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APPLICATION OF DELPHI METHOD IN SPORTS

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Abstract: A well-liked and reputable technique for gathering data from experts in a field of expertise is the Delphi method. This approach may be used to conduct surveys with qualified respondents from a wide geographic area because face-to-face interaction is not necessary. The Delphi method survey is a practical tool for obtaining expert opinions through repetitive rounds of controlled feedback. To have the maximum response rate possible, investigators must actively engage in this area. Participant cooperation is essential for the Delphi process to be carried out successfully. The main goal of this paper is to offer insights which can be useful to other researchers and practitioners preparing to apply Delphi methodology. Moreover, the article contributes to the methodological debate by taking into consideration the introduction of new practices that can be used to overcome certain classical issues of the Delphi methodology: optimal panel size, objectivity, controlled feedback, participant response rate, etc.

Keywords: Delphi metod, methodology, sport, research techniques

Introduction

Since the ancient times, people have always wanted to foresee the future course of events and how they will unfold. Meteorologists predict the weather, doctors give prognosis on their patients' health, politicians hire various marketing agencies for public opinion polls because they want to know the election outcomes, and so on. When people trade in stock market, it all comes down to one rule: buy when prices are low and sell when they rise. However, the problem is how to know whether the price of a product or stocks of a company will increase? Special techniques, such as analyzing the movement of prices in the past through graphs, can be used to anticipate the moments when you should buy or sell. Scientific approach has been used increasingly in this field because it is possible to predict certain stock market changes by using various statistical methods. Sports predictions are quickly becoming the norm in sports industry.

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Professional analysts have become dependent on data analytics apps to offer insights and advice to coaches, players and even managers, who might not otherwise predict certain outcomes based only on intuition. Artificial intelligence is the simulation of human intelligence through computer programs, it enables robots or various machines to perform tasks typically done by humans.

However, some authors ask a controversial question: does an explanatory model need a certain level of predictive power to be considered scientifically useful? Similarly, does a predictive model need a sufficient explanatory power in order to be scientifically valuable? When observing statistical models being used in various scientific disciplines for theory construction and testing, one can find a range of perceptions concerning the relationship between causal explanation and empirical prediction. In numerous scientific fields such as economics, psychology, education and environmental science, statistical models are predominantly used for causal explanation, whereas the models with a strong explanatory power are often assumed to have an inherent predictive power (Shmueli, 2010).

The main purpose of prediction is to attempt to prevent surprises and to reduce uncertainty (to the smallest extent possible). The French writer, educator and philosopher Jean Jacques Rousseau said that one of the most necessary abilities of prediction is the sense that not everything can be predicted. However, scientific prediction differs from regular (non-scientific) prediction.

The Delphi method is a research strategy used to carefully gather professional opinions on a certain issue. It bears the name of Delphi's Greek oracle. Despite being widely used in several other areas, its application in the sports industry has recently drawn a lot of interest. The Delphi technique is highly beneficial in the sports sector for establishing decision-making and strategy since it enables professionals to exchange their thoughts and forecasts. The Delphi method promotes a cooperative approach that can enhance athletic performance and have an impact on future outcomes by harnessing the collective knowledge of respected individuals.

For anticipating future trends and performance outcomes in the field of sports, the Delphi technique is quite helpful. The Delphi technique permits the synthesis of various points of view, providing projections utilizing a wide variety of information with the assistance of a group of professionals, including coaches, players, and sports analysts. For example, sports organizations may make use of this approach to learn crucial information regarding individual performances, team dynamics, and even game preparations. These professional viewpoints may be used to develop training strategies, choose the best team members, and make data-driven decisions.

The Delphi method may be used to make decisions more effectively in the field of sports. By hiring experts with extensive knowledge and experience, organizations may make smarter choices that improve player development, financial investments, and long-term planning. By collecting a wide range of perspectives, the Delphi technique guarantees that judgements are not only dependent on the intuition of

one individual and allows for a complete evaluation of the options offered. This cooperative approach fosters diversity and promotes critical thinking, which ultimately enhances performance both on and off the field.

