

The Chain Reaction Between the Media and Sport. The Impact of Rule Changes in Handball

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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ABSTRACT

A long, historical cooperation exists between sport and the media. The media can lift up the profile of a sport, and sport provides a marketable topic/product to talk about. Rules have been changed and playing conditions adapted to add to the glamor and spectacle of sport, thus making sport more marketable, enhancing media coverage and making it more appealing for the viewer. In the history of handball, rule changes have been introduced for the same purpose. However, changing the rules has a great effect on the team's performance, and thus on the coaches' work as well. There is no doubt that among the rule modifications introduced by the International Handball Federation (IHF) in 2016, substituting the goalkeeper for another court player during an attack without wearing a special shirt has had the greatest impact on the game in recent times. The main aim of the study was to carry out empirical research in order to analyze the recent rule modifications by the IHF, particularly when substituting the goalkeeper for an extra court player during an attack. The 2017 World Championship in France provided an ideal opportunity to collate data in order to explore how often and effectively teams used this rule change at the latest world event. In addition, we have also sought out the opinions of elite coaches concerning the state of current rules in handball and what they would change in order to make this sport discipline more marketable for the media and for spectators. The results show that teams substituted their goalkeeper for an extra court player when in numerical inferiority on average twice as much as when in numerical superiority and on average twice as often when losing as when winning. Surprisingly, the teams' average scoring effectiveness was a little bit higher than when they played in numerical superiority or with an evenly reduced number of players. In addition, the outcome of focus group interviews shows that most coaches think that measuring the attacking time, introducing the third referee into the game, and having better judgment concerning the fast start-off is necessary for the betterment of the game.

KEYWORDS

performance analysis, handball, numerical superiority / inferiority, empty net-goal

Introduction

A long, historical cooperation exists between sport and the media. Sport has a global reach; it is accessible to all and evokes emotional highs and lows like no other form of entertainment. The value of linking sports with brands has been understood for well over a hundred years. As early as the 1890s, sports newspapers and pamphlets carried advertisements for various "healthy" tonics or for the latest

innovations in lawnmowers to enable the suburban upper middle classes to have perfect lawns for tennis and croquet. Victorian and Edwardian sports administrators started to create special jargon (today it is called sports journalism) in an effort to both inform and persuade the public about the benefits of sport, to lobby for changes within the national/regional organizations, or to modify the rules of the game (Vamplew, 2004).

In as early as the 1870s in the United States, tobacco cards featured the baseball stars of the day. For the Berlin Olympics of 1936, Adi Dassler (Adidas) provided spikes free of charge to the sprinter Jesse Owens (“Jesse Owens secretly wore German shoes”, 2017). In its early years, sports marketing was purely about product placement and building product credibility, but the real growth in sports marketing is inextricably linked to the rise in TV coverage of sport over the last 50 years. Since the 1980s, the use of sport-to-market products and services has grown phenomenally. Sport has become more of a product that is manufactured, bought, and sold. Consequently,

“the media’s increasing involvement in, and control over, sport and sports organisations has put it in a powerful position to dictate the characteristics of events or, indeed, even to change fundamental aspects of a sport (e.g. its rules) ...” (Stead, 1986, p. 189).

Essentially, the media has come to play an increasingly influential part in both the construction and destruction of sporting structures and practices. It has been influential in creating and developing new competitions, events, and leagues.

Rules have been changed and playing conditions revised so as to make the game more entertaining, enhance media coverage to the widest audience, and give viewers the feeling that they are actively participating in the game and getting their money’s worth (Curtis & Loy, 1989; Devine, 2000; Leonard, 1988; Lewis, 2013; McPherson, Curtis, & Loy, 1989; Sage, 2002). In her blog, Mariah Gillespie (2011) states that “...the role of television in the development of the sport has contributed to rule changes, the implementation of a code of conduct, and an increased popularity in the sport.” Even the clothes athletes wear and the equipment they use have come to reflect media-related interests (Houlihan 2003). For example, night games and colored clothing in cricket; tighter, “figure hugging” clothing in female sports like netball; rule changes to speed up play in hockey and netball; golf changing match play to stroke play to help ensure that the big-name golfers were in the final stages, when most people watch TV; tennis introducing the tiebreak in the 1970s to replace long, boring deuce games; and, in as early as 2019, the introduction of the shot clock at ATP tour matches to allow players and the crowd to see time ticking by, thus heightening tension and excitement for the viewers (Cashmore, 2000; “Shorter sets and shot clocks”, 2018). In handball, the media has also influenced the length of the break between halves from 10 to 15 minutes not because it is better for the players but rather so that they can provide more time for publicity for their TV sponsors (IHF 2016b). Furthermore, as part of its *Media Regulations*, the International Handball Federation (IHF) recognizes the role of the media in making “handball a more popular sport” (IHF, 2016a, p. 3). These are just a few examples of sports trying to add glamor and spectacle, thus making them more marketable. In fact, Coakley and Pike (2014) pointed out the five objectives of rule changes in commercialized sports:

- to speed up the action,
- to increase scoring chances,
- to ensure a competitive balance so that the outcomes are uncertain,
- to maximize dramatic moments,
- to provide enough time for commercial breaks (for example, in half time).

In the history of handball, rule changes have been introduced for the same purposes. In 1949, the football-like offside rule was cancelled to make the game more fluid and to help attackers score more often. In 1956, the way of bouncing and dribbling was changed in order to enhance the players’ advance. In 1966, field handball was officially ended, and the game moved to indoor courts to make it all-season and more accessible. In 1997, the fast throw-off was introduced into the game to further speed up the play and increase the number of goals.

Changing the rules has a great effect on a team's performance, and thus on the coach's work. Some changes are advantageous for a certain team and some changes are not. Whatever the changes, the coach's and/or the team's tasks have to be adjusted in order to diminish the negative impact of the new rules or even to take advantage of them.

On July 1, 2016, the IHF introduced some new rules and also modified the interpretation of others: in order to make passive play more understandable for players and spectators, they *maximized the number of passes* after the referees' warning signal to 6 passes; in order to better inform the spectators, players, and officials about the referees' signals, the *blue card* was introduced; for serious and dangerous infringements of the rules *in the last 30 seconds*, the other team is awarded with a penalty shot. In order to avoid holding up the game often and for long periods of time, an *injured player has to leave the court* for three attacks; most importantly, *substituting the goalkeeper for an extra court player in an attack* changed the game dramatically.

There is no doubt that among the rule modifications, substituting the goalkeeper for another court player in an attack without the player wearing a special shirt has had the greatest impact on the game. Of course, teams have needed some time to respond tactically. The Olympic tournament in Rio was the first major event where the impact of this rule change was first witnessed, but as the stakes are usually high in this competition, most of the coaches did not risk applying it regularly. However, the teams had enough time to prepare for it the following season, and the matches of the 2017 World Championship in France provided an ideal opportunity to collate data and draw some conclusions.

Objectives

Aside from its many values, sport is also entertainment. Thus, every discipline needs to accommodate itself to some extent to the expectations of the media, which in turn helps to broadcast the sport, making it more popular and accessible to the public. This may often take the form of rule changes. Therefore, it is like a chain reaction that not only impacts the public, but also has an initial and more immediate impact on the coach and players, who have to adopt the new rule changes into their training and then into their match tactics. Hence, we decided to investigate the impact of the new rule in handball where the goalkeeper may be substituted for a court player.

The main objective of this study is to answer the following research questions:

1. How often do teams substitute the goalkeeper for an extra player?
2. In relation to the score line, in which game situation do teams tend to use this tactical move more?
3. What is the success rate of applying these tactical maneuvers?
4. Is there a correlation between the final ranking / success of the team and how often this maneuver was applied?
5. How did the teams use the opportunity of an empty goal?

Through the exploration of elite handball coaches' opinions on the state of the current rules in handball and their suggestions regarding possible changes for the future, we also seek the answers to the following questions:

1. What is their opinion about the current rules of handball in general?
2. How would they change the rules in order to make handball a better game?

Methods

During the World Championship, we analyzed the 15 matches played by the 6 teams in Group C. Before the competition, we designed an observation sheet for the game situations where:

- The coach brings an extra court player into an attack to replace the goalkeeper when in numerical equality (marked: **GK7vs6**);

- The team, in order to compensate for numerical inferiority, substitutes the goalkeeper for an extra court player during the attack (marked: **GK6vs6**);
- In other situations, the goalkeeper leaves the court for a court player teammate (marked: **GK6vs5**, **GK5vs6**, **Gk7vs5**).

