IN VIDEO ASSISTANT REFEREE WE TRUST?

A QUANTITATIVE STUDY OF SWEDISH FOOTBALL SUPPORTERS' PERCEPTION OF

VAR AND ATTITUDE TOWARDS IMPLEMENTING VAR

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In Video Assistant Referee we trust? - A quantitative study of Swedish football supporters' perception of VAR and attitude towards implementing VAR

Abstract:

In 2016, the International Football Association Board (IFAB) approved the use of Video Assistant Referee (VAR) in football. In recent years, an ongoing debate has unfolded in Sweden regarding the potential implementation of VAR in Allsvenskan. The aim of this thesis is to examine VAR and assess the fans' perceptions and attitudes towards it in Sweden. Moreover, it seeks to explore multiple influential factors that shape these opinions including fandom, openness to technology, debating in football and football consumption. Understanding these sentiments has become increasingly pivotal, particularly for preserving the success of clubs within the realm of sports marketing. To achieve this, a cross-sectional quantitative study was conducted using an online questionnaire distributed among nine Swedish football fan groups on Facebook. The collected results from 421 fans across the country revealed a variety of opinions among respondents. Notably, a significant portion expressed a negative perception and attitude towards the technology, while nearly half favored its implementation in Allsvenskan. Regarding the influential factors, fandom and debating in football had a negative impact on the dependent variables while openness to technology and football consumption had a positive impact.

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Definitions

Football: Also called soccer in the United States.

Allsvenskan: The premier professional football league in Sweden.

Perception: Explains how an individual interprets a social stimulus based on their past and present experiences and encounters (Schiff, 1970).

Attitude: Described as our "view of the world" and explains the individual´s feelings and beliefs towards an object (Campbell, 1963).

Decision-aid technology: Technology that is used to facilitate decision making.

Video Assistant Referee (VAR): Decision-aid technology that is used in football to assist referees.

PV: Perception of VAR

AV: Attitude towards implementing VAR

Contents

1. Introduction

Over the past decade, the integration of modern technology has dramatically advanced and has been implemented across various sports. Examples of decision-aid technology that is currently in use are the Decision Review System (DRS) in cricket, Television Match Official (TMO) in rugby, Hawk Eye in tennis and Video Assistant Referee (VAR) in football (Stoney & Fletcher, 2020). The purpose of these technologies is to assist referees and reduce incorrect decisions as that has become important. Despite this, there is present resistance against technology in sports, where some people think that it takes away the traditional feeling of it. Some situations where decision-aid technology has been used have also led to controversial discussions. For example, one unfortunate VAR incident that happened in late September 2023 was during the football game between Liverpool and Tottenham in England, where Liverpool's first goal by Luis Diaz got dismissed due to offside. However, Luis Diaz was actually on the right side of the offside line, and therefore the goal should have been awarded. After the game, Professional Game Match Officials Limited (PGMOL) admitted that the VAR room had made a mistake and that the responsible referees were going to be penalized (Valdés Bahri, 2023).

The aim of this thesis is to examine Swedish football supporters' perception of VAR and attitude towards implementing VAR. Recently, there has been a discussion in Sweden regarding implementing VAR in Allsvenskan, as right now, 37 out of 55 European top football leagues use the system. Some of them are the English Premier League, Serie A, Ligue 1, Danish Superliga and Eliteserien (Bryce, 2022). The Swedish football federation has an ongoing investigation regarding important factors for the system to work and to be accepted in Sweden by various stakeholders (Grefve, 2023).

Allsvenskan is one of the oldest football leagues in Europe (Allsvenskan, 2023) and is considered the premier domestic football competition in Sweden for men. With the league's rich history, it continues to attract fans both nationally and internationally. The strong and passionate fan culture has led to intense rivalries being created between clubs, both on and off the pitch. Supporters' loyalty to the clubs plays a huge role in the success of Allsvenskan and continues to influence the growth of the sport in Sweden. Right now, football accounts for almost (40%) of the sport activities in Sweden, where 600 000 are active players and 1.3 million are members of football organizations (Svensk Fotboll, 2023).

In relation to sports marketing, it is all about finding a strategic way of promoting sport-related products, events, teams, or athletes, and hence, new technological advancements like VAR have a profound impact on this landscape (Fullerton & Merz, 2008). The introduction of VAR across multiple leagues has sparked diverse opinions among fans, where some are skeptical towards it and feel like VAR "ruins football", while others are more open-minded to it. Prior to the implementation of VAR, many fans felt marginalized because the International Football Association (IFAB) did not consider the effect it would have on the supporters' personal experiences. As fans play a fundamental role in the success of football, neglecting their opinions can lead to huge losses for clubs and other stakeholders and influence the overall brand exposure, sale, and image of clubs (Alonso Dos Santos et al., 2023). Thus, understanding fans´ sentiments regarding technological advancements like VAR is crucial for preserving the success of clubs within the sphere of sports marketing.

1.1. Background

1.1.1. The International Football Association (IFAB)

The International Football Association (IFAB) was founded in 1886 and determines the Laws of the Game. The "Laws of the Game" are a set of rules to keep the game as fair and safe as possible and are annually updated and maintained. These 17 codified laws have been established to keep the "spirit" of the game alive and include everything from the number of players a team should have to whether a ball is in or out of play. With the implementation of the VAR, IFAB has made an attempt to come up with a VAR protocol that conforms to the principles and philosophy of the Laws of the Game. The core values for IFAB are "transparency, accountability and inclusivity", with the aim to develop the game for everyone involved including players, fans and game officials (IFAB, 2023).

1.1.2. Video Assistant Referee (VAR)

VAR was approved by The International Football Association Board in 2016 (IFAB, 2023) and since then, it has been a controversial topic in football around the world. The system was created to reduce the number of errors taken by the game officials, leading to an increase of justice in football (Samuel et al., 2020). One reason that made the technical innovation in football speed up was due to errors made by referees in the 2010 World Cup. After that, in 2012, Goal Line Technology (GLT) was introduced (Winand

& Fergusson, 2018). The implementation of GLT then triggered further development in technology in football, which resulted in the introduction of VAR a few years later.

1.1.3. Rules of VAR

VAR's main objective is to monitor the game from a video operating room with the use of instant replay technology to review on-field calls. By assisting the referee, they are able to find "clear and obvious errors" or "serious missed incidents" that the field referee otherwise would have had trouble identifying. The system is used in four match-changing situations during a football game: goals, penalty decisions, direct red card incidents, and mistaken identity. In these four situations, the VAR system can only be used after a decision has been made by the field referee or if the field referee missed a clear incident (IFAB, 2023).

Typically, when an incident occurs during a game that falls under VAR´s mandate, the VAR official automatically reviews the footage without interfering with the original decision made by the referee. During this process, the pitch referee will put a hold on the game until a decision has been reached. After the review, the official communicates it to the referee on the pitch, initiating and recommending that they either uphold the original call or change it. Due to the fact that the VAR system is based on the principle of "minimum interference, maximum benefit" (IFAB, 2023), it is important to note that the final decision is still held by the pitch referee, and that VAR is only there to offer insight and assistance.

1.1.4. VAR accuracy

The VAR officials have access to a total of 42 broadcast cameras, including eight that are super slow-motion and four additional ones with ultra slow-motion capabilities (FIFA, 2022). This makes it possible for them to get a detailed perspective on how a specific situation occurred and identify everything from a handball to the precise location of a physical offense.

The implementation of the new technology has led to an increase in accuracy compared to decisions made only by on-field referees. Specifically, decisions made solely by the referee resulted in an accuracy of (92.1%), whereas the utilization of VAR increased the accuracy level to (98.3%) (Spitz et al., 2021). However, even though VAR is useful for preventing obvious mistakes, it is not able to give accurate judgments at all times. For

example, during potential offsides, there is a possibility that the spatial positions of the ball or the player will be several centimeters from their true positions (Mather, 2020).

1.2. Research purpose and research questions

The aim of this thesis is to empirically study football supporters in Sweden and their perception of VAR and attitude towards implementing VAR. Football is an industry driven by emotions that results in innovations like VAR potentially affecting many stakeholders such as shareholders, players, coaches, fans and sponsors. One of the most important stakeholders is the fans where VAR can impact the supporters' satisfaction, behavior and engagement towards the sport. Therefore, considering the consumer experience is crucial because it can impact various aspects of football such as profitability, the attractiveness of the sport and personal identification with it, making it relevant for marketing. Also, the fact that it is a current debate whether to implement it in Allsvenskan or not, it is an important factor for the strategy and branding of the league and the clubs. The research questions that will be examined in this study are the following:

How do Swedish football fans perceive Video Assistant Referee (VAR)?

What are Swedish football fans' attitude towards implementing Video Assistant Referee (VAR)?

What factors can explain the perception and attitude to Video Assistant Referee (VAR)?

In more detail, the study will focus on investigating potential factors explaining football supporters' perception of VAR and attitude towards implementing VAR. The factors that will be studied are the supporters' fandom, openness to technology in sports, debating in football and football consumption.

1.3. Expected contribution

The expected contribution of this thesis is to bring different perspectives to the ongoing debate on whether or not VAR should be introduced into Swedish football, particularly within Allsvenskan. In Sweden, no extensive research has been conducted regarding Swedish football supporters' perception of VAR and attitude towards implementing VAR or the potential factors that might impact their opinions of it. Keeping fans satisfied is crucial as they directly and indirectly generate resources for the football industry (Sutton et al., 1997). Therefore, it is of importance because their engagement

and opinions are vital for the sport to grow and develop even further. Moreover, by comparing our findings with previous studies that have been conducted in other countries and leagues, our research can help provide a broader perspective and allow for a more comprehensive understanding of the situation in Sweden. Therefore, as stated above, this thesis will hopefully contribute to the ongoing investigation regarding how the implementation of VAR would be welcomed by Swedish supporters.

1.4. Delimitations

This thesis seeks to empirically examine Swedish football supporters' perception of VAR and attitudes towards implementing VAR. However, certain delimitations exist that are essential to understand. The study mainly focuses on football supporters in Sweden and Allsvenskan, resulting in the findings not being extrapolated and generalized to supporters in other countries. Additionally, despite Allsvenskan being the premier football league in Sweden, the research exclusively concentrates on supporters of teams within the league, excluding supporters of lower divisions and competitions such as Superettan and Damallsvenskan (except Helsingborg IF which was included by mistake, see Appendix C, Table C1). This exclusion is done in order to maintain the focus and analytical precision of the study. Moreover, given that the study primarily focuses on football supporters' viewpoints towards VAR, it disregards other stakeholders in the football industry such as referees, coaches and players. While the study includes intentional delimitations, these limitations exist to ensure that the research will not be too broadly scoped and allow for accurate conclusions to be drawn.

2. Literature review and theoretical foundation

In this part, based on prior research, a comprehensive review of past literature will be conducted and the different hypotheses connected to our study will be presented. The goal of this review is to address our research questions and provide insight into potential influences that shape Swedish supporters´ perception of VAR and attitude towards implementing VAR.

2.1. Previous research on sport fans

A sports fan is, according to Clarke (1973), a subjective and self-defining phenomenon, while Wann and Branscombe (1970) see a sports fan as an "individual who is interested in and follows a sport, team, and/or athlete". Hunt et al. (1999) further elaborate on this concept and mean that a fan is a consumer of organized sports and has a sense of attachment to it, which is showcased in their behavior. These fans can then be classified into five distinct sub-groups: temporary fans, local fans, devoted fans, fanatical fans and dysfunctional fans. They mean that a local fan can be formed due to geographic constraints, while a fanatical fan sees it as being part of their self-identification. Thus, sports consumers' levels of behavior and interest vary widely based on their level of commitment and engagement with a team.

2.2. Previous research on football fans' perception and attitude of VAR

This study will examine Swedish football fans´ perception and attitude of VAR and hence, it is important to distinguish the two concepts. Perception explains how an individual interprets a social stimulus based on their past and present experiences. As experiences are subjective, two people who view the same physical stimulus interpret it differently (Schiff, 1970). On the other hand, attitude is described as our "view of the world" and explains the individual´s feelings and beliefs towards an object (Campbell, 1963). This can be measured by ranking something from good to bad (Schiff, 1970).

The association between perception and attitude can be explained by the theory of reasoned action (Ajzen & Fishbein, 1980). The theory consists of two constructs which are: a certain attitude and subjective norm towards a specific behavior. These two constructs are the basis of behavioral intention and the actual behavior. Furthermore, attitude is determined as a person's beliefs about a given behavior and subjective norms

about other people's beliefs about that behavior. In this case, perception and attitude are connected in the sense that a person might have specific beliefs or perceptions about VAR and that also forms their attitude towards the implementation of it.