The Concept Delphi Technique

The Delphi methodology, which was first created by Dalkey and Helmer (1963) at the Rand Corporation in the 1950s, is a well-known and respected way to achieve consensus about real-world knowledge that is gathered from experts in certain subject areas. The Delphi methodology is a method of group communication that tries to have in-depth debates and analyses of a particular subject for the purposes of creating goals, researching policies, or forecasting the occurrence of future occurrences. It is predicated on the aphorism "two heads are better than one, or...n heads are better than one." While most surveys try to identify what is, the Delphi method concentrates on what could or might not be possible.

The Delphi method is a method for forecasting. The Delphi method was at first used mostly for predicting future international crisis situations and potential state of war, but it quickly began to be used for forecasting technical and technological developments. It envolves surveying experts through a series of questionnaires, in a way that the answers from one questionnaire are used for designing the next questionnaire. The logic behind the Delphi method is the systematic use of expert opinions, which stimulates future events or provides a fairly reliable projection of future events (Rubio, et al., 2020).

The research facilitator chooses a group of experts based on the topic being researched. Once everyone has verified their participation, a questionnaire is issued to each group member, instructing them to respond to each question based on their own experiences, knowledge, or prior study. The facilitator gathers the comments and creates copies of the data after receiving the returned surveys. Each participant receives copies of the gathered comments with the option to comment further. All of the questionnaires are sent back to the facilitator at the conclusion of each commenting session, who then chooses if another round of comments is necessary or whether the results are ready for publishing. A general consensus can be reached by conducting as many rounds of surveys as necessary.

For example, in a study (Bolia et al., 2022) that addressed the issue of shoulder stabilization after athletes' surgery and their return to competitive activities, after the third round, the level of agreement on 36 statements was as high as 96%. This process has standardized the criteria for athletes' return to sports after shoulder surgery among professional athletes. These arranged criteria can help the ones responsible for athletes in the decision-making process when determining the optimal timing for their return to sports.

The Delphi method has undergone modifications since its beginning to structure an efficient and faster consensus. The modified Delphi does not have standard criteria,

but essentially, the steering group adequately facilitates the process of group communication. The Delphi method is very suitable for research that is needed for getting the information on health education and for health promotion campaigns (de Meyrick, 2003; Guzys, et Al., 2015). However, in a meta-analysis of Delphi studies in healthcare research, it was revealed that many studies were of questionable quality (Nasa, et al., 2021).

In order to include and organize the information and views of the "panel" members on a subject that they are thought to be competent about, the Delphi method employs a number of "rounds" of data collecting. Have as many "rounds" (repetitions) as required to attain consensus or until the "law of diminishing returns" kicks in is one of the key tenets of the Delphi approach. There are no strict guidelines in regard to the number of rounds and by reviewing the relevant literature, it was determined that the number of rounds varies between two and four (Keeney, Hasson, Mc Kenna, 2006).

This data collection technique is known for its low response rate. Researchers often need to send two to three reminder letters to those that have not responded. In order to improve responses in rounds, it is crucial that the participants feel like and realize that they are partners in the study and to be interested in the topic. Some authors claim that it is very rare to reach 100% of responses in Delphi technique studies (Hsu, Sandford, 2007). Taking that into consideration, the key question in any Delphi study is what percentage the researcher would accept as a consensus. The answer may lie in the importance of the research topic. For example, if it is a matter of life and death, such as whether an athlete should undergo an emergency surgery or be treated with medication, the level of consensus of 100% might be desirable. On the other hand, if the topic was related to the choice of strategies for development of a sports association, the consensus of 51% would be acceptable.