In these game situations, we were interested in the following criteria:

- Number of attack attempts with the replacement;
- Actions and consequences during the attack (goal / goal shot, lost ball, forced to passive play, tackled and stopped by the defenders);
- Number of scoring attempts on the empty goal.

As a follow-up, during the European Handball Federation's Master Coach Course in Porec, Croatia, we organized two focus group (N = 52) interviews with the participants about how they would change the rules in order to make handball more exciting and easier to understand. The 46 male and 6 female coaches, who represented 13 different countries and various levels of handball in Europe, expressed their opinions about:

- the state of the current rules in handball and
- possible rule changes for the future.

Results

The frequency of teams substituting the goalkeeper for an extra player

All together, the teams attempted to play with an extra attacker instead of the goalkeeper a total of 319 times / 15 matches. When in numerical equality, the teams attempted to substitute the goalkeeper for an extra court player (GK7vs6) only 98 times, while when they were shorthanded (GK6vs6), the number of attempts doubled (194). In other game situations, such as GK6vs5, GK5vs6, or GK7vs5, the coaches attempted to take advantage of this rule only 27 times, an average of twice per match. During the 15 matches of the group stage, the two teams combined had an average of 106.4 attacks / match (total: 15 x 106.4 = 1596 attacks) and 319 attack attempts / 15 matches (19.98%), which can be considered a significant percentage. This means that the teams' every fifth attack on average was attempted with the changing of the goalkeeper for an extra court player.

When analyzing the teams individually, it can be established that Saudi Arabia (72 attempts / 5 matches = average 14 / match) and Croatia (65 attempts / 5 matches = average 13 / match) were the most active, while Belarus was the least daring (28 attempts / 5 matches = 6 / match). Surprisingly, Hungary did not attempt to play with an extra court player at all when in numerical equality, but with 36 attempts it was the second-most active when one player down.

Generally speaking, it can be stated that the teams did not use this new rule to gain advantage of an extra player situation. Rather, they used it for compensating for the suspended teammate during an attack (Table 1).

The game situation in which teams tend to use this tactical move in relation to the score line

When playing in numerical equality, teams tend to take less risk and attempt to substitute the goalkeeper only sometimes for an extra court player (98 times / 15 matches). In this game situation, the coaches take the goalkeeper off when losing twice as many times (67 out of 98) as when leading (27 out of 98).

Germany only applied this maneuver when leading (36 times out of 37 attempts!), while Saudi Arabia tried to take advantage of an extra court player when they were behind (70 times out of 72 attempts!). Croatia provided the best balance when GK7vs5 (13 and 18), while Hungary attempted to play with an extra court player 21 times when winning and 15 times when losing the game in a GK6vs6 situation (Table 2).

Table 1. Cumulative statistics of each team in Group C after 15 matches

TEAMS Group C.	Time spent in Num. Sup. / Num. Inf.	Attack attempt with GK	Goal / goal shot	Lost the ball	Forced to passive play	Stopped by fault
1. GER	26 / 30	11	5/9	0	0	2
2. CRO	36 / 34	35	13/24	3	1	7
3. BLR	46 / 42	1	0/0	1	0	0
4. HUN	28 / 42	0	0/0	0	0	0
5. KSA	36 / 46	39	11/18	10	0	11
6. CHI	52 / 32	12	3/7	1	2	2
GK7 vs 6	Total:	98	32/58	15	3	22
1. GER	26 / 30	26	7/13	4	1	8
2. CRO	36 / 34	30	8/12	4	0	14
3. BLR	46 / 42	27	11/18	1	2	6
4. HUN	28 / 42	36	11/22	3	1	10
5. KSA	36 / 46	33	4/11	5	3	14
6. CHI	52 / 32	42	9/16	4	2	20
GK6 vs 6	Total:	194	50/92	21	9	72
1. GER	GK5vs6	4	0/2	2	0	0
2. CRO	GK6vs5 GK5vs6	1-1	0/0	1-0	0-0	0-1
3. BLR	GK6vs5 GK5vs6	1-1	1/1, 0/0	0-0	0-0	0-1
4. HUN	GK6vs5	1	0/0	1	0	0
5. KSA	GK6vs5	2	2/2	0	0	0
6. CHI	GK7vs5 GK6vs5	16-1	6/11, 1/1	1-2	0-0	1-0
Others	Total:	27	10/17	7	0	3
TOTAL		319	92/167	43	12	97

Source: Authors' own study.

