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The Introduction and Application of Sports Analytics in Professional Sport Organizations

A Case Study of the Tampa Bay Lightning

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Abstract

While professional sports organizations continue to seek techniques to augment their on-field success, the growth of sports analytics has concurrently become increasingly competitive and complex. However, despite these recent developments and availability of data, much of the information shared between organizations, academicians, and practitioners is often limited and anecdotal. In this paper, we sought to provide a brief overview of analytics and subsequently share several best practice examples of how one National Hockey League (NHL) franchise, the Tampa Bay Lightning, integrates analytical techniques into several core business entities. An organizational emphasis on Customer Relationship Management (CRM) provides management with valuable data about their customers' current purchasing habits and potentially may predict future purchases. In addition, analytical techniques have assisted the organization in developing and implementing both dynamic and variable ticket pricing strategies to procure additional revenues. We conclude the paper with suggestions for future research and applications.

Keywords: *sports analytics; technology; innovation*

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Introduction

Although analytics is often associated with player personnel decisions and roster movements, professional sport teams are now relying on analytical techniques to confirm or predict answers to questions related to ticket pricing strategies, sponsorship return on investment, and customer relationship management. In today's complex business environment, analytics has become an important tool for organizations. However, as noted by (Phillipps, 2013) in a research study involving more than 100 surveys and in-depth interviews with senior management representing 35 companies worldwide, 96% of the respondents indicated analytics will become more important in operating their organizations in the next three years. This suggests organizations should continue to develop innovative strategies to successfully implement analytic techniques within their business model or potentially risk losing valuable market share.

While data can serve as an incredibly valuable resource, the utility of data is largely dependent on how well it is analyzed and more importantly communicated to a broader audience. An underlying tension between subjective and objective data extends beyond sport organizations and can be found in other academic disciplines including behavioral economics, management, and finance (Wolfe et al., 2007). Today, analytics are utilized in various industries with multiple applications and successfully using analytical techniques appears to be a combination of science and art. As noted by Rivera (2012), effective analysts have the ability to combine a mixture of art and science with intuition to help drive decision making. For example, Internet giants Google and Amazon gather significant data from online web searches and retail consumption to tailor specific offerings to current and potential customers. This is just one example of how analytics has added value—summarizing data, interpreting the findings, and subsequently utilizing these findings to decipher patterns and help forecast future tendencies. While college athletic departments and professional sports organizations respectively have implemented analytical techniques to help with ticket pricing, customer service, game strategy, and player personnel decisions only in the last couple of years has this information been disseminated publicly.

The purpose of this paper is to showcase how one National Hockey League (NHL) team, the Tampa Bay Lightning, has successfully incorporated analytics within several organizational departments. In addition, we review analytics in both sport and non-sport contexts and how analytics has assisted the Lightning front office in business decisions related to customer relationship management and ticket pricing. We conclude the paper with a few suggestions of how analytics can be incorporated in the future.

Literature Review

Analytics

According to Davenport and Harris (2007) analytics can be classified as descriptive, predictive, or prescriptive. Descriptive analytics incorporates gathering and organizing of data and then detailing the qualities of the data. While this analysis has merit, descriptive analytics provides no information about why something happened or what may occur in the future. Next, predictive analytics incorporates previous data to assist with forecasting future trends. While predictive analytics are useful for predicting trends, one cannot assume any explicit cause/effect relationship. Therefore, prescriptive analytics including methods such as optimization and experimental design provide an additional layer of analysis by offering suggestions for implementing solutions to problems.

Davenport and Kim (2013) identified three major stages of analytical thinking: framing the problem, solving the problem, and communicating and acting on the results. Furthermore, each stage is comprised of various steps necessary to achieve a desired outcome. The initial stage, framing the problem involves two steps: problem recognition and reviewing the previous findings. This stage is intuitively important because if the problem is framed incorrectly, all subsequent analysis becomes significantly less valuable. Framing the problem often involves hypothesis development within a given a set of constraints. A review of previous findings is analogous to the literature review section of an academic paper. Specifically, scholars often develop new research questions predicated on previous related research.

Solving the problem represents stage two and encompasses three distinct steps: modeling, data collection, and data analysis (Davenport & Kim, 2013). In this stage, the researcher identifies the variables to include in the model, how they will collect the data, and how the data will be analyzed. Finally, stage three involves how the results should be presented and the subsequent actions needed to implement the recommended course of action. Furthermore, the third stage is just as important as the first two stages but invariably is not given the appropriate attention to detail. Results that are ineffectively communicated to their respective audiences are limited in value.