It is good practice for a research team to establish a definition of consensus before the beginning of data collection. At the moment, there are no formal, universally accepted guidelines on the use of Delphi technique, nor is there any kind of standardization of methodology. There is some flexibility in design and format of the technique and this usually depends on goals and mission of the study. In the Delphi technique, individuals who are considered experts in the relevant field are recruited (based on criteria). The researcher must decide on the criteria before the beginning of the study, for example gender, professional experience, education, employment or appointment. Thus, for instance, there is no sense in seeking consensus among non-professionals regarding the creation of guidelines for the recovery process of elite athletes after a match, when they may have little knowledge on this topic. Perhaps the most important aspect of this technique is time. This is something that can be underestimated by a researcher who uses the Delphi technique for the first time. It involves the time required for conducting the interviews, designing the questionnaires, distribution, feedback, analysis and redevelopment for subsequent rounds.

There are some examples that the whole process can last from 4 to even 12 months. In short, there is no doubt that the Delphi study takes a lot of time. True anonymity cannot exist: individual panel member responses are unknown to other participants, but they are known to the researcher. Some authors call this "quasi-anonymity", as there is a possibility that colleagues participating in a study accidentally find out that they are involved and that they are discussing the research topic and their responses (Hasson, Keeney, McKenna, 2001). The next issue is related to the fact that most of the published Delphi studies primarily focus on findings. Nevertheless, consensus and agreement are really two distinct mindsets. Is there a distinction between a participant's level of agreement with the question at hand and their level of agreement with other participants? For instance, 75% of nurses could concur that older, sicker patients shouldn't be subjected to the strain of aggressive resuscitation. Although it upholds the consensus, this approach might not be the best for treating these people (Evans, 2003). The success of the Delphi technique depends on the analytical and administrative skills of the researcher (Duffield, 1993). The shortcoming of this technique is that it does not provide exact numerical results and it is impossible to guarantee that it will produce identical results in a repeated procedure. The Delphi technique is a qualitative approach, not a quantitative one (Grisham, 2009).

Characteristics end Process

Scenario planning is a vital use of the Delphi methodology in research. In scenario planning, a variety of prospective future scenarios are created and their potential effects are evaluated. Researchers can get important information to direct the creation of these scenarios by including a panel of experts using the Delphi approach. The Delphi method's iterative structure enables ongoing improvement and convergence towards a consensus. This cooperative method makes sure that important variables and uncertainties are taken into account while making sure that no one person controls the decision-making process.

The Delphi method is used extensively in the creation of policies and other types of decisions. Decision-makers frequently need to depend on expert views when dealing with complicated and unclear challenges. Utilizing a varied panel of experts' collective intelligence, decision-makers may use the Delphi approach to ensure that decisions are based on a variety of viewpoints. The Delphi method encourages experts to offer thoughtful and well-supported solutions by employing numerous rounds of surveys or conversations. This approach helps to reduce the impact of personal biases by giving decision-makers a thorough grasp of the problem.

The Delphi method might theoretically be applied repeatedly until it is decided that consensus has been reached. However, emphasize that in most situations, three cycles are adequate to gather the required data and arrive at a consensus. To help individuals who want to employ the Delphi process as a data gathering method

when it is judged that extra iterations beyond three are necessary or helpful, the following discussion offers guidance for up to four iterations.

Round 1: Typically, the first round of the Delphi process begins with an open-ended question. The primary method for requesting specific information on a topic from the Delphi participants is the open-ended questionnaire. After the respondents have provided their responses, the information must be arranged into a well-structured questionnaire. This questionnaire will serve as the survey instrument for the second round of data collection. It should be mentioned that a normal and suitable version of the Delphi process model is to use a structured questionnaire in Round 1 that is based on a comprehensive analysis of the literature. If there is useable and accessible fundamental knowledge about the target issue, then using a modified Delphi approach is suitable.