The success rate of applying these tactical maneuvers

In order to gain some quantitative data regarding the effectiveness of the maneuver, I analyzed the success ratio of goal shots and compared them to the average success rate of the teams. Surprisingly, the average scoring ratio of the six teams during the tournament (58.8%) is higher than the shooting percentage when playing with numerically superior or equally reduced teams (55.0%). Also, it is interesting to note that the teams scored with a slightly better percentage on average with an equal number of players during both attack and defense (GK6vs6 = 55.6%) than when playing with an extra player in an attack (GK6vs6 = 55.1%) (Table 1).

The correlation between the final ranking and the regularity of this maneuver

Among the teams from Group C, Croatia advanced the farthest in the competition (finished fourth), and during the group stage they were the second-most likely to play with an extra player in an attack (65 times with a 58.8% shooting percentage). Group C winner, Germany, scored 5 goals out 11 attempts when playing in numerical equality with an extra court player and lost the ball only 4 times when they unsuccessfully attempted a goal shot. This can be considered a careful and rather safe play. In the GK6vs6 situation, Belarus was able to compensate for the loss of a suspended teammate with an impressive record: out of 27 times attempting to play with an extra court player, they were able to finish the attack with a goal shot 18 times, scoring 11 goals and losing the ball only 3 times due to technical error or passive play (Table 1).

Table 2. Attack attempts with the goalkeeper in relation to the score line

TEAMS Group C.	Time spent in Num. Sup. / Num. Inf.	Attack attempts with GK	When leading	When losing	When there is a draw
1. GER	26 / 30	11	11	0	0
2. CRO	36 / 34	35	13	18	4
3. BLR	46 / 42	1	1	0	0
4. HUN	28 / 42	0	0	0	0
5. KSA	36 / 46	39	2	37	0
6. CHI	52 / 32	12	0	10	2
GK7 vs 6	Total:	98	27	65	6
1. GER	26 / 30	26	25	0	1
2. CRO	36 / 34	30	21	5	4
3. BLR	46 / 42	27	7	4	16
4. HUN	28 / 42	36	21	15	0
5. KSA	36 / 46	33	0	33	0
6. CHI	52 / 32	42	11	27	4
GK6 vs 6	Total:	194	85	84	25
TOTAL		292	112	149	31

Source: Authors' own study.

Usage of the empty goal opportunity

Considering the oppositions' goal was empty 319 times, the teams attempted to score directly from their own half before the substituted goalkeeper could get back into his goal area only 21 times (14.2%). The number of goals scored directly (13) during the 15 group matches did not even reach the average one-goal-per-game ratio. The court players more often attempted the direct throw (8/14), but the goalkeepers scored with slightly better accuracy (5/7). Individually, Chilean goalkeeper Felipe Barrientos in two matches scored 3 direct goals out of 4 attempts including an outstanding 3/3 (in 13 minutes) against Saudi Arabia (Table 3). As a lecturer during the European Handball Federation's Master Coach Course in Porec, Croatia, I organized a focus group interview with the participants about how they would change the rules in order to make handball more exciting and easier to understand. The 52 coaches, representing 13 different countries and various levels of handball in Europe, expressed the following opinions, summarized in brief.

Table 3. Shooting attempts towards an empty goal

TEAMS Group C.	Scoring attempts on empty goal	GK's attempts towards empty goal	Court players' attempts towards empty goal
1. GER	2 / 2	1/1	1 / 1
2. CRO	2 / 5	1/1	1 / 4
3. BLR	1 / 2	0/1	1 / 1
4. HUN	2 / 3	0/0	2 / 3
5. KSA	1 / 3	0/0	1 / 3
6. CHI	5 / 6	3/4	2 / 2
Total:	13 / 21	5 / 7	8 / 14

Source: Authors' own study.