As an example of how important analytics can be to the success or failure of a business, we provide an example from the insurance industry. As a major part of their business model, Assurant Solutions sells credit insurance, debt protection, and competes for market share in the highly competitive credit insurance business where customer retention remains a significant industry problem. Although the company's 16% retention rate was consistent with industry standards, Assurant nevertheless experienced five out of six customers dropping their coverage and essentially ignoring their other products (Hopkins & Brokaw, 2010). Although they were analyzing the key to keeping customers loyal, they did so with the wrong

approach. Consequently, Assurant's leadership decided to implement a new analytical strategy.

The company invited professionals from various outside industries to offer suggestions on how they could improve their customer retention rate. With additional analysis, Assurant recognized some of their customer service representatives were superior at dealing with certain types of clients—essentially by matching the skill set of the employee with specific customer issues, their retention rate nearly tripled. Although the applied science and technology could not explain why something happened, by examining past experience, Assurant accurately predicted when a successful call would occur. Consequently, Assurant was able to receive significant guidance from outside constituents including actuaries and mathematicians to significantly improve their customer retention rate.

Sports Analytics

In 2003, best-selling author Michael Lewis published *Moneyball,* detailing how a small-market Major League Baseball (MLB) team, the Oakland A's, utilized various statistical techniques to assemble a competitive team without the luxury of a high payroll relative to other Major League Baseball teams. In essence, General Manager Billy Beane recognized the value of utilizing player performance data to drive organizational decisions involving player valuations and strategies on the field. Although sport business scholars and practitioners often identify Lewis's work as one of the first analytical approaches to uncovering how statistical applications could be integrated into managerial applications, baseball historian Bill James compiled baseball statistics into annual baseball abstracts during the 1970s (Hanchett, 2012). Baseball provided a laboratory for statistical analysis given the series of quantifiable individual events. Other historians suggested integration of statistical analysis happened years earlier when legendary baseball pioneer Branch Rickey commissioned statistical analysis in the 1940s when he served as general manager of the Brooklyn Dodgers (Dizikes, 2013).

While the utility of analyzing data to increase new business development has been successfully integrated within the professional sports industry, franchises continue to explore different analytical data techniques to drive decision making. Consequently, sport organizations have recognized the added value new technologies present. Leaders in sport business and sales are becoming increasingly savvy with analytics. Data-driven analysis has become a competitive advantage in driving business strategies and challenging the industry overall to invest resources or risk the possibility of falling behind the competition.

One area of sport business research that continues to remain elusive centers on how to accurately quantify the expected return on investment (ROI) involving corporate sponsorships. For example, both national and local brands may elect to engage as a corporate sponsor involving arena/dashboard signage, activation, program advertisements, or even naming rights of the facility. Considering some companies allocate 25% or more of their sponsorship budgets toward sporting

events, understanding how the return on this invested capital impacts the overall bottom line of the organization is significant (Meenaghan & O'Sullivan, 2013).

Titlebaum, Lawrence, Moberg, and Ramos (2013) conducted qualitative research with 15 decision-makers at Fortune 100 firms to assess how they used premium seating as part of their overall marketing efforts. When asked specifically if their firm implemented a type of ROI analysis, most organizations surprisingly indicated they did not. Moreover, several respondents suggested the metric of interest to them was not necessarily ROI, but ROO (return on objectives). Furthermore, for firms using ROI to measure success, the process tended to be more informal in nature. One respondent posited that because the sales cycle typically extended to 12 months, there were underlying constraints in measuring sponsorship ROI.

Meenaghan and O'Sullivan (2013) suggested additional research is needed to provide answers to how businesses measure sponsorship effectiveness and when they attempt to do so, do they utilize appropriate metrics. Citing a recent U.S. Sponsorship survey, 20% of the respondents were unable to determine if their ROI changed in any direction from sponsorship activities. In addition, within the same study, over a third of the participants (34%) confessed to not measuring sponsorship returns. Based on these deficiencies, they argued a "measurement deficit" subsists within sport sponsorship. Given this call to action, Meenaghan and O'Sullivan examined two popular sponsorship metrics, media exposure and sponsorship awareness, respectively. After analyzing several examples of how the same sponsorship program was evaluated quite differently suggested there were notable credibility issues related to sponsorship effectiveness. Yet, questions remain as to the best metric to measure these benefits. Several scholars have examined this issue with varying degrees of success. As metrics capable of successfully assessing sponsorship effectiveness continue to be developed, both sponsors and sport organizations will seek greater clarity on how to effectively measure this relationship.