2.2.1. Overall perception of VAR

A study done by Scanlon et al. (2022) explored fans' opinions of VAR in the English Premier League. After collecting data from various places such as pubs, fan areas and Premier League forums online they found that fans experienced VAR as something that ruins the game due to the decisions taking too long. Fans argued that this disruption takes away the passion associated with the sport. However, this study included a sample of 100 people, which is a quite limited representation of the population. Other studies have also shown that the amount of playing time in the first and second half increased significantly with the implementation of VAR, breaking the match flow and slowing down the tempo (Nlandu, 2012; Svantesson, 2014).

Furthermore, Petersen-Wagner and Lee Ludvigsen (2023) explored online community satisfaction with technology during the 2018 FIFA Men's World Cup. After examining 30 games and collecting over 300.000 comments from fan interactions on Youtube, they found that fans overall perceived VAR to be unjust and expressed dissatisfaction with both its use and its implementation. Moreover, fans expressed the need for errors and mistakes to be part of the game, as it keeps the authenticity of football culture alive.

Moreover, the objective of Kolbinger and Knopps (2020) study was to explore fans´ perceptions of VAR in the English Premier League. After developing a new approach for automated text classification and a variation of a gradient boosting algorithm, they were able to collect over 600.000 tweets over 129 games during the 19/20 EPL season. The study showed that VAR is predominantly creating negative sentiment among fans and that the negative tweets increased in relation to VAR as several correct on-field decisions were overruled.

In the same research by Scanlon et al. (2022) as mentioned above, they also found that supporters thought that football is less satisfying to watch inside the arena when VAR is used and has a negative impact on the game-day atmosphere. One reason for the diminishing enjoyment was that supporters perceived VAR decisions to lack communication between the game officials and the fans inside the stadium. Another study made by Van Den Berg and Surujlal (2020) also pointed towards fans dissatisfaction with VAR decisions' transparency inside the stadium. They conducted a qualitative method with the use of semi-structured interviews with South African soccer

supporters and found that fans wanted changes in their availability to hear and view the VAR decisions inside the stadium.

However, there are also fans who have positive perceptions of VAR as shown in the study by Hamsund and Scelles (2021). After conducting a survey with 1353 respondents, their study showed that the majority of the fans were satisfied with the use of the new technology as it made the game more fair and interesting. Moreover, they also expressed the need for certain adjustments being made in order to enhance the overall game experience. To ensure the continued adoption of VAR, the fans advocated for greater transparency in decision-making and the implementation of stricter rules for on-field referees.

Furthermore, Zhang et al. (2022) conducted a sample of 52 matches during the FIFA Women's World Cup, both before the implementation of VAR in 2015 and after in 2019. They were able to collect data on 10 variables: first half playing time, second half playing time, total playing time, penalties, offsides, fouls, goals, corner kicks, yellow cards, and red cards. These variables were then compared using a Bayesian analysis. One of the variables showed that the time added to a match compared to when VAR is not used was only two minutes in total, indicating that the technology does not lengthen the overall game time that much. Moreover, studies have shown that after the insertion of VAR, the number of yellow cards and fouls were significantly reduced in national championships such as the Bundesliga and Serie A. This was because players were less prone to being aggressive when the VAR technology was used (Carlos et al., 2019).

2.2.2. Fans' perception of technology in other sports

The Hawk-Eye system is widely used in the sport of Tennis, a sport that is known to be resistant to change and very traditional. However, in an article written by Uzoma (2023), she explained that the system has improved fan involvement during major tournaments. For example, the dramatic scenes that are shown on the screens in the stadium have made many fans excited, increasing their enjoyment of the sport. Moreover, in Rugby, The Television Match Official (TMO) is used and similar to VAR in football, TMO negatively affects the consumer experience as well. Stoney and Fletcher (2020) investigated rugby supporters globally using an online questionnaire to assess their experience with the use of TMO. The findings showed that fans were unhappy with the transparency of the decisions inside the arena and would like to hear the conversation between the referee and TMO officials as done on TV.

2.2.3. Swedish football fans' attitude towards implementing VAR in Sweden

As previously stated, there is an ongoing investigation about whether to implement VAR in Allsvenskan or not. For example, in an inquiry made by Sportbladet, nine Swedish football clubs in Sweden strongly opposed the implementation of VAR (Björklin, 2023), while an investigation by SVT showed that (84%) of the Swedish referees wanted it to be implemented (Grefve, 2023). The football clubs in Allsvenskan that were strongly against the implementation of VAR argued that the system does not live up to the principle of "minimum interference, maximum benefit" (Valdés Bahri, 2022). They believed that the price of the system is too expensive and that the crowds' experience will be negatively affected. Whereas, the referees' view was that their mission is to be as fair as possible and that VAR contributes to the fairness of the game.

However, there is a claim that the supporters have massive resistance towards VAR in Allsvenskan. Isak Edén, the chairman of "Svenska Fotbollssupporterunionen", argues that the resistance from the supporter movement is extensive, especially in the stands. On the contrary, Novus did an examination of Swedish people who are interested in football and their opinions of VAR and found that (64%) wanted VAR in Allsvenskan (Grefve, 2023). Additionally, in late November 2023, SvFF claimed that they had interviewed 800 Swedish people who are interested in football and that (71%) were positive to VAR and (62%) wanted it in Swedish elite football (Bachner, 2023). However, the above mentioned articles are not journal articles and thus, they are not scientifically approved and lack credibility.

2.3. Possible factors explaining fans opinions of VAR

2.3.1. Fandom

Fandom is commonly used as a variable in different studies and is considered to be in line with the social identity theory, a theory that is seen as one of the most influential and generative social psychological theories of the twentieth century (Hodson & Earle, 2017). The theory outlines one´s sense of connection to other people in their in-group, which affects how they define themselves and behave. Therefore, in relation to sports, social identity theory can be explained as one person's feeling of identification with their favorite team (Tajfel.H & Turner, 1985). For example, in one study by Crisp et al. (2007) that investigated emotional reactions by football fans in relation to their team's outcome of a game, it was found that a higher in-group identification with your team was associated with negative actions towards the out-group. In contrast, lower in-group

identification was instead linked with sadness and avoidance after a loss of a game. Previous studies also indicated that fans who strongly identify with a specific sports team show more involvement, invest more time and have more positive expectations for the future success of the team relative to those with moderate or low identification with a sports team (Branscombe & Wann, 1991).

Furthermore, research done by Winand and Fergusson (2018) showed after collecting 313 online questionnaires, that football supporters' identification with their favorite team did not change due to the implementation of Goal Line Technology (GLT). However, opposition was noted for fans who highly identified with their team regarding further technological developments in football connected to offside and penalty decisions.

2.3.2. Openness to technology in sports

The introduction of technology in sports, especially in football, has been met by a lot of criticism. One typical argument for technological opponents in sports is that decision-aid technologies take away the spirit of the game.

Winand et al. (2021) examined differences between supporters from England and Germany and their satisfaction with VAR by using an online questionnaire. They looked at fan identification, VAR satisfaction, enjoyment from debate and decision-aid technology in sports. Particularly, the investigation about supporters' perceptions of decision-aid technology in sports found that supporters who generally support technology in sports were more positive to VAR. Furthermore, the results also showed that those with higher levels of team identification supported new technology more than those with lower levels of team identification.

Additionally, age could also have an effect on how adaptable you are as a person to new innovations. As Yim et al. (2021) pointed out, younger generations are generally more open to and prefer technology in sports compared to the older generation. In the same study as mentioned before by Hamsund and Scelles (2021) also investigated if age had an impact on the fan´s perception. They found that younger people were more willing to accept VAR while older people were more reluctant.

2.3.3. Debating in football

Debating in football is considered vital because VAR might hinder the possibility of having discussions about a specific game situation. According to the argumentative

theory, humans want to exchange thoughts, opinions and arguments with other people (Mercier, 2016). The theory posits that the purpose of reasoning is to engage in persuasive argumentation with others in different social contexts.

The study by Winand et al. (2021) that was mentioned before investigated fans' enjoyment from debate in different game events and found that fans liked to discuss controversial decisions made by referees. Connected to team identification, supporters who felt highly identified with their team found it more exciting to discuss and argue for their team's advantage. As the implementation of VAR would decrease discussions about controversial decisions in football games, highly identified fans might favor VAR less.

2.3.4. Football consumption

Football consumption is taken into consideration due to the belief that it might have an impact on supporters' perception of VAR.

Trail and James (2001) explain sport consumption as the investment that a supporter makes in different activities associated with the sport or a team. One study by Stander et al. (2016) on 806 football fans from the South African premier football league examined the relationship between their engagement and motivation for sports consumption. They conducted a quantitative method with a questionnaire and found that both game related and personal motivational factors were linked to the ability to predict fan engagement in sport consumption. However, one might also anticipate that the level of football consumption can have an impact on how you perceive VAR as a supporter.

2.4. Generation of hypotheses

2.4.1. Dependent variables

This thesis consists of two dependent variables that are going to be examined. The first dependent variable is perception of VAR and the second dependent variable is attitude towards implementing VAR. In the thesis, from now on, perception of VAR will be abbreviated to "PV" and attitude towards implementing VAR will be abbreviated to "AV".

2.4.2. Independent variables

The thesis comprises four independent variables: fandom, openness to technology in sports, debating in football and football consumption.

2.4.3. Hypotheses

The generation of hypotheses is constructed based on the literature review and theoretical foundation. In respect to the theory of reasoned action (Ajzen & Fishbein, 1980), regarding the connection between perception and attitude as previously stated, the hypotheses connected to attitude will follow the same pattern as the hypotheses connected to perception.

Firstly, two hypotheses are composed from the independent variable fandom and how it impacts the PV and the AV. Taking the social identity theory into consideration, if a fan highly identifies with their favorite team, one can argue that they should also be affected by their favorite team's outcome of a VAR decision. Furthermore, findings from the literature review in Chapter 2.3.1 pointed out that fans who felt highly identified with their team were in opposition to further technological development in football, especially in relation to offside and penalty decisions which are currently in the mandate of VAR. This shows that fandom plays a big role in football supporters' perception of various aspects connected to the sport and could be a potential factor in how fans perceive VAR and therefore, the following hypotheses are generated:

> **H1a:** Fandom will have a negative impact on the general perception of VAR.
>
> **H1b:** Fandom will have a negative impact on the attitude towards implementing VAR.

Secondly, two hypotheses are created from the independent variable openness to technology in sports and how it impacts the PV and the AV. By looking at previous studies from the literature review in Chapter 2.3.2, there was a clear connection between general openness to technology in sports and a positive PV. Hence, the following hypotheses are generated:

> **H2a:** Openness to technology in sports will have a positive impact on the general perception of VAR.
>
> **H2b:** Openness to technology in sports will have a positive impact on the attitude towards implementing VAR.

Furthermore, two hypotheses are constructed from the independent variable debating in football and how that impacts the PV and the AV. Considering the findings in the

literature review and theoretical foundation in Chapter 2.3.3, fans do like to discuss different events and situations connected to a football match and especially if these are controversial referee decisions. Because people like to engage in persuasive argumentation according to the argumentative theory, the following hypotheses are generated:

> **H3b:** Debating in football will have a negative impact on the general perception of VAR.
>
> **H3b:** Debating in football will have a negative impact on the attitude towards implementing VAR.

Relating to the independent variable football consumption and its effect on the PV and the AV, two hypotheses are created. Based on the literature review in Chapter 2.3.4, a football fan's sport consumption is dependent on both game related and personal motivational factors. Given that VAR is considered a game related factor capable of impacting the consumer experience, it is inherently linked to football consumption. If supporters have a high level of football consumption, they might also be more exposed to VAR and more familiar with its presence, and thereby have a greater knowledge of the system. Therefore, it is reasonable to hypothesize the following:

> **H4a:** Consumption of football will have a positive impact on the general perception of VAR.
>
> **H4b:** Consumption of football will have a positive impact on the attitude towards implementing VAR.

Lastly, one hypothesis is created in relation to the second dependent variable AV and the first dependent variable PV. Based on the literature review and the theory of reasoned action (Ajzen & Fishbein, 1980), one can anticipate that fans that are overall positive to VAR will also have a positive attitude towards implementing it in Allsvenskan. Therefore, the following hypothesis is generated:

> **H5:** General perception towards VAR will be positively correlated with attitude towards implementing VAR.

