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MONOGRAPH:
**“HOW HAS THE APPLICATION OF NEW TECHNOLOGIES INFLUENCED THE
PRACTICE OF SOCCER IN ECUADOR”**

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Gratitude

First of all, I want to thank God for giving me greetings and the opportunity to have a good education, I also want to thank my parents for all the support I have received from them to have a good preparation. I would also like to thank my teachers, Patricia Sánchez and Claudia Lossa for helping me carry out this monograph in the best way and giving me advice, which contributed a lot in the journey of this work. Last but not least, thank the school for giving me the opportunity to do this monograph which will give me experience and knowledge for future projects.

Summary

This monograph is about how it has influenced the application of new technologies in the practice of soccer in our country. Focusing on 3 different aspects, the first is to make known which are the new systems and devices that are being implemented, as well as their functions, where they are used and who are those who occupy them. Highlighting the VAR as the most important, innovative and controversial at the same time because fans and many experts in the sport have complained that it reduces the passion generated by soccer and even if it makes the game more transparent and fairer does not completely convince the public. Another aspect that also includes this study are the advantages and disadvantages that bring or have each of the new technologies that have been applied in recent years. The majority of the advantages are towards the players and coaches since they all try to raise the collective and individual performance of the team, and the disadvantages are more those that affect the soccer match, and the decisions that take the referees since this despite being a system is still controlled by humans and continues to generate controversy when choosing in situations that can change the course of the match. Finally, this monograph explains the causes and consequences of implementing these technologies, being many good but the negative generates so much controversy that can overshadow the success of new systems and devices that are being applied. In Ecuador many of these technologies are still not used, but in international tournaments these changes have been felt. Reaching the conclusion that they are necessary to improve and further develop this sport but still need better management of them.

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Introduction

The present task is a monographic research work with the theme *How has the application of new technologies influenced the practice of soccer in Ecuador*; whose purpose is to publicize the evolution of the beautiful game and all its changes, whether in the rules or in the playability of teams, which have occurred thanks to the implementation of these devices and systems. It is also essential that fans of this sport have a new way to enjoy it with all the innovations that have been added, knowing the advantages and disadvantages brought by each of them.

Soccer has been the most watched and fanatical sport in the world for a long time, therefore it is called the king sport. As everything in life has changed for the better; football has not been left behind and technology has invaded this field in recent years, the implementation of systems and devices within this world has grown and games have suffered changes. In our country not all the innovations have arrived yet, but the consequences of the technologies that are already being applied in our environment can be noted.

For the present study has been taken as the main reference to the book “*the new technologies applied to football*”, much of the information and quotes were taken from that text that refers to everything that involves the technologies in this sport. At the time of conducting this research has not found many books on the subject as it is a new topic and to supplement the information has been compiled from articles from official sources such as FIFA and different federations and associations of this sport that explain how the rules have changed and some specific rules.

Technology has invaded the world in recent years and major sports companies have incorporated different measures to innovate their actions, events or spectacles. Soccer being the most watched sport was the most controversial at the time of wanting to implement new systems because many people believe that the essence will be lost; FIFA has decided that soccer must evolve and change making it fairer and more entertaining for all actors in this sport so the new systems and devices have been put into practice and, like everything, has both positive and negative consequences.

It is important for fans of this sport to know about the changes that have occurred through the influence of the application of new technologies, and the monographic study that I present consists of 3 chapters that are divided into which are the different systems and devices that are being applied, the advantages and disadvantages that present each, what caused the use of these technologies and what has been their effect or consequence either on or off the field of play. Each one with its respective conclusions and recommendations that allow the reader an overview of the influence of technology on this sport.

Chapter I

New technologies in soccer

1.1 Technologies applied inside the soccer field

There are many technologies that are used in the soccer field and it can divide into two groups. Some are applicable in decisions made by referees and the others are used for players.

1.1.1 Technologies applied on the referees.

These are the ones that help the most in the match, helping the referees to take the fairest decision for any situation that may arise. The technologies that are currently used the most are the VAR and the GTL.

The use of technology for the king's sport is one of the most controversial issues of today.

You have to bear in mind that the referee plays a very important role in soccer, but it is also important to bear in mind that he is a human being, susceptible to make mistakes like all of us. (Torres, 2015, p.2)

The decision of the referees in a football match is very important and influential, therefore the new technologies help a lot to make the match as fair as possible.