The Orlando Magic of the National Basketball Association (NBA) is recognized as an industry leader for utilizing analytics within several departments. Throughout the 2012–13 season, the Magic implemented a unique fan promotion with restaurant sponsor Tijuana Flats. During any home game, ticket holders were eligible to win a free taco when the Magic made at least 10 three-point field goals. While this type of promotion at face value does not appear to be distinctively different than other types of restaurant sponsorships, there was one key differentiator. After Magic fans redeemed their game ticket in exchange for the taco, Tijuana Flats then returned the tickets back to the organization for further analytical analysis allowing the team to gather additional consumer information (Simmons, 2013).

Once the redeemed tickets were returned, the Magic organization followed up with consumers and subsequently collected valuable consumer information to help quantify the elusive ROI. Among their findings: 26% of the consumers

had never visited a Tijuana Flats restaurant, 66% would not have visited without the promotion, and 85% indicated they would visit again. The Magic could now tangibly provide the sponsor with several ROI metrics linked to the promotion and identify strategies to increase awareness and ultimately revenues (Simmons, 2013).

Jensen and Cobbs (2014) noted the absence of established metrics and pricing data for nontraditional marketing techniques complicates assessing ROI. They analyzed the ROI for sponsorship in Formula One racing by examining sponsorship prices and the exposure generated from television. Collectively, their results suggest a link between team performance and brand exposure. Specifically, sponsor ROI was more likely to be positive as team performance increased.

In May 2013, social media giant Twitter unveiled a new in-stream advertising program aptly named Twitter Amplify. This platform allows content owners the opportunity to link video clips and connect them with sponsors. Collectively, the revenue is divided between the content owner, distributor, and Twitter. The most important contribution of Twitter Amplify could be developing a revenue strategy for sport organizations through social media (Fisher, 2013). While sport consumers have turned to social media as a way to keep engaged with their favorite team/players, a similar issue to traditional sponsorship remains: How to assess advertising effectiveness and more specifically quantify the ROI. Although not without criticisms, other media content including television and radio, have historically relied on either Nielsen or Arbitron ratings as a primary way to assess and establish fair market advertising rates. As the continued growth of social media platforms expands, further development of social media analytics is likely to transpire.

Applications

With regard to data analytics, the Tampa Bay Lightning's main focus is centered on making data-driven decisions. This focus has been a significant contributor to the overall brand transformation over the past three years. Specifically, the organizational transformation fueled by a strong focus on data analytics and technology has included a new team logo, a $60 million privately financed arena renovation, a renewed focus on customer service, and a commitment to giving back to the Tampa Bay community through philanthropic and volunteer efforts.

To support the strategic planning behind a successful transformation, executive leadership understood the significance of community and team support. In addition, to incorporate outside viewpoints that would assist in developing a more complete plan, the Lightning organization formulated several focus groups. These focus groups were designed to glean additional information and understanding on what the team, brand, and hockey meant to Lightning fans, the Tampa community, current and past players, coaches, and other stakeholders. Through these focus groups, important elements to the targeted constituents surfaced and were

subsequently integrated into the tangible and intangible transformation. Similarly, the Lightning used data, analytics, and technology to advance two significant areas related to the success of the organization: the development and strength of customer relationship management (CRM) and the identification of new revenue opportunities. Each of these segments will be examined in further details.

Technology

This emphasis on data has encouraged developments in CRM strategies. Technological growth within various digital and mobile platforms assist in making data collection easier and more seamless than previous periods. Concurrently, sport consumers have higher expectations for smart, relevant marketing. With increased competition within teams, rival leagues, and other entertainment options, attracting and retaining consumers is especially important for the long-term viability of professional sports teams. Subsequently, understanding who the consumer is and furthermore establishing a deeper relationship with their individual preferences is important.

As the sport industry develops over the next few years, teams must offer individualized marketing strategies or run the risk of losing valuable clientele. Therefore, for sport business to succeed in one-to-one marketing, organizations must invest in CRM solutions and strategies based on accurate data. Consumers, especially sport fans, possess unique attributes and consequently should be targeted and marketed to reflect these characteristics. A strong CRM strategy can help a team acquire a complete and authentic perspective of each consumer and ultimately understand how to effectively communicate with them.