2.4.4. Overview of variables

Figure 1 illustrates the impact that the independent variables are expected to have on the dependent variables. Two of the independent variables: fandom and debating in football are hypothesized to have a negative impact on the dependent variables, while the other two: openness to technology in sports and football consumption are expected to have a positive impact. Moreover, the figure illustrates that the relationship between PV and AV is expected to be positively correlated.
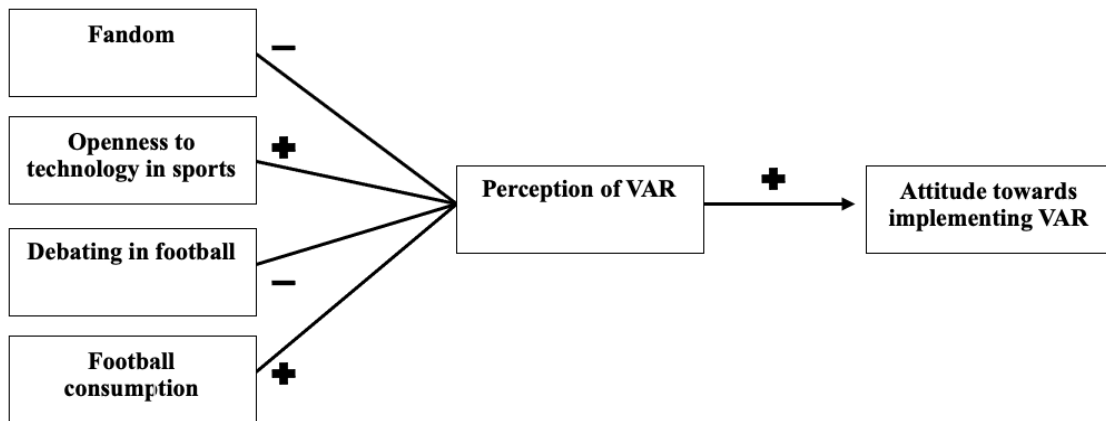

Figure 1: Illustration of the four independent variables and the two dependent variables. Two are expected to be positively correlated while two are expected to be negatively correlated.

3. Methodology

The aim of the thesis is to empirically study Swedish football supporters' perception of VAR and attitude towards implementing VAR. In this part, the following will be presented: Scientific approach and research design, preparatory studies, main study and lastly, data collection and statistical methods.

3.1. Scientific approach and research design

This thesis is grounded in previous research and studies conducted in sports marketing, fandom and technology in sports. A deductive approach was used as the theories formed the basis for generation of hypotheses and further gathering of data (Bell et al., 2022).

Because the purpose of this thesis is to investigate what factors influence Swedish football fans' PV and AV, the intended research design followed a cross-sectional quantitative method. The collection of data was conducted at a single point in time with multiple variables being examined simultaneously in order to investigate relationships between them. Furthermore, the research questions were examined using an online self-completion questionnaire and the data was collected from different football supporters across Sweden. The sample is seen as a heterogeneous group as it is taken from the whole country, and according to Bell et al. (2022), the represented population should be varied.

A qualitative method could have been another way of conducting this study, utilizing interviews to capture different perceptions and opinions of VAR with flexibility in the answers. However, the method was not chosen due to the thesis's purpose[1].

3.2. Preparatory studies

To gain a deeper understanding of the thesis's subject and existing PV in Sweden, preparatory interviews (pre-study 1) were made with nine selected football fans, see Appendix A, Table A1. The conclusions from the interviews were that the respondents had mixed opinions about VAR. However, the respondents agreed that it increases the justice of the game as referee mistakes are reduced but that it interrupts the traditional flow of the game. The insights from the interviews were then used for the creation of the questionnaire draft.

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[1] A qualitative method was not chosen due to time constraints and the need to collect a large amount of data.

Furthermore, a second preparatory study (pre-study 2) was made by sending out the questionnaire draft to ten selected people, see Appendix A, Table A2. The respondents were encouraged and asked to record the time to complete the survey, provide feedback regarding the clarity of the instructions and questions and how they experienced the design of the survey. The main conclusion from this preparatory study was that the respondents experienced the survey to be too long and extensive. Hence, the insights from the pilot test of the questionnaire were valuable in order to make final adjustments before making the survey public for everyone, and thereby increasing the quality assurance of it.

3.3. Main study

3.3.1. Survey

The survey was created with the program Qualtrics as an anonymous questionnaire. The survey comprised 10 blocks and 23 questions[2] (excluding introduction and GDPR), see Figure 2. The blocks were the following: 1) Favorite team, 2) Football consumption, 3) Open question about VAR, 4) Perception of VAR, 5) Fandom scale, 6) Decision-aid technology in sports, 7) Debating in football, 8) Attitude towards implementing VAR, 9) Demographics, 10) Evaluation of survey. The complete survey can be found in Appendix G.

In the blocks 4 and 10, two attention check questions were included. By excluding the responses from respondents that did not correctly answer the control questions, the statistical power of the data could be argued to have been enhanced (Oppenheimer et al., 2009). Furthermore, seven questions involved multiple statements and all of these statements were randomized to prevent any bias, except the question about the evaluation of the survey.

In the introduction, the subject and the estimated time to complete the survey were presented. It was also stated that a donation of 1 SEK will be made to Barncancerfonden for every respondent. Contact information was provided and that all the answers will be anonymous and treated confidentially according to GDPR. The respondents were then provided with GDPR information and had to consent to continue the survey.

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[2] One of the questions that were supposed to measure football consumption was excluded in the analysis. This was because the respondents that answered that they did not have a favorite team in Allsvenskan jumped directly to another question.

The survey was constructed in Swedish because the targeted respondents were Swedish football fans. This choice was made because of the risk that the survey could be misinterpreted by the respondents if it instead was constructed in English. However, it is also a risk to interpret the answers wrongly when translating it from Swedish to English. The survey was open for respondents from October 22, 2023, until November 5, 2023.
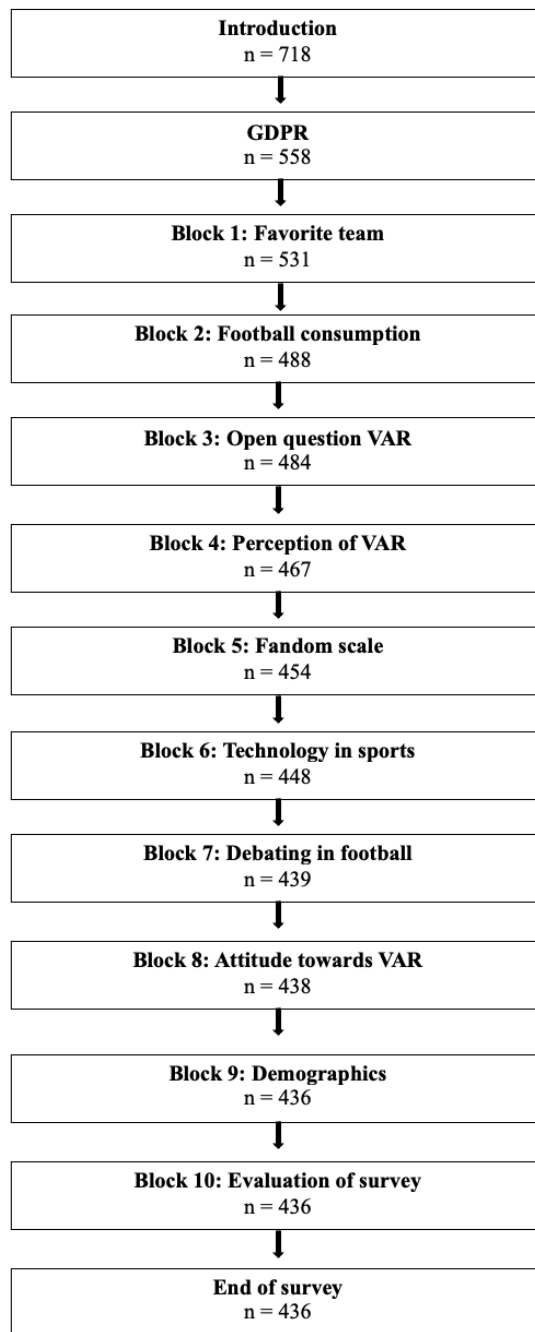
3.3.2. Survey flow