Round 2: In the second phase of the Delphi process, each participant is given a new questionnaire asking them to rate the items that the researchers had compiled using the information from the previous round. Given this, the Delphi panel may ask participants to rank or score things to establish their top priority. Areas of agreement and disagreement are mentioned after round two. The Delphi panelists are occasionally asked to provide justification for the scores they gave certain items. The true outcomes may become apparent among the participants' responses when consensus begins to form in this round.

Round 3: In the third phase, the researchers distribute questionnaires to each member of the Delphi panel with the questions and ratings they detailed in the first round, along with an invitation to revise their thoughts or "to specify the reasons for remaining outside the consensus." In this phase, the Delphi panelists have the opportunity to go into further depth on the specifics and their evaluations of the relative importance of the topics. However, just a slight increase in the level of agreement over the previous round may be predicted.

Round 4: In the fourth and typically last round, the panelists get a list of the remaining items, their ratings, minority viewpoints, and topics that have gained consensus. Participants have one final chance to revise their evaluations at this phase. It should be emphasized that the number of Delphi iterations may vary from three to five, mostly depending on the degree of agreement the investigators are looking for.

The majority of Delphi studies incorporate consensus reached after a predetermined number of rounds (often two) as criteria for closure. With two rounds of Delphi, it is impossible to confirm the consistency of answers or consensus. Each modification to the products or controlled feedback may alter the panelists' opinions. A predetermined number of rounds without considering result stability undermines statistical robustness since these replies could not be stable. The "modified Delphi" method was developed, and it employs two or three rounds of research that were chosen at random as completion requirements.

However, the "Modified" phrase in Delphi surveys is ambiguous and doesn't have any agreed standards. The steering group's active efforts to attain consensus are the sole shared feature of the modified Delphi technique. The steering committee has carried out thorough literature searches in the challenging area, and first Delphi rounds are concentrated on reaching agreement among panelists rather than being open-ended. The things that persistently fail to gain consensus despite controlled feedback can also be deleted. The group also analyzes the outcomes following each round, discarding the items that have reached consensus for the next round. However, this active involvement of the steering group can cause bias in members' opinions (Nasa, et al., 2021).

Number of expert panelists

Existing research on the ideal size of a Delphi panel is conflicting. According to some experts, the larger panel size can produce results that are more trustworthy. Others have countered that the accuracy and efficiency of the Delphi approach are not significantly correlated with the size of a Delphi panel. The size or nature of the problem being studied, the number of specialists accessible, and the amount of time and money that are available are only a few of the variables that affect the number of Delphi panelists.

The number of rounds is an essential aspect in design a Delphi study, which aims at reaching consensus among panelists through controlled and anonymous feedback and iterative process (Hallowell, Gambatese 2010b). Researchers frequently choose different numbers of rounds depending on the desired level of consensus because there is no clear guideline on the ideal number of rounds in prior literature for Delphi investigations. The detected 88 publications have between two and six rounds, on average. It is important to note that after two and three rounds, the requisite agreement had been established for 40 of the identified 88 publications. This is consistent with the finding that after two iterations, Delphi outputs are more accurate. However, if there are more than three iterations, the researcher should take participant tiredness, attrition rates, time, and cost into account. The number of experts involved started dropping out of the studies after Round 2. (Ameyawa, et al., 2016).

Another problematic issue surrounding the Delphi investigations is the size of panel required. There is no agreement regarding the size of the panel and in the Delphi literature it is indicated that panel size varies from a few to hundreds of experts (Ab Latif, et al., 2016; Grisham, 2008).

