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Analytics on Service Quality in Spectator Sports

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Sport analytics has received significant attention since 2002 when Oakland Athletics almost won a World Series (the Moneyball effect). Since then, significant progress has been made in recruiting and scouting players and optimizing teams using player analytics. It is now possible to go beyond drafting players and into the finer details of the game, such as ball speeds, spin rates, player movements using wearable technology, breakaway speeds, because technology allows for automatic capturing of such data using video footage or other sensors on a real time basis. The data is analyzed and presented using visualizations and dashboards that are instantly made available to the users such as coaches, general managers, or fans. Coaches discuss post game takeaways, devise strategies to win the next game, and fans make projections in fantasy sports (Fried & Mumcu, 2017; Schroer, 2022). We can predict that this cycle of events will be even much faster, more intelligent, and more commonplace in the future. However, one area that still needs more attention from sport analytics is *sport quality*. In this article, we discuss how sport analytics can relate to service quality from the lens of co-creation of value in spectator sports.

In service industries, the service offering needs to be engaging and appealing to the customers as this will eventually create satisfaction. Similarly, to retain and expand spectators and fans, event organizers should provide a satisfying consumer experience at sporting events (Yoshida, 2017). In service research, it is commonly accepted that satisfaction from a service offering is through service quality (Parasuraman et al., 1988; Cronin & Taylor, 1992). Customers' perceptions of quality drive satisfaction as well as loyalty, sales, and profitability (Mitra & Golder 2013; Zeithaml 1988). The perceived quality can be defined as the subjective customer judgments about a service's overall excellence or superiority (Zeithaml, 1988).

In the context of sport services, academic research on sport quality is prolific. In their review, Yoshido (2017) reports that most articles either focused on direct experience of a sport (as a participant), or indirect experience of a sport (as a spectator). They make a distinction between "core sport product quality," which is based on elements pertaining to team, player and game characteristics (e.g., team standings, game results, star players, player skills), and "facilities service quality," which is based on ancillary services to the core sport product like service environment, facilities, and employees. The literature in

sport quality has investigated constructs and dimensions (e.g., sport programs, interactions, outcomes, and physical environment) leading to quality and satisfaction. Most research uses SERVQUAL (Parasuraman, et al., 1988) based instruments, including SPORTSERV (Theodorakis et al., 2001), SSQRS (Ko & Pastore, 2005), and QSport-14 (Yildiz & Kara, 2012). These instruments and scales are used to measure quality perceptions of customers experienced in a sport related event or service.

An interesting conclusion from this short review is the lack of sport analytics in the sport service quality literature. This is also true on the opposite end. We browsed the contents of top 10 books on sport analytics found on Amazon.com using search keyword “sport analytics” published between 2013 and 2022 and observed that most of these analytics books hardly include any chapter on sport service quality analytics. Topics such as customer relationship management, fan engagement, and talent management only partially capture the service quality concept. Thus, studies and applications focusing explicitly on modern data analytics applied on sport service quality is uncommon in the sport management literature.

Analytics and quality often go hand-in-hand. In fact, product quality is traditionally based on data collection, analysis, and statistical control whereby measurements on manufactured units are compared to product specifications (Deming, 1986). In services, where customers play a significant role in creating the service, the quality is considered the gap between customer expectations and perceptions of *co-created/ coproduced* service output (Parasuraman et al. 1985). In either case, data collection and analysis are essential elements for assessing and improving quality.

Coproducted Sport Service Quality

When we consider spectator sports as a service which is co-created by fans, players, teams, coaches, GMs, commentators, organizers, sponsors and other parties, and experienced through different environments (stadium, TV, cell phone, etc.), and in different modes (live, or recorded) assessing the quality of the experience is a multidimensional challenge. For example, Horbel et al. (2016) studied co-created value in sports using four different environments including large screen TV outside in a park or plaza, in a bar/pub, at home with friends, and finally at home alone. Each environment included a different level of spectator involvement, interactions with other actors, and different data collection techniques.