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┌─────────────────────────────────┐
│         Introduction            │
│           n = 718               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│            GDPR                 │
│           n = 558               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│      Block 1: Favorite team     │
│           n = 531               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│   Block 2: Football consumption │
│           n = 488               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│    Block 3: Open question VAR   │
│           n = 484               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│    Block 4: Perception of VAR   │
│           n = 467               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│      Block 5: Fandom scale      │
│           n = 454               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│   Block 6: Technology in sports │
│           n = 448               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│   Block 7: Debating in football │
│           n = 439               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│  Block 8: Attitude towards VAR  │
│           n = 438               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│     Block 9: Demographics       │
│           n = 436               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│  Block 10: Evaluation of survey │
│           n = 436               │
└─────────────────────────────────┘
                │
┌─────────────────────────────────┐
│        End of survey            │
│           n = 436               │
└─────────────────────────────────┘
```

Figure 2: Survey flow of the different blocks illustrated.

3.3.3. Variables

The indexed dependent- and independent variables were measured with various closed questions using three different 7-point Likert scales. The first scale ranged from: "Do absolutely not agree" (1) to "Do absolutely agree" (7). The second scale ranged from: "Very bad" (1) to "Very good" (7). And the third scale ranged from: "Very negative" (1) to "Very positive" (7). See Appendix B, Table B1 and Table B2 for details about the different questions.

Indexed dependent variables

Perception of VAR. This dependent variable was created to assess Swedish football supporters' PV and was measured through two questions. The first question consisted of five positively associated items with VAR, while the second question consisted of five negatively associated items with VAR. These ten statements were inspired from the preparatory interviews with football fans. A Cronbach's Alpha of 0.94 was assessed from the ten statements which indicates an excellent internal consistency (Glen, 2023), see Table 2.

Attitude towards implementing VAR. This dependent variable was constructed to measure Swedish football fans' AV. The indexed variable was created with three different questions. A Cronbahcs Alpha of 0.85 was assessed from the three questions which indicates a good internal consistency (Glen, 2023), see Table 2.

Indexed independent variables

Fandom. The first independent variable fandom was created to examine how it impacts Swedish football fans' PV and AV. The already established Psychological Continuum Model, PCM, was used which consists of three different constructs: pleasure, centrality and sign (Funk & James, 2001). With each construct, it follows three statements, making it nine statements in total. A Cronbach's Alpha of 0.85 was assessed from the nine statements which indicates a good internal consistency (Glen, 2023), see Table 2. One study by Pu and James (2017) on National Basketball Association fans used the PCM and generated a Cronbach's Alpha of 0.84, 0.87 and 0.74 respectively for the three constructs.

Openness to technology in sports. This independent variable was constructed to measure how openness to technology in sports affects Swedish football fans' PV and AV. The creation of this variable was inspired by the study of Winand et al. (2021). However, the term "I" was eliminated, making the statements more consistent with each

23

other. The variable was indexed using the four statements. A Cronbach's Alpha of 0.86 was assessed which indicates a good internal consistency (Glen, 2023), see Table 2. From the study by Winand et al. (2021), a Cronbach's Alpha of 0.76 was generated.

Debating in football. This independent variable was constructed to assess enjoyment from debate and how that affects Swedish football fans' PV and AV. The indexed variable was also inspired by the study of Winand et al. (2021) using six statements. However, one of the statements was substituted with another statement that fit this study better. This was "Debating whether a penalty was awarded correctly is fun". Furthermore, the term "I" was also eliminated to make the statements more consistent. A Cronbach's Alpha of 0.86 was assessed which indicates a good internal consistency (Glen, 2023), see Table 2. In the study by Winand et al. (2021) a Cronbach's Alpha of 0.89 was generated.

Football consumption. This independent variable was constructed to investigate how football consumption impacts Swedish football fans' PV and AV. This variable includes one question with six statements[3]. A Cronbach's Alpha of 0.74 was assessed which indicates an acceptable internal consistency (Glen, 2023), see Table 2.

Other variables

Open question VAR. This variable was used to provide an open question to the respondents where they were encouraged to express what they think about VAR in general. The purpose for the allowance of comments was to capture flexible answers of PV that were not thought about in advance.

Consequences and opinions of implementing VAR in Allsvenskan. The respondents´ beliefs of consequences of implementing VAR in Allsvenskan were assessed using a list of twelve possible consequences. Furthermore, the respondents were asked directly if they think that VAR should be implemented in Allsvenskan, with the opportunity to write a comment as well. The reason for including these questions was to get an understanding of how Allsvenskan might be affected by a potential implementation from the fans' point of view.

Demographics. This variable consisted of three different questions that assessed age, gender and occupation. It was used to investigate whether any demographic factors would have an impact on the dependent variables. Descriptive statistics can be found in Chapter 3.4.1.

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[3] The inspiration was taken from a Bachelor thesis by Brännström and Leijonhufvud (2023).

3.4. Data collection and statistical methods

3.4.1. Data collection

The questionnaire was distributed to different Allsvenskan football fan groups on Facebook. Before the publication, messages to the admins of the Facebook groups were sent out to get consent for the publication, see Appendix C. However, permission was not confirmed from all the teams in Allsvenskan and therefore the results do not cover all respective teams in the league. The questionnaire was then posted together with a message with information about the survey, see Appendix C.

As shown in Table 1, there were eight different football teams in total represented in the questionnaire, as they gave consent for publication.

Table 1: Distribution of respondents teamwise.

Teams	Total: n = 421	Percentage = 100%
Malmö FF	57	13.4%
IFK Norrköping	27	6.4%
Helsingborgs IF	82	19.5%
Halmstads BK	35	8.3%
Djurgården	155	36.8%
Degerfors IF	62	14.7%
Other	3	0.7%

Note: "Other" include BK Häcken and Varbergs BoIS.

Other descriptive statistics of the respondents regarding age and occupation can be found in Appendix D. The survey showed uneven gender representation, with approximately (86%) of the respondents being men and (14%) women. The respondents´ ages ranged from 16 to 85 years, where the average age was 46 years old. The majority of the supporters classified themselves as "working".

3.4.2. Data quality

The total number of respondents that began the survey was 718 people, while it was 436 people that completed the whole survey. Out of these 436 people, 15 respondents answered the control questions incorrectly. Thus, the final sample consisted of 421 respondents that both completed the whole survey and answered the control questions correctly.

3.4.3. Data analysis

The data from the questionnaire was firstly exported to Microsoft Excel to make adjustments in the data set. The adjustments included: eliminating unqualified data, changing some text to numbers and revising some of the 7-point Likert scales so all followed the same range. After this, the cleansed data set was exported to the statistical program R.

Furthermore in R, statistical tests were performed to measure means, standard deviations and medians as well as Cronbach's Alphas, correlations, multicollinearity, t-tests, multiple linear regressions and segmentations. Several multiple linear regressions were made based on the whole sample and different segmentations. The open questions were analyzed by examining patterns in the data to assign different categories and thereby, perform a thematic analysis (Crosley, 2021).

3.4.4. Reliability and validity

Reliability and validity are two important concepts to ensure that a quantitative research meets its quality criteria (Bell et al., 2022). Below it is stated how each of these two concepts is treated in this study.

Reliability. The concept of reliability refers to if the measurements of a study are consistent and that the results would be the same if the study was repeated (Bell et al., 2022). In this study, internal consistency with the use of Cronbach's Alpha was measured to meet the quality criteria of reliability. Cronbach's Alpha is computed between the values 0 and 1 and a rule of thumb is that the measure should be above 0.7 to be accepted (i.e. 0 indicates no internal consistency whereas 1 indicates perfect internal consistency). Therefore, as previously stated in Chapter 3.3.3, multiple statements or questions were used to index the dependent- and independent variables. All the variables then received a Cronbach's Alpha ranging from 0 to 1. As shown in Table 2, all the indexed variables have a Cronbach's Alpha above 0.7 which indicates that they are all over the acceptable level of internal consistency.

Table 2: Summary of the Cronbach's Alpha, number of items, mean and standard deviation for all the indexed variables.

Variable	Cronbach's Alpha	Number of items	M	SD
Perception of VAR	0.94	10	3.47	1.67
Attitude towards implementing VAR	0.85	3	3.86	1.92
Fandom	0.85	9	5.45	0.96
Openness to technology in sports	0.86	4	5.13	1.38
Debating in football	0.86	6	4.29	1.39
Football consumption	0.74	6	5.09	1.24

Validity. The concept of validity refers to if the study really measures what it is supposed to measure (Bell et al., 2022). In this study, the questions were properly formulated, with the help of feedback gained from pre-study 2, to reduce the risk of misinterpretation and ensure construct validity. Also, the definition of VAR was described in the survey to assure that the respondents understood it and could answer the questions adequately. Moreover, external validity refers to the extent the findings of a study can be generalized to a broader population and beyond the context of the study. In this study, the sample size is considered large and from different parts of Sweden and therefore, it complies with external validity.

3.4.5. Survey evaluation

A final block including four statements with a 7-point Likert scale were used at the end of the survey to further assess validity. Three of the statements assessed how the respondents experienced the survey and the fourth statement assessed to what extent the respondents understood what the survey was about. The results can be found in Table 3.

Table 3: Summary of the mean, median and standard deviation for all the statements in the survey evaluation.

Question	M	SD	Median
The questions were clearly formulated	6.16	1.01	6.00
The answer alternatives were clearly formulated	6.18	1.05	6.00
The survey was neutral and did not affect my answers in any direction	6.29	1.28	7.00
This study was about VAR in football	6.73	0.54	7.00

Note: 7-point Likert scale: "Do absolutely not agree" (1) to "Do absolutely agree" (7). Respondents that answered less than "Agree to some extent" (5) on the control question: "This study was about VAR in football" were excluded.

4. Results and analysis

The aim of the thesis is to empirically study Swedish football supporters' perception of VAR and attitude towards implementing VAR. This part will present the results from the study with an overview of the study respondents, their perspectives and opinions regarding VAR, and the empirical evidence concerning the hypotheses. Lastly other observations that emerged during the study are presented.

4.1. Descriptive statistics

4.1.1. Perception of VAR and Attitude towards implementing VAR

Below, the results of the respondents' PV and AV are presented. Figure 3 and 4 shows a frequency diagram displaying respondents´ PV and AV, using a 7-point Likert scale. The figures show that a higher proportion of the respondents expressed a negative PV compared to AV.
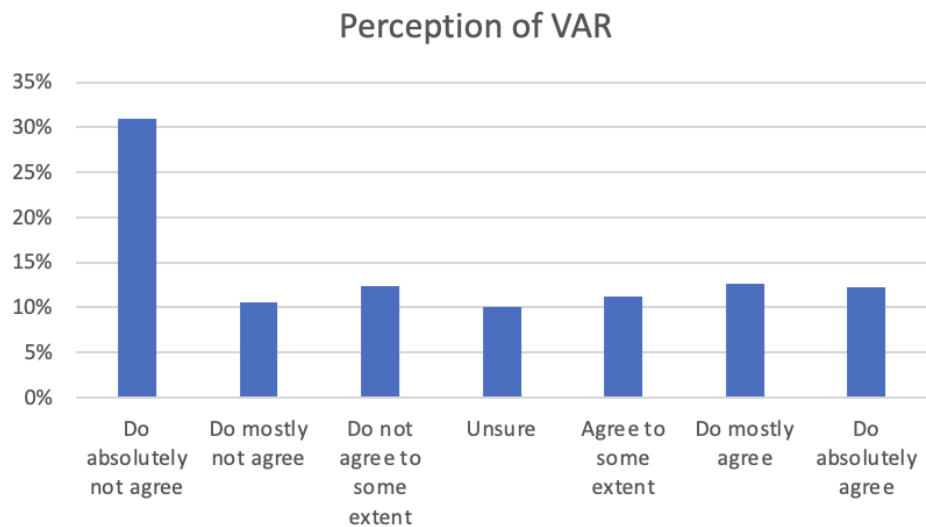
Figure 3: Frequency diagram regarding the respondents Perception of VAR. 7-point Likert scale: "Do absolutely not agree" (1) to "Do absolutely agree" (7).

Attitude towards implementing VAR
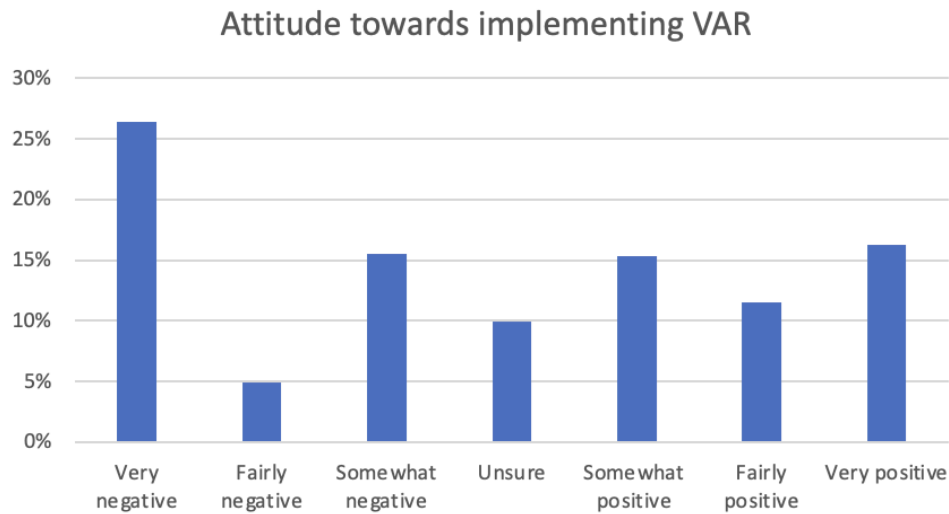
Figure 4: Frequency diagram regarding respondents Attitude towards implementing VAR. 7-point Likert scale: "Very negative" (1) to "Very positive" (7).

To analyse this further, boxplots are illustrated in Figure 5 to display the respondents PV and AV, with the median marking the average value of the responses. The median value for respondents PV (Mdn = 3.4) was slightly lower than the respondents AV (Mdn = 3.7). Moreover, the data for the respondents PV exhibited less dispersion between each sample compared to their AV with a standard deviation of (SD = 1.7) and (SD = 1.9) respectively.