1.1.1.1 VAR (Video Assistant Referee).

This system is the first use of video technology to reach better decisions in the match. This only applies when the referees have been wrong and need to consult and analyze it from a better view. It is used in situations such as:

- Goals: When there are doubts if the goal is valid or not.
- Penalties: To be sure whether the fault should be sanctioned or not.

- Straight red cards: Certain violent actions are not seen in the first instance, so the VAR is required whether or not to penalize.
- Mistaken identity: If the referee sanctions the wrong player, the play is reviewed through the VAR.

The VAR is the newest technology and is the one that helps the referees the most, although it still has many criticisms since it does not allow the game to be fluent.

1.1.1.2 GTL (Goal Line Technology).

This system is used to determine if the ball crossed the goal line completely. This technology is used through a watch that only the match officials have, this watch takes a second to tell if it was a goal or not and manifested by vibration. Until now it is one of the most effective systems within the soccer field since it does not interfere with the game and the signal is only sent to the referee.

“The system consists of a chip that detects if the ball has really entered the arc or not. The company KINETICAL, (...) put into practice an application of arbitration management that greatly facilitates the work of these men” (Torres, 2015, p.1). As it says in the quote, the GLT facilitates the referees’ job a lot and also does not stop the match turning it into one of the best that has been applied in this sport.

1.1.2 Technologies applied on the players.

This type of technologies is those that the spectator or amateur cannot see at the moment in which he is enjoying the game since they are used in the uniforms of the players. Its purpose is to improve the performance of players without breaking the rules that FIFA establish.

1.1.2.1 Electronic devices that measure players' performance.

It is a system that uses cameras and laptops that track the movement of the player throughout the soccer field, heart rate monitors are also used to measure physiological parameters. There are different ways of physical tracking devices:

- Local positioning systems (LPS)
- Sistema GPS
- Camera systems based on optics

These systems are those that are available in the market and that better results are reflect in the performance of the players.

1.1.2.2 New materials that are used in players' implements.

The materials that are used in the players' implements, must be resistant and support the different elements and environmental conditions that can be presented in a soccer match.

The materials that are the most common in the uniforms of a soccer team are the following:

- Absorbent polyester: This absorbs moisture allowing the sweat to come out faster helping evaporation to be efficient.
- Double knit polyester: It is durable and is used in uniforms that have a lot of wear.
- Polyester mesh: Its fabric allows the air to flow more easily therefore the cooling is maximum.
- Air-Knit polyester: It has small perforations helping the air to have a better fluidity and has more durability than the previous ones.

All these materials are intended to improve the comfort of the soccer player, helping him only to worry about the game and thus improve his performance. Torres (2015) says that

soccer shoes have also evolved and what the current technology offers in the soccer shoe, among other features, are comfort, lightness, freshness, stability and design, as the power and type of hit depends basically on the individual technique of the soccer player. These shoes help to improve the player's performance.

1.2. Technologies applied outside the soccer field

In this sport technology has not only invaded the playing field, it has also taken training thus helping the coaches to plan the game system he wants to apply in the match.

1.2.1 Technologies applied by the coaches in training.

Coaches have a fundamental role within a football team and need to apply the best resources for their players to achieve a better level of performance.

Cuadrado, Jimenez (2014) say: "If the goal of training for any player or coach is the improvement of performance, for this you will need to put into practice the most advanced means and resources and know more precisely the effects of training" (p.102). As mentioned in the quote, they look for the best resources to have an adequate training for the results they want to achieve.

1.2.1.1 Working with videos.

Nowadays many coaches have worked hard to work with technology in their training and the main help on which they rely is the video. Gonzáles (2008) says: "The video allows us to access information that we could not reach with direct observation" (p.2). This quote allows us to reflect on the importance of video within the soccer world, it helps to watch the mistakes of the players and how the team adapts to the different game systems that the coach wants to apply in the team.

“The video is an impressive didactic support to get the player to internalize what we want to transmit” (González, 2008, p.2). In this phrase we can notice that another aspect to consider about the video applied in training is that it does not only help the coach to have a better view of his work, it also helps to make the communication between coach and player easier and more effective.