Furthermore, assessing sporting event quality from the perspective of the spectators provides information on just one side of the whole picture. Recent studies on services revealed the significance of taking a holistic perspective (Yoshida, 2017) to assessing the service experience. Namely, it is important to not only capture the perspective of the customers but also the perspective of service providers, managers, and their employees because if customers and employees perceive a co-produced service very differently (so called *incongruence*), resulting contradictions can hinder quality improvement initiatives (Ozkul et al., 2019; Benlian, 2014; Julien and Tsoni 2013). In the context of spectator sports, knowing the opinions and perceptions of players, coaches, GMs, organizers, and other key actors that play a role in the creation of the game experience is essential to possessing the full picture of the quality of the sporting event. For example, a great soccer game according to a certain player, team or coach can be perceived as unimpressive or disappointing by some spectators, commentators, or business managers. Data can show the extent and reasons for these discrepancies so that they can be addressed. These discrepancies could be differences

between what is expected vs. what is perceived in the service, or what one actor is perceived vs. what the other actor is perceived. Traditional surveys and interviews to get this kind of data may be inadequate. Additionally, data collected by automatic data capture devices typically available in most sporting events, such as video cameras, sensors, cell phones, apps, smart watches, drones, GPS, social media posts should be used to make this type of multi perspective quality assessment. These technological tools and advances are not only enhancing the game day experience (Greenhalgh et al., 2014), but also allowing the sport industry to make significant innovations towards understanding what sport actors (fans, players, coaches, managers, etc.) want and how to deliver it to reach the goal of sporting event satisfaction.

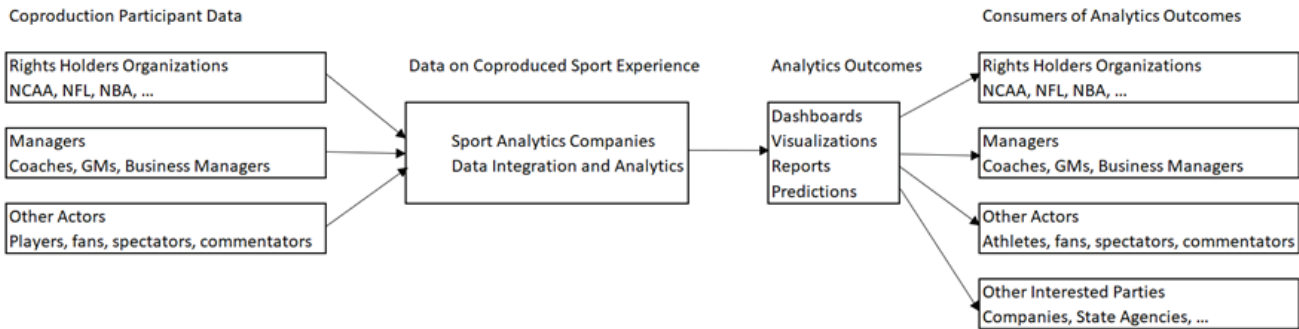
It is acknowledged that managers and organizers have no control on how a team plays for the day, and sport managers do not promise any level of actual game performance (Greenwell et al., 2002). However, it is the *perceived* game performance (rather than the actual game performance) that is essential. According to the basic premise of service co-creation, the game experience is not only created by the players and teams but also other active actors such as fans, opposing fans, sport commentators, and employees. Fans pay for tickets, attend games, sing battle chants and songs, perform moves, or create banners in or outside of the stadium as players play the game in the field, stadium employees deliver food or drinks and media broadcasts the game with commentaries (Horbel et al., 2016). Therefore, the perceived game experience is shaped by the contributions of the core actors and can be altered and enhanced by those other than players/teams, such as employees and their engagement activities (giveaways, half-time shows, contests) to generate more excitement during a game (Yoshida, 2017; Grewal et al., 2009). If a series of games is considered, continual data collection and analysis on the perceived game experience from the perspectives of spectators and other actors can help sport decision makers adjust key variables to optimize the overall game experience.

Data Collection and Sport Analytics

Data from multiple actors can be categorized as objective and subjective. Objective data is what is collected from sensors and other data capture devices whereas subjective data may include data from questionnaires, polls, interviews, and sentiment/text analysis from social media. The objective and subjective data streams need to be processed, cleaned, reorganized, tidied, joined, and finally analyzed. The service science literature models the coproduction process as black box with inputs and outputs. Inputs (such as efforts, information, money, or other resources) of coproduction actors go into the box where value is co-created using resource integration. Resulting output is judged for quality (Roels, 2014; Ozkul et al. 2019). Extending this approach to sports, Figure-1 illustrates major actors (in a spectator event) whose data inputs are collected in a data warehouse/lake at a data integrator which is possibly a sport analytics company where sport data is analyzed for service quality. The outcome of this process includes analytics products such as dashboards, visualizations, smart reports suggesting ways of actions, and predictions. Finally, these outcomes are consumed by the same or different entities.