Concerning the current rules of handball

When there is a need for a rule change, the IHF follows a strict and thorough procedure. The two bodies responsible for these matters (Rules and Refereeing and Commission of Coaching and Methods) discuss the possible changes, test them, and re-analyze their effects before introducing the new rules worldwide. Thus, every opinion collected from coaches is valuable for the process of further planning. This

is also a reason why I asked for the opinion of elite handball coaches about the state of the current rules and their suggestions regarding possible changes for the future. I noticed that coaches in general tend to approach the matter from a different perspective.

Some coaches approached the situation of a court player substituting for a court player when there is a 2-minute suspension from an ethical point of view: the 2-minute send-off is a punishment for the individual, but not a punishment for his/her team because it can still play 6vs6. Another vocal point for an argument is the fast start-off after conceding a goal: due to the speed of the game, most of the time the referees cannot judge it well. The judgment of passive play is another general concern: objective measurement is required, just like in water polo or basketball where the remaining attacking time is clearly visible for players, officials, and spectators alike.

According to our survey, the summary of suggestions for possible rule changes in handball are as follows:

- Regarding the fast start-off, they recommend that only the player who executes the throw has to be in a certain circle in the middle, or the game should continue with the goalkeeper's throw after a goal.
- Concerning passive play, most of the coaches believe that measuring the attacking time is a good idea and reduces the responsibility of the referee, relieving him or her of stress.
- According to many coaches, a third referee is also needed on the court because two referees cannot cope with the speed of the game, particularly in a fast break. Basketball is played on a shorter court and the game is slower than handball, yet they use three referees. So, why does this not occur in handball as well?

Conclusions

The relationship between sport and the media has long been a point of great investigation, and there is an abundant supply of research in this regard. However, if we investigate further how the media affects sport directly (through rule changes, for example), the research is sadly lacking. Whatever is available is usually newspaper reports and personal articles that are not based on scientific research. Perhaps this is because the information/feedback available would be difficult to quantify. Therefore, for us it was difficult to find already published material as a starting point. On the other hand, this further justifies the need for more research into the direct effect that the media has on rule changes in sport.

As has already been mentioned in brief, during the history of handball rule changes have always revitalized the game, and the spark has most often been ignited by the media. In the early stages of handball, the evolving rules were often adjusted to better suit the public. When field handball started to struggle a little and its popularity began to wane, it was necessary to re-size the playing field and reduce the number of players to adapt to playing the game indoors. Then, when our already established and popular Olympic sport needed another thrust, the fast throw-off was introduced to further speed up the game and produce more goals for the spectators. These changes aided the development of the technical-tactical repertoire of handball and at the same time gave coaches a new task: to adapt to these changes with new tactics. This work is well supported with any data collected at handball events, particularly at the World Championships and European Championships, where the best teams compete against each other.

Our quantitative analysis showed that:

- Teams substituted their goalkeeper for an extra court player while in numerical inferiority on average twice as much as when in numerical superiority.
- The coaches took off the goalkeeper and sent in a court player when losing on average twice as often as when winning.
- Surprisingly, the teams' average scoring effectiveness of the WCh was a little bit higher than when they played in numerical superiority or with an evenly reduced number of players.

- Similarly, the teams scored with a slightly better shooting percentage when they played with equal numbers opposed to when they played with an additional attacker.
- When playing with an extra court player instead of the goalkeeper, the teams only tried to attempt direct goal scoring to the empty goal occasionally; the number of goals scored in an empty/unprotected goal did not reach the average one goal per game.

Since this was the first attempt to collect some data about how often and how effectively teams play with an extra court player instead of the goalkeeper, these findings can be considered as a basis for comparison. Analyzing this game situation in the upcoming world events makes it possible to compare results and draw further conclusions, and thus offers the chance to establish trends and tendencies.

The coaches' valid comments clearly demonstrate the necessity of thinking about the effect of playing rules on the game. Thus, the question must again be raised: How do rule changes influence the game of handball?