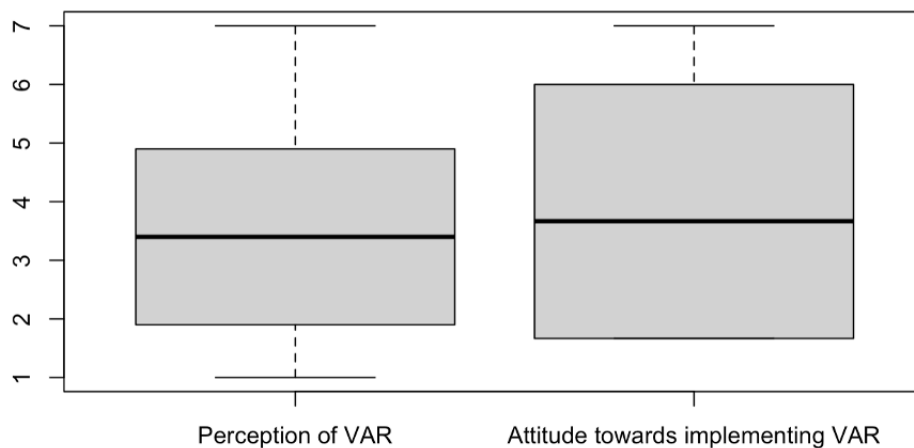
Figure 5: Data presented in two boxplots regarding Perception of VAR and Attitude towards implementing VAR. 7-point Likert scale used for "Perception of VAR": "Do absolutely not agree" (1) to "Do absolutely agree" (7). 7-point Likert scale used for "Attitude towards implementing VAR": "Very bad" (1) to "Very good" (7) and "Very negative" (1) to "Very positive" (7).

4.1.2. Opinions of VAR Implementation

Furthermore, respondents were asked whether they think that VAR should be implemented in Allsvenskan or not. The results showed that (47.3%) wanted it to be implemented, (47.7%) did not want it to be implemented and (5.0%) did not know. This indicates a split among Swedish football supporters regarding the use of the technology. Table 4 shows the means and standard deviations for the dependent- and independent variables for the respondents that answered "yes" and for the respondents that answered "no". The respondents that answered "no" scored a lower value on PV and AV and a higher value on fandom compared to those that answered "yes". Notably, the respondents that answered "no" consisted of (89%) men and (11%) women. Additionally, (67%) that answered "yes" were 46 years old or older, while (65%) of those that answered "no" were younger than 46 years old.

Table 4: Means and standard deviations for the dependent- and independent variables segmented by answering yes or no regarding VAR implementation in Allsvenskan.

VAR implementation in Allsvenskan	Yes (n = 199) M (SD)	No (n = 201) M (SD)
Perception of VAR	4.98^A (0.93)	1.95^B (0.62)
Attitude towards implementing VAR	5.61^A (0.89)	2.06^B (0.72)
Fandom	5.17^A (1.13)	5.72^B (0.94)
Openness to technology in sports	6.16^A (0.60)	4.08^B (1.16)
Debating in football	3.99^A (1.39)	4.62^B (1.37)
Football consumption	5.38^A (1.11)	4.78^B (1.32)

Note: Means in a row with different subscripted letters are statistically significantly different at $p < 0.05$, as indicated by t-tests. Means in a row with identical subscripts are not statistically significantly different.

Recall that the respondents also answered a question about what they think would happen if VAR was implemented in Allsvenskan. In Table 5, the responses are summarized. The results showed that supporters anticipated too many interruptions during football games and nearly as many believed that referees would make fewer mistakes. Few respondents thought that the introduction of VAR would lead to more excitement in games, but rather they believed that it would make games less enjoyable.

Table 5: Data about the respondents' beliefs about different consequences that would occur if VAR was implemented in Allsvenskan.

Consequences	n = 1427	Percentage = 100%
Too many interruptions during football games	257	18.0%
Fewer referee mistakes	250	17.5%
Football will become less enjoyable	186	13.0%
Fairer football games	183	12.8%
Financial impact on football clubs	115	8.1%
The big football clubs' advantage to win games will decrease	108	7.6%
The referees will be even more questioned	101	7.1%
More expensive tickets	78	5.5%
Home team advantage decreases	74	5.2%
The odds on football will change	32	2.2%
Other	25	1.8%
More exciting games	18	1.3%

Note: The respondents could choose multiple alternatives and therefore the number of answers is 1427. "Other" included answers such as: "referees will become worse", "the culture in the stands will become worse" and "referees will not be questioned to the same extent".

4.2. Testing of hypotheses

To test the different hypotheses, correlation matrix and multi-linear regressions were performed.

4.2.1. Correlation matrix

Table 6 shows that PV and AV had a high positive correlation coefficient of r (419) = 0.90, $p < 0.001$. Thereby, they also followed the same pattern with the correlations with the independent variables. Furthermore, when looking at the correlation between the independent variables, openness to technology in sports and football consumption had a positive correlation coefficient, similar to fandom and debating in football. All the values except two were significant with a p-value of ($p < 0.001$).

Table 6: Mean, standard deviation and correlation matrix for the dependent- and independent variables.

	M	SD	1	2	3	4	5	6
1. Perception of VAR	3.47	1.67						
2. Attitude towards implementing VAR	3.86	1.92	0.9***					
3. Fandom	5.45	0.96	-0.26***	-0.28***				
4. Openness to technology in sports	5.13	1.38	0.78***	0.76***	-0.2***			
5. Debating in football	4.29	1.39	-0.28***	-0.27***	0.18***	-0.19***		
6. Football consumption	5.09	1.24	0.25***	0.26***	-0.04	0.26***	0.02	

Note: P-value that is <0.05 indicates that a variable is significant. The significant p-values are marked with: *p<0.05, **p<0.01, ***p<0.001. Tests for multicollinearity was performed and no or very little multicollinearity between the independent variables was shown, and therefore it is not considered a problem.

Table 6 shows that the correlation between PV and AV had a positive significant correlation coefficient and thus, empirical evidence exists for the hypothesis H5. See Table 8 for a summary of the hypotheses.

4.2.2. Regressions

To examine the linear relationship between the dependent- and independent variables, the following regressions were made:

Perception of VAR = β_0 + β_1(Fandom) + β_2(Openness to technology in sports) + β_3(Debating in football) + β_4(Football consumption) + μ (1)

Attitude towards implementing VAR = β_0 + β_1(Fandom) + β_2(Openness to technology in sports) + β_3(Debating in football) + β_4(Football consumption) + μ (2)

Table 7 shows the components of the regressions and how the independent variables impact the dependent variables. Openness to technology in sports and football consumption had a positive impact on the dependent variables while fandom and debating in football had a negative impact. The most prominent factor was openness to technology in sports for both the models. All independent variables had a p-value ($p <$ 0.05), meaning that their effect on the dependent variables are statistically significant.

Table 7: Statistics of the multi-linear regressions showing unstandardized beta coefficients and standard deviations in parentheses.

	Dependent variable:	
	Perception of VAR (1)	Attitude towards implementing VAR (2)
Fandom	-0.15***	-0.21***
	(0.05)	(0.06)
Openness to technology in sports	0.88***	0.96***
	(0.04)	(0.05)
Debating in football	-0.15***	-0.17***
	(0.04)	(0.04)
Football consumption	0.08*	0.13***
	(0.04)	(0.05)
Intercept	-0.01	0.15
	(0.41)	(0.49)
Observations	421	421
R^2	0.64	0.61
Adjusted R^2	0.64	0.61
Residual Std. Error (df = 416)	1.01	1.20
F Statistic (df = 4; 416)	184.93***	163.19***

Note: *p<0.05, **p<0.01, ***p<0.001. Regressions were made without Helsingborg IF to test if there would be any difference in the results and no difference were found. Therefore, Helsingborg IF was included in the models.

Consistent with the hypothesis H1a, fandom had a negative impact on PV with an unstandardized beta coefficient of β = -0.15 and a p-value of ($p < 0.001$). This means that it was statistically significant and thus, empirical evidence exists for the hypothesis H1a.

The results regarding fandom and its effect on AV showed that the unstandardized beta coefficient was β = -0.21 and statistically significant ($p < 0.001$). This means that fandom had a negative impact on AV and thus, empirical evidence exists for the hypothesis H1b.

The results regarding openness to technology in sports and its effect on PV showed that the unstandardized beta coefficient was β = 0.88 and statistically significant ($p < 0.001$). This means that openness to technology in sports had a positive impact on PV and thus, empirical evidence exists for the hypothesis H2a.

The results regarding openness to technology in sports and its effect on AV showed that the unstandardized beta coefficient was β = 0.96 and statistically significant ($p < 0.001$).

This means that openness to technology in sports had a positive impact on AV and thus, empirical evidence exists for the hypothesis H2b.

The results regarding debating in football and its effect on PV showed that the unstandardized beta coefficient was $\beta = -0.15$ and statistically significant ($p < 0.001$). This means that debating in football had a negative impact on PV and thus, empirical evidence exists for the hypothesis H3a.

The results regarding debating in football and its effect on AV showed that the unstandardized beta coefficient was $\beta = -0.17$ and statistically significant ($p < 0.001$). This means that debating in football had a negative impact on AV and thus, empirical evidence exists for the hypothesis H3b.

The results regarding football consumption and its effect on PV showed that the unstandardized beta coefficient was $\beta = 0.08$ and statistically significant ($p < 0.05$). This means that football consumption had a positive impact on PV and thus, empirical evidence exists for the hypothesis H4a.

The results regarding football consumption and its effect on AV showed that the unstandardized beta coefficient was $\beta = 0.13$ and statistically significant ($p < 0.001$). This means that football consumption had a positive impact on AV and thus, empirical evidence exists for the hypothesis H4b.

A summary of the different hypotheses and whether they are supported or not is demonstrated in Table 8.

Table 8: Summary of hypotheses.

H1a	Fandom will have a negative impact on the general perception of VAR.	**Supported**
H1b	Fandom will have a negative impact on the attitude towards implementing VAR.	**Supported**
H2a	Openness to technology in sports will have a positive impact on the general perception of VAR.	**Supported**
H2b	Openness to technology in sports will have a positive impact on the attitude towards implementing VAR.	**Supported**
H3a	Debating in football will have a negative impact on the general perception of VAR.	**Supported**
H3b	Debating in football will have a negative impact on the attitude towards implementing VAR.	**Supported**
H4a	Consumption of football will have a positive impact on the general perception of VAR.	**Supported**
H4b	Consumption of football will have a positive impact on the attitude towards implementing VAR.	**Supported**
H5	General perception towards VAR will be positively correlated with attitude towards implementing VAR.	**Supported**

4.3. Other observations

4.3.1. Other regressions regarding segmentations

Regressions were conducted based on whether the respondents answered "yes" or "no" on the question regarding whether VAR should be implemented in Allsvenskan, see Appendix E. The results revealed that the biggest difference concerned openness to technology in sports. For the respondents who answered "no", it seemed to have a much lesser impact on the dependent variables compared to those who answered "yes".

Regressions were also performed based on segmentation by gender, age and Facebook groups, see Appendix E. Gender-specific regressions showed similar results, with only openness to technology in sports being statistically significant for women, possibly due to the small sample size. For men, fandom and debating in football had a greater impact on the dependent variables. Age-based regressions were conducted by separating the respondents into two subgroups. The first group is called "young" (younger than 46 years old) and the second group is called "old" (46 years old or older). The results were almost identical, but football consumption had a more substantial impact on the younger

respondents. Regressions based on Facebook groups were performed on the four biggest groups represented by the respondents in our sample: Malmö FF, Helsingborg IF, Djurgården and Degerfors IF. The results revealed minor differences, such as a slightly negative impact of football consumption on PV for Degerfors IF, but it was not statistically significant.

4.3.2. Open questions

As previously mentioned, the respondents had the possibility to answer two open questions. The first one about their general PV and the second one if VAR should be implemented in Allsvenskan or not. Notably, many respondents shared multiple opinions, resulting in them being categorized into more than one of the 13 categories, see Appendix F, Table F1.

The answers underscored that there was a difference of opinion among respondents. Some held a very negative stance towards the implementation of VAR, perceiving it as time consuming and potentially destroying the essence of football. Conversely, others viewed VAR as necessary in order to maintain the fundamental principle of fairness in football and help reduce referee mistakes. Additionally, a substantial number of respondents emphasized the need for the technology to improve and become more effective. For a further understanding, examples of the responses and categories can be found in Appendix F, Table F1.

5. Discussion and conclusion

The aim of the thesis is to empirically study Swedish football supporters' perception of VAR and attitude towards implementing VAR. To provide a discussion and conclusion regarding our research questions, key findings from the survey, implications of our results, limitations and a conclusion will be presented.

5.1. Key findings from the results

- The respondents of the survey were overall negative towards VAR. However, respondents scored a slightly higher value on AV compared to PV.
- Almost half of the respondents of the survey (47.3%) thought that VAR should be implemented in Allsvenskan while the other half (47.7%) did not.
- In a potential implementation of VAR in Allsvenskan, respondents anticipated, among other things, that there will be too many interruptions during football games, fewer referee mistakes, that football will become less enjoyable and that there will be fairer football games.
