify deep-level personality characteristics that have a significant impact on valuation behavior. A better understanding of potential interrelationships in this context could help to improve the interpretation of results and thus the derivation of more accurate managerial implications. Moreover, the operationalization of future-making practices and research techniques in both academia and practice requires further

research to improve the quality of outputs and to provide guidance for researchers and managers to properly use these tools. In light of the most recent disruptions, we will most likely live in a world that continues to change more quickly than ever before. In such times, it is hard to have everything under control, and prospective research will most likely fail with its predictions. Still, scholars and managers should not fear to make mistakes in applying future-making practices. Instead, they should continue to think and debate about the future because all of us spend the rest of our lives living in this future.

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