Figure 1

Data Collection, Analytics, and Consumption in the Coproduced Sport Experience



What Can Sport Analytics Do for Service Quality?

Multi-perspective objective and subjective data should be collected and analyzed on a regular basis to produce quality related analytics outcomes. Some of these outcomes include descriptive analytics, predictive analytics, prescriptive analytics, association analysis, and cluster analysis. Next, each of these areas will be briefly discussed.

Descriptive Analytics

Using basic statistics to complex metrics and KPIs to visualizations, sport quality analytics can present what happened and what is happening in the stadium, in the bar, in front of the TV, and on mobile devices. Traditional tools such as control charts, cause and effect diagrams, and Pareto charts can be generated for each actor on a real time basis. Objective performance measures (e.g., game scores, number of assists, ball speeds, spin rates, player movements, spectator social media mentions and likes) can be summarized, visualized, compared, and benchmarked to past performances. Perceptual performance measures (e.g., perceived team performance according to fans, satisfaction with the food in the stadium, cleanliness of the restrooms) can be collected, counted, summarized, visualized, and monitored. Data coming from objective performance measures and perceptual performance measures can be checked to see if they are correlated and consistent. If everything seems to be correct, strategies can be devised to keep it that way. If the data leads to concerns, it may be systemic due to “common causes” or a random single event.

Predictive Analytics

A data warehouse consisting of objective and subjective data can be used to answer a variety of question. For example, predictive analytics could be used to explore a comprehensive question such as: What combinations of variables in the data (e.g., hour of the day, day of the week, sunny or cloudy weather, location, game scores, ball speeds, number of possessions, attacks and assists, opinion of fans, coaches) can predict perceived performance, quality and satisfaction in an on-going or future game according to the spectators? Players? Coaches and other actors? Researchers and practitioners can also explore how various data mining methods can be used to better understand those same outcomes.

Prescriptive Analytics

The entire sporting event experience can be optimized to yield the best actor and financial outcomes. What combinations of variables (e.g., hour of the day, day of the week, sunny or cloudy weather, location, game statistics, opinions, etc.) in a sporting event can result in the *highest* perceived quality and satisfaction in the eye of the spectators? Players? Coaches, managers, and other actors should be considered as well. Prescriptive analytics can also be used to gauge the best optimization and machine learning techniques that are suitable for a particular job.

Association Analysis

The typical question of what two products or services are sold together in a sporting event can be answered by conducting association analysis. This type of analysis focuses on finding meaningful relationships in large datasets. With this approach, interesting questions can be asked such as what two-player, three- player, ... arrangements can result better scores and perceived performances in fantasy sports? What two, three, ... characteristics in the data (out of scores, speeds, movements, metrics, survey results, ...) go together when spectators (and other actors) are satisfied with the sporting event? When not satisfied? Answers to these questions can inform decision makers about what factors/events happen at the same time for a successful (or failed) game experience for a spectator.

Cluster Analysis

Cluster analysis requires the interested party, such as researcher, to group a set of objects in a way that objects in the same group are more analogous to each other than to those in other groups. With this technique, spectators and other actor groups can be created to find out relatively homogenous groups with similar mind sets, interests, experiences, performances, perceptions, and channel preferences. Which segments are characterized by higher game satisfaction, and lower game satisfaction generated for each actor? What are their common characteristics? These are questions that can be explored with cluster analysis.

Conclusion

Sporting events are multi-dimensional in terms of the variety of participants involved in the experience. Sporting event quality and satisfaction is in the eye of the beholder, changing from actor to actor in terms of how it is experienced. Monitoring sport service quality from different angles can provide valuable business intelligence. An analytical approach can lead to a variety of valuable outcomes, including better understanding of performance deficiencies of the actors and the game experience in general. The timely and proper corrective action to remedy deficiency is critical for actor satisfaction. Real time data streams can provide timely data and the potential for immediate corrective tactical intervention.

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