- Consistent with our hypotheses, Fandom and Debating in football had a negative impact on PV and AV.
- Consistent with our hypotheses, Openness to technology in sports and Football consumption had a positive impact on PV and AV.

5.1.1. Respondents were overall negative towards VAR

As shown in Figure 5, survey respondents overall expressed negative sentiments towards the technology. These findings align with Kolbinger and Knopps' study (2020), which showed that VAR predominantly caused negative feelings among fans in the English Premier League. As similar concerns are highlighted in other studies such as Svantesson (2014) and Scanlon et al. (2022), these findings suggest dissatisfaction with VAR, not only in Sweden, but in other countries as well.

Furthermore, the positive correlation displayed in the correlation matrix between the respondents' PV and AV reinforces the theory of reasoned action (Ajzen & Fishbein, 1980). The theory suggests that people's attitudes are shaped by their perceptions, which in turn influence behavioral intentions. This indicates that having a positive PV would most likely mean that you support the implementation of VAR and vice versa. However, the theory also emphasizes that despite an individual holding a certain

attitude, subjective norms can have an influence on the person's behavior. For instance, if someone has a negative AV but their family and friends advocate for its adoption in Allsvenskan, they might adjust their behavior and vote "yes" for the implementation. Our findings aligned with this, as it showed that (47.3%) of the respondents voted "yes" for implementing VAR in Allsvenskan, despite having an overall collective negative perception and attitude towards the technology.

5.1.2. Determinants of opinions of VAR

The most important factor explaining the respondents' opinions of VAR was openness to technology in sports. The regressions demonstrated that it had a positive impact on the dependent variables, which is also consistent with the hypotheses. This also relates to the study by Winand et al. (2021) that found that supporters that generally support technology in sports were more positive to VAR. However, openness to technology in sports had a greater effect on the dependent variables in our study for the older age group compared to the younger age group. This also aligns with the question regarding VAR implementation in Allsvenskan, where (67%) of those who answered "yes" were 46 years old or older, while (65%) of those who answered "no" were younger than 46 years old. This contradicts the findings of Hamsund and Scelles (2021), which showed that younger people are more receptive to VAR while older people are more reluctant. Similarly, Yim et al. (2021) also revealed in their study that younger people are more technology-driven. This variation of opinion between the age groups shows some very interesting things as our study seems to differ from previous literature. The reason for this is however unknown, but we speculate that it can be due to several factors such as cultural differences, sample disparities and the degree of trust towards the existing refereeing system in both Sweden and England.

Furthermore, as shown in the regressions, fandom and debating in football both had a negative effect on the dependent variables, aligning with the hypotheses. As the social identity theory suggests, a person's sense of identification with their team affects how they define themselves and behave (Tajfel.H & Turner, 1985). Connecting this to the argumentative theory (Mercier, 2016) and the findings by Winand et al. (2021), fans who strongly identify with their team tend to find greater excitement in engaging in discussions and advocating for their team's advantage. Furthermore, if your in-group is taking part in a discussion, one could anticipate that the desire for engaging in persuasive argumentation with others increases in respect to the social identity theory and the argumentative theory. Hence, a reason explaining why both debating in football

and fandom had a negative effect on the dependent variables could be because of VAR hindering the possibility to discuss controversial referee decisions.

Lastly, football consumption had a positive impact on the dependent variables, aligning with our hypotheses, but the effect was minor. An explanation could be that a greater level of football consumption leads to increased exposure and acceptance of VAR. However, it also creates the possibility that a negative sentiment towards VAR could arise from less favorable experiences.

5.2. Implications of the results

5.2.1. Should VAR be implemented in Allsvenskan?

This thesis presents various aspects of the dilemma that should be considered before a potential implementation. Interestingly, (47.3%) of the survey respondents thought that VAR should be implemented in Allsvenskan, contradicting the conception of massive resistance among supporters as expressed by Isak Edén, the chairman of "Svenska Fotbollssupporterunionen". It is more in line with the investigations performed by Novus and SvFF that found that (64%) and (62%) respectively of football interested people wanted VAR in Allsvenskan (Grefve, 2023; Bachner, 2023).

Furthermore, the respondents expressed a spectrum of beliefs regarding the potential consequences of implementing VAR in Allsvenskan, see Table 5. The most frequent positive consequences respondents anticipated were fewer referee mistakes and fairer football games. This finding accords with the study done by Spitz et al. (2021), which showed that there is a significant increase in accuracy level with the use of the technology. Additionally, in the open questions, some respondents advocated for the adoption of VAR in Allsvenskan as other leagues have. They mean that being the only league without the technology will potentially affect the competitiveness of Allsvenskan as they will fail to live up to the prevalent football standards.

In contrast, others raised concerns about VAR resulting in too many interruptions during football games and that football will become less enjoyable, see Table 5. This resonated with the findings by Petersen-Wagner and Lee Ludvigsen (2023), where they highlight that errors and mistakes are a part of the game as it keeps the authenticity of the football culture alive. In the open questions, some respondents expressed the need for Allsvenskan to maintain a unique stance and not give in to global trends. These respondents also highlighted the potential negative financial impact VAR would have on

football clubs, as in fact the estimated annual cost of VAR in Sweden would be 13-15 million SEK (Svensk Elitfotboll, 2021).

This divergence of opinions resonates with other findings from previous literature such as Hamsund and Scelles (2021) and Scanlon et al. (2022). As respondents both mentioned the benefits and drawbacks with the technology, it underscores the complexity of VAR and that there is a multifaceted viewpoint concerning it. Moreover, as these beliefs are expressed by football supporters in other leagues as well, it suggests that they are not only exclusive to fans within Allsvenskan.

One thing worth noticing was that no respondent expressed concerns about the communication of VAR inside the arena. The reason could be that the Swedish football supporters have not experienced VAR inside the arena to the same extent as other supporters in other leagues have. For example, as mentioned before, in the English Premier League, Scanlon et al. (2022) found that supporters think that VAR is less satisfying to watch inside the arena and that the communication with the fans is less good. Similarly, in Rugby, Stoney and Fletcher (2020) found that fans were not pleased with the transparency around TMO decisions inside the arena. Thus, it is essential to consider this before implementing VAR in Allsvenskan, as it is a well known concern in other leagues and sports that use decision-aid technology.

5.2.2. Implications for marketing

With ticket sales alone accounting for (21%) of the total net sales of Allsvenskan, fans play a huge role for the financial success of Swedish football clubs (Ey, 2020). Moreover, in Swedish football, club ownership follows a (51%) rule, giving fans a voice to influence their respective clubs. This demonstrates supporters' powerful authority where they can represent, engage and impact the culture of the club (Baxter et al., 2019). Thus, in order to maintain supporters' satisfaction, acknowledging and understanding the positive and negative stances of VAR is vital before making a decision on a potential implementation. As seen from the results, VAR significantly impacts fans' personal experiences with football which in turn can influence sales and overall image of clubs. By proactively addressing these concerns, clubs within Allsvenskan can sustain a loyal and strong support from fans.

5.2.3. Practical implications

As mentioned before, there is a current split among fans regarding implementing VAR in Allsvenskan, with some in favor and others against it. Given that Allsvenskan has not

yet introduced VAR, this is a good opportunity for clubs and the league to publicize videos, articles and social media posts addressing these concerns. By acknowledging the potential shortcoming of VAR and actively working on innovative solutions, both individual clubs and the league can collectively reshape the overall PV towards a more positive stance. Moreover, using storytelling through the use of words, images and sounds can be an effective approach to convey a narrative, making it easier for the audience to take in the message (Kaufman, 2003). This can help emphasize that VAR is there to improve, not hinder, the football experience for supporters. By engaging and exposing fans in this manner, there is potential to transform the "uncertainty", in this case VAR, to a sense of "familiarity" (Tellis, 1997). Additionally, coordinating the clubs and the league's marketing strategies, a consistent message can be delivered to supporters. These collective efforts will enhance an overall positive perception throughout the entire Swedish football community on a larger scale.

5.3. Limitations

Like other academic reports, there might be limitations to the empirical study. In terms of the sampling, distributing the survey through Facebook groups meant that supporters not engaged within these online communities were excluded. While this exclusion was intentional due to the limited time constraint, it could pose a potential bias to the sample. To help mitigate this bias, other approaches could be used to distribute the survey for example by physically going to a football game or using multiple online platforms to diversify the target group.

Furthermore, it is important to note that two prominent clubs, AIK and Hammarby, did not participate in the survey. The two clubs represent about (33%) of the fans in Allsvenskan, based on average attendance (Sportbloggare, 2023). Given that they are two of the top teams in Allsvenskan, not having the possibility to collect responses from their Facebook groups due to lack of response from their administration, it limited our ability to gain a more comprehensive understanding of fans' viewpoints of VAR in Sweden. Moreover, since we accidentally added a team from Superettan (Helsingborg IF), this might not be a fully representative sample of Swedish football fans within Allsvenskan. However, this can be seen as an advantage as it provided insights into the opinions of fans in Superettan regarding VAR. Additionally, it would have brought more perspectives to the study if fan perspectives were explored in other leagues such as Damallsvenskan.

Moreover, as the survey was only open for a specific period of time it could be seen as a limitation. A more extended duration would be more befitting, as it would have allowed us to obtain a larger data collection to further strengthen the analysis. Another limitation is that not all respondents tend to finish a survey completely (Wu et al., 2022) as illustrated in Chapter 3.3.2, Figure 2. This could be due to many reasons, one of them being that it took too long to finish the survey (average time = 18,4 minutes). This resulted in a substantial number of respondents being excluded from the final dataset, as discussed in Chapter 3.4.2. However, to give the respondents the incentive to complete the whole survey, we donated 1 SEK to Barncancerfonden for every response. Furthermore, depending solely on surveys makes it difficult to attain an in-depth analysis of the respondents. However, as qualitative methods help gain a nuanced understanding of the individual's perspective (Almalki, 2016), we tried to meet this limitation by doing pre-studies and including open ended questions.

5.4. Conclusion

The aim of the thesis was to empirically study Swedish football supporters' perception of VAR and attitude towards implementing it. The survey results revealed that respondents had an overall negative PV and AV, expressing concerns about game interruptions, reduced enjoyment and the belief that mistakes should be part of the sport. However, several positive aspects of VAR were also highlighted, including its potential to increase accuracy, fairness in football and to reduce referee mistakes. In contrast, distinct divisions emerged amongst the respondents with almost half wanting VAR to be implemented in Allsvenskan.

Openness to technology was identified to play an important factor, where respondents who were more receptive towards the technology exhibited a more favorable PV and AV. Additionally, as respondents felt that VAR hinders engaging discussions, fandom and debating in football both had a negative impact on PV and AV. Conversely, football consumption had a positive impact on PV and AV, emphasizing that increased exposure results in greater acceptance.