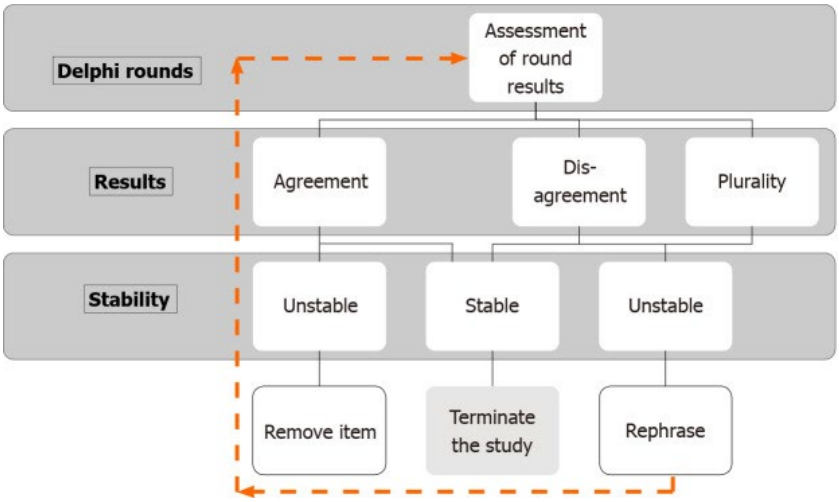
There are a number of recommendations for choosing an expert group. Despite the fact that every circumstance and the pool of specialists to choose from will be different, some general guidelines for the procedure are provided (Rowe, Wright, 2001):

- Employ specialists with the necessary topic expertise.
- Make use of a range of experts.
- Use five to twenty specialists.

• For Delphi comments, include the panel's mean or median estimate and each member's reasoning for their estimates.
• Delphi polling ought to go on till the outcomes are consistent. Three planned rounds are often plenty..
• To arrive at the final projection, add together and evenly weight all of the expert predictions.

Consensus stability is harder to understand than response stability, and Delphi studies seldom employ consensus stability as a criteria for conclusion (Picture 1). A predetermined round of surveys or consensus used to be the standard closure criterion. There is an inherent danger that the past round's considerable shift in replies will have an impact on the consistency of the findings or the level of unanimity. Therefore, several scholars thought that reaching a consensus with unpredictable replies is pointless. Thus, it is believed that the required criteria is the stability of the outcomes. The uniformity of replies throughout research rounds is referred to as stability. The results of two different rounds for a given topic may differ, according to the researchers, although this possibility can be lessened by ensuring statistically significant response stability (or variance). To put it another way, agreement can exist in unstable replies as well as stable ones, therefore ensuring response stability should be a suitable closure condition. However, every attempt should be taken to reach agreement. As a result, the closure criterion for Delphi should be a hierarchical ending criterion. (Nasa, et al., 2021).

Picture 1. Stability assessment for Delphi rounds



Source: Nasa, et al., 2021

So, there is no agreement in literature about expert panel sample size (Lambe, Bristow, 2010). The panelists' status as "experts" is the most debatable, though. An expert can be someone who has knowledge and experience on a subject, yet it can

be challenging to put experience into numerical terms. Despite criticism, experts are frequently included as panel members in Delphi research without any particular selection criteria.

The Delphi coordinator is faced with difficult compromises during the preparation and conducting the survey, such as deciding on the number of experts who will be engaged and the manner in which they will be involved to attract and maintain participation, dealing with expert responses to ensure the Delphi survey remains uncompromised and that it reaches the general goals, as well as the balance of conciseness and richness of information in qualitative analysis of coding (Hirschhorn, 2019). These compromises emphasize the critical role of the survey coordinator, which can be a potential source of weakness of Delphi process. for instance, in a study, out of 94 people expressing interest to be on the expert panel, 48% (45/94) met the eligibility criteria (Vishnubala, et al., 2023).

Delphi Technique in Sport

Anticipating and preparing for the future are important components of sports organization management, as well as achieving targeted economic outcomes in the future. Long-term success of sports organizations will increasingly depend on the ability of the manager to predict (forecast) the future, that is, to create and implement an efficient plan.

Depending on the sport that they are intended for, today, there are a lot of different prediction methods, ranging from those completely relying on intuition or common sense to the highly organized and complicated quantitative systems. Prediction techniques can be simple or complicated, accurate or imprecise and if you take into consideration the prediction period, they can be short-term, middle-term and long-term (Dašić, 2023).