1.2.1.2 Working with drones and GPS.

Drones are an add-on to video work, as this device allows the training to be recorded from different angles. Thanks to this the coach with his entire team can analyze the work in a complete way and the result will be effective.

GPS is another device that helps the training to be evaluated in a better way. Mainly its function is to follow the whole players' movement through the playing field and helps to be clear about the positioning of the players. The coach will have knowledge of what is the best way to use their players and thus improvement the performance of the team in general.

Chapter II

Advantages and Disadvantages generated by the technologies

2.1 Advantages

Technology has invaded this era and football is no exception. Recently different technologies have been developed which generate advantages on and off the field. In general, they help to make the game fairer and to make as few mistakes as possible.

2.1.1 Advantages inside the soccer field.

The application of technology is more influential inside the field; therefore, it is easier to identify its advantages. Players and referees are the most affected by new technological developments since they are the ones who act within the game.

Cuadrado, Jimenez (2014) says: “The soccer ball has a chip that indicates if the ball has entered the goal, just as the VAR avoids injustices and in the long run makes the best end up winning” (p.110). This quote reflects the main advantage that is to increase the level of justice and veracity in the decisions made in the match in order to make the result more transparent. Referees can be highly criticized, and technology helps make their job easier, because their decisions directly affect the match and can change results due to factors external to the match.

2.1.1.1 Advantages of the players.

Soccer players are responsible for making the match a spectacle and trying to make it more eye-catching and entertaining. The technology helps to make their work easier, for example, the new materials with which the uniforms of the football teams are produced helps the player to concentrate on the game and not to worry about external factors.

As I mentioned before one of the main advantages is the improvement of uniforms, the use of special fibers allows good ventilation of the body and very fast drying, among others.

These fibers help to reduce the unpleasant sensation of humidity and with it the heat. This helps the footballer to relax during the match and to do his work better.

Another advantage that I would like to emphasize is that due to the advancement of technology the injuries have reduced recovery time. For example, before they lasted from 6 to 8 months and now thanks to the implements the time is under 50%, 3 or 4 months depending on the injury. The monitoring equipment, the use of video and sensors allow to better study the development of the soccer player.

2.1.1.2 Advantages of the referees.

In recent years, innovative and controversial systems have been implemented, for example, the VAR or the GTL which are the most named and known as they can be seen and are applied in most parties today. Referees are the beneficiaries of these technologies as they provide more justice at the time of their decisions, if applied the right way.

There are also technological advances that are applied in the referees to facilitate their work on the field.

The advance of technology has allowed referees in a football match to communicate with each other through the use of headphones in each of them, this means that there is no need to sign in order to communicate, as the headphones are high-tech and are linked together, which is very useful for referees. (Torres, 2015, p.40)

It is very important the communication inside the matches since errors are omitted and the referees can clarify their doubts with the assistants. Referees have been the most benefited

by the new technologies in the field because it makes their job easier and the game has more fluidity.

2.1.2 Advantages outside the soccer field.

Outside the field, there are also advantages. In the training and in general towards the league that is applying them, the technology generates results that help the playability of this sport increase its level. Although they do not directly affect soccer matches, they do have an influence within them because the agents participating in the matches use or are affected by these technologies and their advantages.

2.1.2.1 Advantages in training.

The coaches are in charge of making the training innovative. Currently, different devices or elements are used such as videos and recordings of the sessions, there are also drones and GPS. These favor the team that applies them because it generates better results.

Drones are the best-known technology used in training. It helps to have a better vision of the positioning of the team and also to analyze the movements of each player in order to study it better, to take advantage of its abilities and therefore to improve the level of the team and squad.

2.1.2.2 Advantages of the league that applies it.

European soccer leagues are the most developed in every sense. Therefore, they have resorted to technology to have the best football in the world. This is more for marketing than to grow the passion for this sport but there is no denying that they have made the games more eye-catching.

The technology in the major leagues has generated more views and therefore there is more capital to innovate this sport. We have to focus on European soccer because in Latin America these techniques are recently being implemented. For this reason, soccer in that area is more famous and known worldwide, because technology attracts and makes their games more interesting and fairer. This is an advantage for the league because it is better known and with the capital that comes in it can raise its level of competition.

2.2 Disadvantages

Technology as everything in life has its good and bad side, has advantages and disadvantages and football has suffered many of these. Inside or outside the field technology has influenced many factors that despite improving justice within the matches has also generated bad things.