The findings from this study provide valuable insights for the ongoing debate on the potential introduction of VAR in Swedish football, specifically within Allsvenskan.

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7. Appendices

Appendix A

Information regarding the preparatory studies

Pre-study 1: interviews

<u>Questions in the interviews</u>

1. Vad tycker du om VAR i fotboll?
2. Vilka faktorer tycker du är positiva och negativa med VAR?

<u>Respondents</u>

Table A1: Date, age and gender of the respondents in the preparatory study 1.

Date	Age	Gender
2023-10-01	25	Male
2023-10-01	24	Female
2023-10-01	53	Male
2023-10-02	12	Male
2023-10-02	25	Male
2023-10-02	26	Female
2023-10-02	23	Male
2023-10-02	23	Female
2023-10-02	21	Male

Pre-study 2: questionnaire pilot test

<u>Respondents</u>

Table A2: Date, age and gender of the respondents in the preparatory study 2.

Date	Age	Gender
2023-10-17	25	Male
2023-10-17	26	Female
2023-10-17	27	Female
2023-10-17	30	Female
2023-10-18	24	Male
2023-10-18	12	Male
2023-10-18	21	Male
2023-10-18	23	Female
2023-10-18	23	Male
2023-10-19	26	Female

Appendix B

Information about the items/questions related to the indexed variables

Table B1: Mean, standard deviation and median for each item/question associated with the dependent variables.

Questions	M	SD	Median
Perception of VAR			
VAR increases fairness in football	4.60	2.08	5.00
With VAR, there are fewer referee mistakes	4.68	1.98	5.00
VAR makes football matches more interesting	2.74	2.00	2.00
VAR is necessary for the development of football	3.65	2.40	4.00
VAR reduces player diving	3.63	2.04	4.00
VAR takes away the passion in football	3.53	2.34	3.00
VAR creates too many interruptions in football matches	2.68	1.88	2.00
Goal celebrations have become less enjoyable due to the risk of VAR review	2.88	2.13	2.00
Communication around a VAR decision is less good inside the football arena	3.24	1.63	3.00
VAR negatively affects the emotional part of football	3.06	2.20	3.00
Attitude towards implementing VAR			
Imagine that VAR is introduced in Allsvenskan, how good or bad do you think this will be	2.52	1.94	2.00
Imagine that VAR is not introduced in Allsvenskan, how good or bad do you think this will be	5.12	1.99	5.00
Imagine that VAR is introduced in Allsvenskan, how positive or negative do you think this will be	3.93	2.57	4.00

Note: 7-point Likert scale used for "Perception of VAR": "Do absolutely not agree" (1) to "Do absolutely agree" (7). 7-point Likert scales used for "Attitude towards implementing VAR": "Very bad" (1) to "Very good" (7) and "Very negative" (1) to "Very positive" (7).

Table B2: Mean, standard deviation and median for each statement associated with the independent variables.

Questions	M	SD	Median
Fandom			
Watching my favorite team is one of the most satisfying things I do	6.10	1.20	7.00
I really enjoy watching my favorite team's games	6.74	0.70	7.00
Compared to other activities, watching my favorite team is very interesting	5.88	1.34	6.00
I find a lot of my life organized around following my favorite team	4.65	1.94	5.00
Following my favorite team has a central role in my life	5.11	1.73	5.00
A lot of my time is organized around following my favorite team	5.51	1.65	6.00
Following my favorite team says a lot about who I am	4.79	1.94	5.00
You can say a lot about a person by knowing which favorite team they have	3.85	1.98	4.00
When I watch my favorite team, I can be myself	6.40	1.13	7.00
Openness to technology in sports			
Decision-aid technology produces a fair result	5.04	1.68	5.00
Decision-aid technology is more accurate than human judgment	5.06	1.57	5.00
Instant replay assists referees to make correct decisions	5.21	1.67	6.00
It is good that decision-aid technology is used in sports	5.23	1.66	6.00
Debating in football			
Debating whether a red card incident has a crucial influence on the outcome of a game is fun	4.82	1.70	5.00
Debating whether a penalty was awarded correctly is fun	4.84	1.69	5.00
Debating about wrong refereeing decisions is fun	4.54	1.85	5.00
Debating whether a goal was awarded correctly is fun	4.69	1.72	5.00
A contentious goal being awarded improves the atmosphere at a football match	3.37	1.93	3.00
Without referee error, a football match is less interesting	3.48	2.06	3.00
Football consumption			
I follow more leagues and cups than the ones my favorite team plays in	4.85	2.02	5.00
I follow both club- and national team football	5.85	1.52	6.00
Apart from my favorite team I also follow European cup football (Champions League, Europa League, Conference League)	5.05	1.97	5.00
I have more than one favorite team and thus follow more leagues	4.26	2.35	5.00
I follow both women's and men's football	4.51	1.98	5.00
I follow what happens in the world of football on for example the news and social media	6.02	1.16	6.00

Note: 7-point Likert scale used": "Do absolutely not agree" (1) to "Do absolutely agree" (7).

Appendix C

Information regarding the distribution of the survey to the different Facebook groups

Facebook supporter groups

Respondents

Table C1: Name of the Facebook group, the number of members and if the post got consent or not.

Facebook group	Number of members	Consent for post
AIK: Black Army	28000	No
IFK Göteborg: Supporterklubben änglarna	22000	No
Djurgården IF: Djurgården IF - Alltid Oavsett!	17825	Yes
Hammarby IF: Bajenfans	33000	No
Malmö FF: Alla vi som älskar MFF	12100	Yes
Helsingborg IF: HIF - supporter forum	6365	Yes
BK Häcken: Getingarna	1900	Yes
Degerfors IF: Degerfors IF FanClub Stockholm	2647	Yes
Halmstad BK: Forza HBK!	3841	Yes
IF Elfsborg: Guliarnerna	5700	No
IFK Norrköping: IFK Norrköping Supportrar Sverige	2121	Yes
IFK Värnamo: Kamrat-12:an	384	No
IK Sirius: Västra Sidan Supporters	1600	Yes
Kalmar FF: Kalmar FF Supporterunion	2100	No
Mjällby AIF: Sillastrybarna	2400	No
Varbergs BoIS: Klacksparken	1400	Yes

Note: Helsingborg IF was included by mistake.

Message Facebook supporter group admins

Hej! Jag hör av mig till dig eftersom du är admin för (insert group name) på Facebook. Jag och Yusra Ali är studenter på Handelshögskolan i Stockholm och skriver just nu en kandidatuppsats där vi undersöker svenska supporters uppfattning av Video Assistant Referee (VAR) i fotboll. I undersökningen kommer vi att kolla på olika faktorer som kan förklara denna uppfattning och därmed bidra till en djupare analys av svenska supporters synvinklar och åsikter om VAR. För att undersöka detta kommer vi att göra en enkät och skulle därför gärna vilja publicera detta på eran sida. Det skulle uppskattas otroligt mycket då vi anser att era följare skulle kunna bidra med mycket betydelsefulla svar och insikter angående VAR-frågan i svensk fotboll. För era medlemmar blir det en möjlighet att uttrycka sina åsikter, då denna uppsats kommer att publiceras för allmänheten. Enkäten kommer dessutom att vara anonym för deltagare. Hoppas detta är okej och om ni undrar över något är det bara att fråga.

Med vänliga hälsningar

Klara Lundquist och Yusra Ali.

Message survey post in Facebook supporter groups

Vad tycker du om VAR?

Välkommen till att delta i denna enkätundersökning!

Vi är två studenter från Handelshögskolan i Stockholm som skriver vår kandidatuppsats och behöver din hjälp för att få en bättre förståelse för svenska fotbollssupportrars uppfattning om Video Assistant Referee (VAR).

Om du har några frågor angående undersökningen, kontakta gärna 25152@student.hhs.se (Klara Lundquist). Tack för att du tar dig tid till att delta i vår undersökning!

Appendix D

Descriptive statistics regarding the respondents

Table D1: Descriptive statistics for the respondents' age.

Number of respondents	421
Mean (years)	45.93
Standard deviation (years)	15.54
Min. age	16
1st quartile	34
Median	46
3rd quartile	57
Max. age	85

Table D2: Descriptive statistics for the respondents' occupation.

Question	Total: n = 421	Percentage = 100%
Studying	39	9.3%
Working	312	74.1%
Retired	59	14.0%
Other	11	2.6%

Appendix E

Regressions based on different segmentations

Table E1: Statistics of the multi-linear regressions segmented by voting "yes" or "no" on implementing VAR in Allsvenskan. Showing unstandardized beta coefficients and standard deviations in parentheses.

	Dependent variable:			
	Perception of VAR		Attitude towards implementing VAR	
	(Yes)	(No)	(Yes)	(No)
Fandom	-0.03	-0.10**	-0.04	-0.18***
	(0.05)	(0.04)	(0.05)	(0.05)
Openness to technology in sports	0.64***	0.23***	0.64***	0.13***
	(0.10)	(0.03)	(0.09)	(0.04)
Debating in football	-0.12***	-0.04	-0.11***	-0.03
	(0.04)	(0.03)	(0.04)	(0.04)
Football consumption	0.07	0.02	0.06	0.09**
	(0.05)	(0.03)	(0.05)	(0.04)
Intercept	1.29*	1.66***	1.95***	2.31***
	(0.61)	(0.31)	(0.68)	(0.40)
Observations	199	201	199	201
R^2	0.23	0.24	0.25	0.14
Adjusted R^2	0.21	0.23	0.23	0.12
Residual Std. Error	0.83 (df = 194)	0.54 (df = 196)	0.78 (df = 194)	0.68 (df = 196)
F Statistic	14.47*** (df = 4; 194)	15.70*** (df = 4; 196)	16.07*** (df = 4; 194)	7.79*** (df = 4; 196)

Note: *p<0.05, **p<0.01, ***p<0.001.

Table E2: Statistics of the multi-linear regressions with the dependent variables segmented by gender. Showing unstandardized beta coefficients and standard error in parentheses.

	Dependent variable:			
	Perception of VAR		Attitude towards implementing VAR	
	(Men)	(Women)	(Men)	(Women)
Fandom	-0.18***	-0.10	-0.24***	-0.17
	(0.05)	(0.12)	(0.06)	(0.14)
Openness to technology in sports	0.86***	0.95***	0.94***	1.02***
	(0.04)	(0.08)	(0.05)	(0.10)
Debating in football	-0.15***	-0.12	-0.19***	-0.05
	(0.04)	(0.09)	(0.05)	(0.10)
Football consumption	0.07	0.09	0.13**	0.11
	(0.04)	(0.11)	(0.05)	(0.13)
Intercept	0.26	-0.40	0.42	-0.59
	(0.44)	(0.96)	(0.54)	(1.15)
Observations	360	60	360	60
R^2	0.63	0.73	0.60	0.68
Adjusted R^2	0.63	0.71	0.60	0.66
Residual Std. Error	1.00 (df = 355)	0.94 (df = 55)	1.22 (df = 355)	1.13 (df = 55)
F Statistic	153.47*** (df = 4; 355)	37.99*** (df = 4; 55)	134.14*** (df = 4; 355)	29.38*** (df = 4; 55)

Note: *p<0.05, **p<0.01, ***p<0.001.

Table E3: Statistics of the multi-linear regressions with the dependent variables segmented by age. Showing unstandardized beta coefficients and standard error in parentheses.

	Dependent variable:			
	Perception of VAR		Attitude towards implementing VAR	
	(Young)	(Old)	(Young)	(Old)
Fandom	-0.08	-0.16**	-0.22**	-0.15**
	(0.07)	(0.07)	(0.09)	(0.07)
Openness to technology in sports	0.81***	0.92***	0.87***	0.99***
	(0.06)	(0.05)	(0.07)	(0.06)
Debating in football	-0.12**	-0.16***	-0.11*	-0.21***
	(0.05)	(0.05)	(0.06)	(0.06)
Football consumption	0.10*	0.03	0.20***	0.04
	(0.06)	(0.06)	(0.07)	(0.07)
Intercept	-0.42	0.27	-0.12	0.45
	(0.61)	(0.54)	(0.76)	(0.62)
Observations	208	213	208	213
R^2	0.59	0.64	0.55	0.62
Adjusted R^2	0.58	0.64	0.54	0.62
Residual Std. Error	1.01 (df = 203)	0.99 (df = 208)	1.25 (df = 203)	1.13 (df = 208)
F Statistic	71.83*** (df = 4; 203)	93.93*** (df = 4; 208)	61.69*** (df = 4; 203)	85.81*** (df = 4; 208)

Note: *p<0.05, **p<0.01, ***p<0.001.

Table E4: Statistics of the multi-linear regressions with the dependent variable Perception of VAR, segmented by Facebook group. Showing unstandardized beta coefficients and standard error in parentheses.

	Dependent variable:			
	Perception of VAR			
	(Malmö FF)	(Helsingborg IF)	(Djurgården)	(Degerfors IF)
Fandom	-0.23*	-0.01	-0.18*	-0.19
	(0.12)	(0.09)	(0.09)	(0.13)
Openness to technology in sports	0.90***	0.93***	0.85***	1.00***
	(0.09)	(0.08)	(0.07)	(0.11)
Debating in football	-0.20**	-0.04	-0.09	-0.26***
	(0.08)	(0.07)	(0.08)	(0.09)
Football consumption	0.17	0.26***	0.06	-0.01
	(0.10)	(0.08)	(0.07)	(0.11)
Intercept	0.13	-2.61***	0.19	0.50
	(0.87)	(0.90)	(0.73)	(0.99)
Observations	57	82	155	62
R^2	0.79	0.71	0.60	0.65
Adjusted R^2	0.77	0.69	0.59	0.62
Residual Std. Error	0.84 (df = 52)	0.90 (df = 77)	1.11 (df = 150)	0.99 (df = 57)
F Statistic	47.88*** (df = 4; 52)	46.55*** (df = 4; 77)	56.57*** (df = 4; 150)	26.14*** (df = 4; 57)

Note: *p<0.05, **p<0.01, ***p<0.001.

Table E5: Statistics of the multi-linear regressions with the dependent variable Attitude towards implementing VAR, segmented by Facebook group. Showing unstandardized beta coefficients and standard error in parentheses.

	Dependent variable:			
	Attitude towards implementing VAR			
	(Malmö FF)	(Helsingborg IF)	(Djurgården)	(Degerfors IF)
Fandom	-0.23	-0.15	-0.14	-0.13
	(0.14)	(0.11)	(0.11)	(0.15)
Openness to technology in sports	0.90***	1.07***	0.86***	1.19***
	(0.11)	(0.10)	(0.08)	(0.12)
Debating in football	-0.28***	-0.02	-0.17*	-0.21**
	(0.10)	(0.09)	(0.09)	(0.10)
Football consumption	0.15	0.22**	0.14	0.08
	(0.13)	(0.10)	(0.09)	(0.12)
Intercept	0.93	-2.11*	0.12	-0.95
	(1.08)	(1.17)	(0.85)	(1.13)
Observations	57	82	155	62
R^2	0.71	0.66	0.55	0.67
Adjusted R^2	0.69	0.64	0.54	0.64
Residual Std. Error	1.04 (df = 52)	1.16 (df = 77)	1.30 (df = 150)	1.13 (df = 57)
F Statistic	32.60*** (df = 4; 52)	36.60*** (df = 4; 77)	45.51*** (df = 4; 150)	28.31*** (df = 4; 57)

Note: *p<0.05, **p<0.01, ***p<0.001*.

Appendix F

Analysis of the open questions

Table F1: Statistics from the open questions

Category	n	Example answer
Overall perception of VAR		
Interruptions in the game	68	"I think it takes too long to reach a decision."
Removes passion	69	"It ruins the atmosphere in football. Removes spontaneity and joy."
Incorrect decisions with VAR	31	"If it had worked as intended, it would be good, but now that incorrect decisions happen fairly often, one becomes a bit skeptical."
Human error is necessary	24	"Poor referees are part of the game."
Fewer mistakes	24	"VAR is a fantastic invention. It alerts the referee if they made a mistake or missed something."
Increased fairness	25	"It becomes fair, and that's important! VAR should be present in all arenas and leagues."
Needs improvement	46	"The idea is good. The execution is less than ideal."
VAR is needed, but not in all situations	22	"It should only apply to penalties or if the ball is inside the goal."
Attitude towards implementing VAR		