The usage of the Delphi technique to facilitate group discussion and promote agreement among a panel of experts on a chosen issue has considerably risen during the past fifty years. The element with the biggest impact on the Delphi process is probably the human element (Grime, Wright, 2016). Recently, thanks to the advancements in science and information systems, the possibilities of this method have substantially increased. For example, online surveys and statistical software ready to use have made Delphi method much easier for work. However, the increased use of Delphi can also be attributed to its adaptable application to the use of human opinion (Shelton, Creghan, 2015). Electronic Delphi surveys (also known as e-Delphi) help in representation of panel members, it saves time and speeds up the survey rounds using technology without physical presence.

The Delphi approach offers a versatile and adaptable instrument for gathering and analyzing the necessary data for individuals participating or interested in engaging in research, assessment, fact-finding, issue exploration, or learning what is truly known or not known about a particular topic (Billy, et al., 2003). It is crucial to carefully

consider the subject choice and the timescales for conducting and ending a Delphi investigation before the study even begins. Additional precautions against low response rates, accidentally influencing comments, and asking panelists for their expert views rather than measuring their topic knowledge should be included in the study's design and implementation. The Delphi method has been and will be a vital data collection methodology with a host of advantages for those who want to get information from people who are deeply involved in the topic at hand and can offer in-the-moment and real-world experience.

The Delphi method is an effective way for getting the opinions of experts in a certain field with the goal of achieving consensus. This iterative procedure, which is typically completed in three to four rounds, entails a number of ad hoc formulated questions, each of which is based on the answers to the preceding one. Results of each round are collected and returned to the experts who, in successive iterations, get the possibility to re-evaluate their answers taking into account the anonymous answers of the whole panel. When the complexity and ambiguity of a given issue surpass the decision-maker's intellectual capacity, the Delphi method must be used in sports. This is crucial when the material that is currently accessible is somewhat sparse or has a multidisciplinary focus. In a study (Sandrey, Bulger, 2008), the Delphi method was used in athletic training to achieve two goals; the need for evidence-based practice and the need for establishing policies and procedures when they are absent or when an individual finds it difficult to make a decision. Delphi participants' cooperation is essential to its execution, and researchers must take an active role in this area to assist assure the highest response rate feasible. Investigators must take an active involvement in this area to assist assure the highest response rate possible. Cooperation from participants in the Delphi process is vital to its effective execution.

Conclusion

The Delphi method is a popular approach in research that aims to get consensus or professional opinions on a certain subject. In order to reach consensus or pinpoint areas of dispute, this approach entails completing numerous rounds of anonymous surveys or organized talks with a panel of experts. When direct face-to-face talks are impractical or when specialists are geographically spread, the Delphi method is very helpful. This research technique offers a platform for producing rich and varied viewpoints and enables efficient information sharing.

The Delphi approach has been applied to study in a variety of sectors, including sports. The method is predicated on specialists imparting their know-how on a particular subject and reaching an understanding via iterations of feedback. The Delphi method has been applied in sports to enhance player and team performance, comprehend current developments and trends, and create fresh coaching approaches. It has been discovered that the Delphi approach works well for getting advice from professionals on a range of sports-related problems.

The ability to exchange knowledge without being affected by other group members is one of the Delphi technique's key benefits in the sports industry. This promotes the development of unique perspectives and ideas that would not have been considered otherwise. Since the Delphi approach is based on numerous rounds of feedback rather than simply one survey or interview, it also offers a more trustworthy and accurate reflection of the group's overall viewpoint. A genuinely global perspective on issues relating to sports may be obtained by using the Delphi approach to collect comments from a wide range of specialists from across the world. The Delphi approach will likely continue to be an important resource in the study and advancement of the area of sports as it develops and becomes more data-driven.

Conflicts of inerests

The authors declare no conflict of interest

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