2.2.1 Disadvantages inside the soccer field.

The main disadvantages within the field are presented by the misuse of technology. The new systems that are applied are more precise and scarcer of failures, but they are still human who apply them and there are many doubts at the time of using them.

Also, the use of these technologies, mainly the VAR, removes a lot of emotion and spectacle to football, since you have to wait a few minutes to celebrate the real goal. Also, whether you like it or not, the little squabbles of the footballers that with this technology would be very well watched have their morbid crumb (Torres, 2015). It is a disadvantage because it loses the essence that has football from its origins and the interest in supporting the team with which you feel identified is going to lose prominence.

The controversy has always existed in soccer and the implementation of technology was done to eradicate it, the people responsible for using the devices and systems are human beings and continue to make mistakes. These errors make failure more criticized because there is no justification, for the technology they have at their fingertips. This makes the new implementations seen as useless and just a waste of money.

2.2.2 Disadvantages outside the soccer field.

The misuse of technology also affects the world of off-court football. The organizations or soccer leagues that apply these technologies become vulnerable to criticism that stains their image, specifically as corrupt.

In South American football, specifically, CONMEBOL, is new in the implementation of technology and has caused the displeasure of fans since it could not be used in the best way. On the other hand, the European leagues have become more consolidated and there are not many controversies as in the leagues of the American continent.

Chapter III

Causes and consequences of technology in soccer

3.1 Causes of technology in soccer

Technology is progressively evolving and has been introduced in different areas that needed an actualized change, and soccer was no exception. There are many causes that occasioned the implementation of different innovative systems and materials that contribute to making the game more dynamic, but it could be said that the main cause was that soccer cannot remain stagnant and needed new methodologies to develop this sport.

Although historically soccer has not been very attached to technology, it is true that technology has always done its best to please it. The beautiful game would not be the same without inventions such as the radio, television or even the Internet, which made it known and massified, creating passion in millions of people in the remotest corners of the world.
(Torres, 2015, p.30)

This quote says that soccer never gave importance to linking with technology, but many aspects around it grew and developed in such a way that soccer had no choice than to implement innovative measures to grow with the environment in which it was.

3.1.1 Causes of the technology inside the match.

In the soccer matches the use of technology was minimal since the organizations, federations and major soccer leagues were afraid of losing the essence of this beautiful sport. It was not until a few years later that space was given for systems to be applied and thus innovate the sport. The controversies generated by the polemic actions inside the parties were the main cause to study the possibility of including a system that contributes to the decision of actions that can change the direction of the match.

It can be said that the pressure exerted on referees generated the desire to implement different techniques to make their decisions more visible and transparent. The desire to improve the performance of the players was also a cause that influenced the technology to become part of the community of this sport. Every year the teams want to stand out from the others and competitiveness rises so they force each other to look for methods, whose purpose is to raise the level of play of their players, this includes different devices and materials that provide the development of their skills.

3.1.2 Causes of the technology outside the match.

The external context of the game was the one that influenced the technology to be completely attached to soccer as it is today, thanks to the brands that needed a step into a new era of soccer. A clear example is the football stadiums, which in the most developed football leagues have been adding systems into the stadiums for the fan to better enjoy the show, comparing it with the stadiums that are in our country that are needed for these systems to attract the attention of the spectators and provide a good experience. Therefore, the necessity to improve the football facilities was one of the causes that technology enters the world of the king sport.

More attached to the game, but took place off the field, were the actions that coaches took in their training. To improve a team must train with the best methodologies and tools, therefore, arose the need to apply new methods which include devices and systems with a great technological advance, the team coaches requested this to the management to achieve the objectives and this was another cause that technology is part of the football environment today.

3.2 Consequences of technology in soccer

It is clear that technology has changed the way we watch soccer games or soccer in general. This has caused different discussions about whether it is being used correctly, but it has also facilitated the function of many factors within the sport making it improve with its transparency and honesty inside the games.

Soccer is passion, goals, shouts, but it is also technology, after each game a whole group of technicians and technological gadgets moves to make the experience of the game better and more transparent at the time of making decisions in the soccer game (Torres, 2015). Soccer now has a structure full of new methods, systems and teams that work to make everything go well and give a good show to the spectators and fans who are passionate about this beautiful sport. There are also controversies that even with technology have not been cleared, but the progress that has been obtained thanks to this has been a great evolution for the development of the game and that each time is a more complete sport.