Implement it like other leagues have	28	"VAR is here to stay, and we should keep up with other leagues or we'll end up being the only league without VAR."
Referees needs VAR	25	"The level of Swedish referees is bad. VAR is needed to make the right decision."
Sweden should continue to be unique	16	"The Allsvenskan must go its own way. Just as we did in e.g. The 51% rule. The Allsvenskan is the people's sport and if the people don't want VAR, we won't get it."
VAR is costly	4	"It is costly especially for small clubs."
Other leagues have not succeeded	9	"It doesn't work anywhere, so why introduce something that everyone wants to get rid of in Europe?"

Appendix G

Complete survey

Introduction

Vad tycker du om VAR?

Välkommen till denna enkätundersökning!

Vi är två tjejer som skriver vår kandidatuppsats vid Handelshögskolan i Stockholm och behöver din hjälp för att få en bättre förståelse för svenska fotbollssupportrars uppfattning om Video Assistant Referee (VAR). VAR är ett teknisk hjälpmedel som används inom fotboll för att assistera domare i olika beslutssituationer genom videogranskning.

Det tar cirka 10 minuter att svara på enkäten och vi rekommenderar att du besvarar frågorna från din dator eller surfplatta. Alla dina svar är anonyma och kommer att behandlas konfidentiellt.

För varje respondent donerar vi 1 SEK till Barncancerfonden.

Om du har några frågor angående undersökningen, kontakta gärna 25152@student.hhs.se (Klara Lundquist). Tack för att du tar dig tid till att delta i vår undersökning!

GDPR

GDPR:

Vänligen läs följande information relaterat till dataskyddsförordningen GDPR.

Projekt: BSc thesis in Business & Economics
År och termin: 2023, höstterminen
Ansvariga studenter för studien: Klara Lundquist, BSc-student (25152@student.hhs.se)
samt Yusra Ali, BSc-student (25368@student.hhs.se) Handledare och avdelning vid SSE:
Patric Andersson, Associate Professor; Institutionen för marknadsföring och strategi.
Handledarens e-postadress: patric.andersson@hhs.se

Typ av personuppgifter om dig som ska behandlas: Initialer, kön, ålder och sysselsättning

Information relaterat till GDPR: Som en integrerad del av utbildningsprogrammet vid
Handelshögskolan i Stockholm gör inskrivna studenter individuellt examensarbete. Detta
arbete baseras ibland på undersökningar och intervjuer kopplade till ämnet. Deltagande är
naturligtvis helt frivilligt och denna text är avsedd att ge dig nödvändig information om vem
som kan röra ditt deltagande i studien eller intervjun. Du kan när som helst återkalla ditt
samtycke och dina uppgifter kommer därefter att raderas permanent.

Sekretess. Allt du säger eller anger i undersökningen eller till intervjuerna kommer att hållas
strikt konfidentiellt och kommer endast att göras tillgängligt för handledare och
krisledningsgruppen.

Säker lagring av data. All data kommer att lagras och bearbetas säkert av SSE och kommer
att raderas permanent när det projekterade är slutfört.

Inga personuppgifter kommer att publiceras. Uppsatsen som skrivs av studenterna kommer
inte att innehålla någon information som kan identifiera dig som deltagare i undersökningen
eller intervju ämnet.

Dina rättigheter enligt GDPR. Du är välkommen att besöka https://www.hhs.se/en/about-
us/data-protection/ för att läsa mer och få information om dina rättigheter relaterade till
personuppgifter. Tveka inte att kontakta oss via email (25368@student.hhs.se) om du har
frågor kring hur vi hanterar datan!

*Jag har läst informationen ovan och samtycker till att delta i den här enkäten

Ja. Skriv dina initialer och dagens datum t.ex. (ML230920)

○ [   ]

○ Nej. Jag vill inte fortsätta med enkäten.

Block 1: Favorite team

*I den här delen ställer vi frågor om ditt favoritlag, dvs det lag som du hejar på mest.

Vilket lag håller du på i Allsvenskan i fotboll?

○ AIK	○ BK Häcken	○ Degerfors IF	○ Djurgården
○ Halmstads BK	○ Hammarby	○ IF Brommapojkarna	○ IF Elfsborg
○ IFK Göteborg	○ IFK Norrköping	○ IFK Värnamo	○ IFK Sirius
○ Kalmar FF	○ Malmö FF	○ Mjällby AIF	○ Varbergs BoIS
○ Jag har inget favoritlag i Allsvenskan			

*

Hur länge har du varit en supporter för ditt favoritlag i Allsvenskan? (ange antal år i siffror, t ex. 5)

[   ]

*Hur ofta kollar du på ditt favoritlags matcher per säsong i Allsvenskan? (ange antal matcher i siffror, t ex. 10)

[   ]

*Vänligen ange vilka mediekanaler du använder för att följa ditt favoritlag i Allsvenskan. (Du kan välja flera alternativ)

☐ Facebook   ☐ Instagram   ☐ Twitter   ☐ Dagstidning (t.ex. Aftonbladet, Dagens Nyheter etc.)

☐ Fotbollsmagasin   ☐ Lokalpress   ☐ Klubbens egen hemsida   ☐ Fanforum (t.ex. Svenskafans)

☐ Podcast/sportradio   ☐ Annat
                        [   ]

*Håller du på något annat fotbollslag i en annan liga? Vilket lag isåfall? T.ex. i Premier League, Bundesliga, Damallsvenskan.

[   ]

Block 2: Football consumption

*I denna del undrar vi över ditt intresse för fotboll och din fotbollskonsumtion.

Nedan följer ett antal påståenden om dig och ditt fotbollsintresse. Vänligen välj det alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
Jag har fler än ett favoritlag och följer därför fler ligor.	○	○	○	○	○	○	○
Jag följer både dam- och herrfotboll.	○	○	○	○	○	○	○
Jag följer både klubb- och landslag fotboll.	○	○	○	○	○	○	○
Jag följer utöver mitt favoritlag även europeisk cupfotboll (Champions League, Europa League, Conference League).	○	○	○	○	○	○	○
Jag följer vad som händer i fotbollsvärlden på exempelvis nyheter och sociala medier.	○	○	○	○	○	○	○
Jag följer fler ligor och cuper än de som mitt favoritlag spelar i.	○	○	○	○	○	○	○

Block 3: Open question about VAR

*I den här delen kommer vi att fråga dig om dina tankar om Video Assistant Referee (VAR) .

Vet du vad VAR innebär?

   ○   ○

   Ja   Nej

*Vad tycker du om VAR?

○	○	○	○	○	○	○
Mycket bra	Ganska bra	Något bra	Varken bra eller dåligt	Något dåligt	Ganska dåligt	Mycket dåligt

Eventuella kommentarer (utveckla gärna ditt svar till föregående fråga).

Block 4: Perception of VAR

För att förtydliga vad VAR innebär är definitionen av Video Assistant Referee följande (VAR):

En videoassisterande domare (VAR) är en matchdomare med oberoende tillgång till matchfilm, som endast får assistera huvuddomaren om det förekommer ett "uppenbart och tydligt fel" eller en "allvarlig missad händelse" i samband med: mål, straff, direkt rött kort och "mistaken identity". VAR används i 37 av 55 högsta fotbollsligor i Europa, bland annat Premier League i England, Bundesliga i Tyskland, Serie A i Italien och Superliga i Danmark.

*Nedan följer ett antal påståenden om din uppfattning av VAR. Vänligen välj det alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
VAR gör att spelare filmar mindre.	◯	◯	◯	◯	◯	◯	◯
VAR är nödvändigt för utvecklingen av fotboll.	◯	◯	◯	◯	◯	◯	◯
Med VAR så blir det färre domarmisstag.	◯	◯	◯	◯	◯	◯	◯
VAR gör fotbollen mer rättvis.	◯	◯	◯	◯	◯	◯	◯
VAR gör fotbollsmatcher mer intressanta.	◯	◯	◯	◯	◯	◯	◯

*Nedan följer ytterligare ett antal påståenden om din uppfattning av VAR. Vänligen välj det
alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
VAR tar bort passionen i fotbollen.	○	○	○	○	○	○	○
VAR skapar för mycket avbrott under fotbollsmatcher.	○	○	○	○	○	○	○
Målfirande har blivit mindre njutbart på grund av risk för VAR-granskning.	○	○	○	○	○	○	○
Kommunikationen kring ett VAR-beslut är mindre bra inne på fotballsarenan.	○	○	○	○	○	○	○
VAR påverkar den emotionella delen i fotboll negativt.	○	○	○	○	○	○	○

***För att veta att du svarar uppmärksamt på frågorna så kommer nu en kontrollfråga för
att säkerställa det. Välj "instämmer absolut" om du svarar uppmärksamt på frågorna!**

○	○	○	○	○	○	○
Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut

Block 5: Fandom scale

*I denna del undrar vi över dig och ditt supporterskap.

Nedan följer ett antal påståenden om ditt favoritlag och dig som supporter. Vänligen välj det alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
En stor del av mitt liv är organiserat kring att följa mitt favoritlag.	○	○	○	○	○	○	○
Jag tycker om att kolla på mitt favoritlags matcher.	○	○	○	○	○	○	○
Att följa mitt favoritlag har en central roll i mitt liv.	○	○	○	○	○	○	○
Att titta på mitt favoritlag säger mycket om vem jag är.	○	○	○	○	○	○	○
En stor del av min tid går åt till att följa mitt favoritlag.	○	○	○	○	○	○	○
Att kolla på mitt favoritlag är något av det bästa jag vet.	○	○	○	○	○	○	○
Man kan säga mycket om en person beroende på vilket lag hen håller på.	○	○	○	○	○	○	○
Jag kan vara mig själv när jag tittar på mitt favoritlag.	○	○	○	○	○	○	○
Jämfört med andra aktiviteter föredrar jag att kolla på mitt favoritlag.	○	○	○	○	○	○	○

Block 6: Decision-aid technology in sports

*I den här delen undrar vi över din syn på tekniska hjälpmedel inom sport.

Nedan följer ett antal påståenden om tekniska hjälpmedel inom sport. Vänligen välj det alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
Tekniska hjälpmedel inom sport är mer tillförlitligt än mänskligt omdöme.	○	○	○	○	○	○	○
Det är bra att tekniska hjälpmedel används inom sport.	○	○	○	○	○	○	○
Återuppspelning i realtid hjälper domarna att fatta korrekta beslut.	○	○	○	○	○	○	○
Tekniska hjälpmedel i sport ger rättvisa beslut.	○	○	○	○	○	○	○

Block 7: Debating in football

*I denna del undrar vi över ditt intresse av att diskutera eventuella händelser som inträffar under fotbollsmatcher.

Nedan följer ett antal påståenden om debatt inom fotboll. Vänligen välj det alternativ som bäst överensstämmer med din uppfattning.

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
Det är roligt att diskutera om felaktiga dombeslut.	○	○	○	○	○	○	○
Utan domarmisstag är fotbollsmatcher mindre intressanta.	○	○	○	○	○	○	○
Ett kontroversiellt dömt mål förbättrar stämningen på fotbollsarenan.	○	○	○	○	○	○	○
Det är roligt att diskutera om ett rött kort har en avgörande påverkan på matchens resultat.	○	○	○	○	○	○	○
Det är roligt att diskutera om en straff dömdes korrekt.	○	○	○	○	○	○	○
Det är roligt att diskutera ifall ett mål dömdes korrekt.	○	○	○	○	○	○	○

Block 8: Attitude towards implementing VAR

*Nu är vi intresserade av vad du tycker om Video Assistant Referee (VAR) i Allsvenskan.

Tänk dig att VAR införs i Allsvenskan, hur bra eller dåligt tycker du att detta kommer att vara?

○	○	○	○	○	○	○
Mycket bra	Ganska bra	Något bra	Varken bra eller dåligt	Något dåligt	Ganska dåligt	Mycket dåligt

*Tänk dig att VAR **inte** införs i Allsvenskan, hur bra eller dåligt tycker du att detta kommer att vara?

○	○	○	○	○	○	○
Mycket bra	Ganska bra	Något bra	Varken bra eller dåligt	Något dåligt	Ganska dåligt	Mycket dåligt

*Tänk dig att VAR införs i Allsvenskan, hur positivt eller negativt tycker du att detta kommer att vara?

○	○	○	○	○	○	○
Mycket positivt	Ganska positivt	Något positivt	Varken positivt eller negativt	Något negativt	Ganska negativt	Mycket negativt

*Tycker du att VAR ska införas i Allsvenskan?

○	○	○
Ja	Nej	Vet inte

Eventuella kommentarer (utveckla gärna ditt svar till föregående fråga).

*Vad tror du kommer att hända om VAR införs i Allsvenskan? (Du kan välja flera alternativ)

- [ ] Hemmalagets fördel minskas
- [ ] Färre domarmisstag
- [ ] Fler spännande matcher
- [ ] Dyrare biljetter

- [ ] För mycket avbrott under fotbollsmatcher
- [ ] Ekonomisk påverkan på fotbollsklubbar
- [ ] Rättvisare fotbollsmatcher
- [ ] Fotboll blir mindre njutbart

- [ ] Storklubbarnas fördelar till att vinna matcher kommer att minskas
- [ ] Domarna ifrågasätts mer
- [ ] Oddsen på fotboll ändras
- [ ] Annat

Block 9: Demographics

*Nedan följer ett antal frågor om dig.

Vad identifierar du dig som?

- ⚪ Man
- ⚪ Kvinna
- ⚪ Ickebinär
- ⚪ Annat

*Min ålder är: (Vänligen ange med bara siffror t.ex. 28)

*Vad är din sysselsättning?

- ⚪ Studerande
- ⚪ Arbetande
- ⚪ Pensionär
- ⚪ Annat

Block 10: Evaluation of survey

*Slutligen undrar vi hur du upplevde undersökningen.

Vad tyckte du om undersökningen?

	Instämmer absolut inte	Instämmer i stort sett inte	Instämmer delvis inte	Osäker	Instämmer delvis	Instämmer i stort sett	Instämmer absolut
Frågorna var tydligt formulerade.	○	○	○	○	○	○	○
Svarsalternativen var tydligt formulerade.	○	○	○	○	○	○	○
Undersökningen försökte inte påverka mina svar i någon riktning.	○	○	○	○	○	○	○
Denna undersökning handlade om VAR i fotboll.	○	○	○	○	○	○	○

Appendix H

Use of AI tools in the thesis

1. What AI tools have been used and how?

The AI tool that has been used in the thesis is ChatGPT. It was used to brainstorm ideas and for giving feedback regarding grammar in the text. The following question was used regarding the brainstorming process: "what potential factors can explain football fans' perception of VAR?" and some examples of the answers generated by ChatGPT included "trust in technology", "fan engagement", "cultural differences", "fairness" and "accuracy" (OpenAI, 2023).

2. In what ways have these tools contributed to increasing the quality of the thesis?

Using the AI tool provided us with additional insights and perspectives regarding our subject that enhanced our understanding and helped us in the process of writing the

thesis. Furthermore, the grammar checks increased the quality of the language used in the thesis.

3. What potential risks were found using AI and what measures were taken to reduce these risks?

While the AI tool comes with numerous advantages, we identified potential risks associated with it. These included misinformation, limited expressive capabilities, its difficulty in adopting a clear stance, and the presence of biased algorithms. To avoid these risks, we critically assessed all the AI outputs and refrained from accepting all the information blindly before considering using it in our thesis.

4. What are the insights gained from using AI tools in the thesis writing process?

The usage of the AI tool in the thesis writing process has yielded several valuable insights. Firstly, these tools provided us with novel ideas and perspectives that were able to enrich the overall content of our thesis. Secondly, the constructive feedback provided by the AI, offered valuable suggestions for improvements which enhanced the quality of the work.