During our research, we carried out a quantitative and qualitative analysis in order to learn more about the media's effect on the rule changes in handball while seeking the opinion of sport experts on the state of this game. With the evaluation of the statistical data, we wanted to see the effect of the most recent rule change – substituting the goalkeeper for another court player in an attack without requiring a special shirt to be worn – in an objective manner. With the general and particular comments of our focus group interviews, we expected to hear subjective feedback from those who are principally affected by the rule changes – the coaches. To this end, it is clear that the media has an effect on the development of the game, as it has in the past, because the new rule results in a more fluid game that lends excitement and thrill to the spectator because of the empty goal situation. Often the outside world dictates these things, but the evolution and development of the game still requires the input of experts to ignite rule changes. Therefore, the combination of both external and internal forces is necessary to bring about a positive change in handball that is both attractive to the spectator and beneficial for the players and coaches.

REFERENCES

- Boyle, R. (2010). *Sport and the Media*. University of Glasgow, Scotland. eprints.gla.ac.uk/44177/1/Boyle_final2.doc
- Cashmore, E. (2000). *Making Sense of Sports*. London and New York: Routledge.
- Coakley, J. & Pike, E. (2014). *Sport in Society: Issues and Controversies*. London: McGraw-Hill Education.
- Gillespie, M. (2011). *Tennis and Television: The Impact of the Media*. Retrieved September 20, 2018, from: <http://mariahgillespie1.blogspot.com/2011/10/tennis-and-television-impact-of-media.html>
- Houlihan, B. (2003). *Sport and Society: A Student Introduction*. London: SAGE.
- International Handball Federation. (2016a). *Media Regulations*. Retrieved September 20, 2018, from: http://www.ihf.info/files/Uploads/NewsAttachments/0_IHF_STATUTS_CHAP_16_GB.pdf
- International Handball Federation. (2016b). *Rules of the Game*. Retrieved September 20, 2018, from: <http://www.ihf.info/en-us/technicalcorner/referees/rulesandexperts%E2%80%99corner/rulesofthegame.aspx>
- Jesse Owens secretly wore German shoes at the 1936 Summer Olympics in Berlin. (2017, January 31). *The Vintage News*. Retrieved April 2, 2018, from: <https://www.thevintagenews.com/2017/01/31/jesse-owens-secretly-wore-german-shoes-at-the-1936-summer-olympics-in-berlin/>
- Josh, E. (2013). *How the Media has Influenced Football*. Retrieved September 20, 2018, from: <https://prezi.com/ssapvaxnml-s/how-the-media-has-influenced-football/>
- Leonard, W.M. (1988). *A Sociological Perspective of Sport*. New York: Macmillan Publishing Company.
- Levine, G. (2000). Technology and sport. *M/C: A Journal of Media and Culture* 3(5). Retrieved September 9, 2018, from: <http://www.api-network.com/mc/0010/sport.php>
- Lewis, J. (2013). *How the Development of Media Has Influenced Football*. Retrieved September 20, 2018, from: https://prezi.com/lyp_7yvezmxr/how-the-media-has-influenced-football/
- [McPherson, B. D., Curtis, J. E., & Loy, J. W. \(1989\). *The Social Significance of Sport: An Introduction to the Sociology of Sport*. Champaign, IL: Human Kinetics.](#)

- Rule changes send netball into new era of faster and more furious play. (2015, November 25). *The Guardian*. Retrieved April 2, 2018, from: <https://www.theguardian.com/sport/blog/2015/nov/25/rule-changes-send-netball-into-new-era-of-faster-and-more-furious-play>
- Rule changes with media. *Sports Media Weekly*. Retrieved September 20, 2018, from: <https://sportsmediaweekly.weebly.com/rule-changes-with-media.html>
- Sage, G. (2002). Global sport and global mass media. In A. Laker (Ed.), *The Sociology of Sport and Physical Education: An Introductory Reader* (pp. 211-231). London and New York: RoutledgeFalmer.
- Saini, D. (2015). Effects of media on sports. *International Journal of Applied Research* 1(4), 320-323.
- Shorter sets and shot clocks - ATP continues rule change experiment. (May 16, 2018). *CNN*. Retrieved September 20, 2018, from: <https://edition.cnn.com/2018/05/16/tennis/tennis-shot-clock-rule-changes-atp-us-open/index.html>
- Stead, D. (1986). Sport and the media. In B. Houlihan (Ed.), *Sport and Society: A Student Introduction* (pp. 184-200). London: SAGE.
- Vamplew, W. (2004). *Pay Up and Play the Game: Professional Sport in Britain, 1875-1914*. Cambridge: Cambridge University Press.

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