3.2.1 Consequences of the technology inside the match.

In recent years technology has influenced more inside the playing fields, since different systems have been implemented that help referees and players to make matches fairer and that decisions are legal and that all spectators can transparency of actions, as well as different materials and substances that contribute to the performance of players.

One of the new and most famous systems is the VAR, this has generated controversy but today has been accepted in the biggest competitions of the sport, such as the World Cup. It helps referees to make the fairest decision regarding the moves that are presented and also to leave no doubt about the decisions. Cuadrado Jimenez (2014) says: “The application of

the VAR has been vital in several passages of the Champions Tournament, either to detect offside situations or hand with direct influence on goal occasions” (p.136). As the quote says, VAR participation has been very important in the championships that have been implemented because its function is to analyze the situations that can change the course of the game, so it directly affects the outcome of the game. Unfortunately, it is not a perfect system since it is a human being who applies it and that generates more controversy, as a consequence of this, the soccer matches have become a little more pause.

3.2.2 Consequences of the technology outside the match.

The consequences outside the soccer field are those that have had a better acceptance by the fans of this sport. What stands out most are the structures and facilities that the teams have thanks to technological advances, the stadiums now have greater capacity and better attendance to spectators, the sports centers that have been enhanced with implements that promote the development of the team. All this applying new devices and systems being this a favorable consequence for soccer since the technology increased the level of players' performance and improved the way of seeing the spectacle.

Conclusions

At the end of this monographic work it is concluded that:

- There are many new technologies that are being applied in many countries and leagues around the world, each and every one of them have brought changes to the playability and strategies of teams, while there are also others who feel these changes as referees and organizations being these the main image of the league or federation they represent. Describing the most important and general characteristics of the systems and devices that are being implemented, it can be said that all try to give a spark of innovation so that football is seen in a simpler way, but behind everything is a very complex mechanism in which all actors whether players, coaches, referees or managers have to use these instruments in the most effective way.
- The implementation of these devices and systems in the world of soccer have intervened in the actions that the players, coaches, directors and mainly the referees since they are made to facilitate the work of all the actors of this sport, unfortunately they are not always the help that they should generate. There are advantages and disadvantages to each of these innovations, the advantages in general are more present in the implements used by players today because they make their level grow, and that matches have the fairest possible result by emphasizing the transparency of decisions taken in the game. The disadvantages are clear since they are observed in many matches, mainly in the most watched leagues in the world, although the systems are as advanced and accurate as possible are still handled by humans and

- although the existence of the margin of error is lower than before but more controversial because the use of these systems mean that there should be no failures.
- In order for these new systems and devices to be implemented in the most watched sport in the world, many situations had to happen that affected the dignity of this healthy sport, and they also waited a long time compared to other sports, so the administration of the leaders was judged. The causes that led to the decision to add new techniques in soccer are based on the fact that the game needed to develop and do something different inside and outside the field, it means to make soccer look like something new but with the same passion that has always characterized it and that fans are pleased. Since all changes that are applied bring consequences these measures were not the exception, there are positive and negative consequences which have made soccer be seen from a more analytical perspective. The good thing that these changes have brought focuses on the fact that now the matches are fairer and that is easier for the level of the players to be the best; the negatives have as a center that an error that is committed will be judged in an excessive way because the implementation of these systems are made so that there are not these doubts, they also make the passion of this sport decrease.

Recommendations

At the end of this work it is recommended:

1. Given the recent changes that has suffered the favorite sport of many people, there is an urgent need to explain what the causes of them have been and that the consequences always bring advantages and disadvantages. All fans of this sport should bear in mind that football has changed and the way we see it, therefore has to change as well, knowing how these technologies work and trying to understand that the passion of this sport will continue as long as the fans continue to support the best way and that the technologies are simply to facilitate the work and have a better experience of the spectacle.
2. The soccer matches have changed either in how teams play or in which it is now normal to see that decisions are made through VAR checks, or another system to make the fairest decision, for a league like that of our country that still do not use these systems is advisable to see the most developed leagues where they apply them, in order to know more about how they work and get used to see these actions as normal in this sport today.

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