The Lightning franchise utilizes several integrated software solutions and third-party vendors to manage the collection, organization, and storage of consumer demographic and behavior data into a centralized Microsoft CRM platform. Daily data feeds and standard reports inform the marketing, sales, and service teams about new consumers, consumer attributes, and segmented consumer demographics. One example is qualifying and prioritizing prospects for the sales team. Each night, all new ticket purchase customers have Acxiom demographic data appended to their customer record. Acxiom is an enterprise data, analytics, and software-service company uniquely building trust, experience, and scale to fuel data-driven results. The customer record is then put through two lead scoring models. One model predicts how likely each customer will eventually purchase a Lightning ticket plan and the other model predicts, if the customer buys any kind of ticket, how much the customer is expected to spend. Each model provides a rating on a 1 to 5 scale, indicating to the sales team which customers should be given higher priority in their sales campaigns. Another less frequent method is used to determine which current season ticket members are most likely to lapse their season ticket membership. The lapse ratings are used by the season ticket member service team to prioritize their time and resources when addressing customer

issues. Collectively, by consistently reviewing data reports, management can encourage their respective teams to make data-driven decisions on consumer interactions. Ultimately, this analysis can positively influence the consumer experience and augment the Lightning's financial position.

Data retention and integration have helped the Lightning organization increase sales transactions to unprecedented levels. For example, as part of a loyalty initiative, the Lightning offered free customized team jerseys to season ticket members. This type of program rewards both the team and the fans. For the organization, fans wearing jerseys to the games helps foster a home-team atmosphere within the arena and on television. Other guests attending games or watching on television see these jerseys and may subsequently inquire about becoming season ticket holders. As an incentive for season ticket holders to wear their jerseys to games, they received substantial discounts on concessions and merchandise. This initiative was made possible due to a radio frequency identification (RFID) chip sewn into the jersey sleeve capturing all in-arena transactions made by the season ticket member. Each season ticket member is made aware this information is being collected to help enhance the overall fan experience. This information provided new insight on individual consumer purchasing habits and preferences.

In addition to providing discounts to their season ticket members, understanding consumer preferences empowers the Lightning to create both targeted concession and merchandise offers at the individual consumer level based on previous transactions. This becomes extremely valuable when marketing specific products. For example, one application of this data analysis would be a sponsorship activation program rewarding fans for purchasing sponsorship products during Lightning games. Since the Lighting franchise features an in-arena Outback Steakhouse location, the team can send a notification to all season ticket members who purchased from Outback Steakhouse during the game, thanking them and providing a coupon good for a free appetizer at a local Outback Steakhouse restaurant. The added ability to accurately market at the individual consumer level creates opportunity to provide added value to targeted customers.

The Lightning management uses technology and analytics to identify revenue opportunities and take a more strategic and methodical approach when addressing business issues. Consequently, the Lightning organization addresses business solutions in carefully implemented stages. Initially, the team defines the problem. After the problem is clearly defined, the organization develops the action plan, identifying key measurements for success. Finally, the team executes the plan by collecting and analyzing data to derive and validate insights.

Ticketing Analytics

Adopting this new approach of using data to address problems and discover innovative opportunities requires a willingness to change established practices. One area the Lightning organization has relied on extensive analytics involves

ticket pricing. For example, based on existing ticket sales, the Lightning organization theorized ticket demand for seat inventory in variably priced sections of the arena was not uniformly proportionate. Consequently, if this assumption was accurate, ticket demand based on current pricing and inventory structure resulted in either lost or undervalued sales. To test this hypothesis, the Lightning analyst analyzed ticket demand based on individual arena seating sections. Through their analysis they confirmed their hypothesis, and by the following season, the organization adjusted prices and altered the boundaries confining seat locations to price sections. Accordingly, by increasing supply to match market demand, the organization experienced an influx of new business into these adjusted arena sections.

Inventory management represents another level of focus where the Lightning used data analytics to drive ticket revenue. Group tickets represent an important aspect of ticket sales and help many teams secure both a large volume of revenue and distributed tickets. However, because group tickets are typically discounted, seats sold at a group ticket rate that otherwise would sell at the standard ticket rate represent lost revenue. To help minimize lost revenue, the Lightning franchise has established both game-by-game and section-by-section inventory levels. These inventory levels were derived from historical ticket sales and current ticket sales trends. Both of these practices helped price future season tickets and set ticket inventory levels at each price point. This new practice facilitated maximizing overall ticket sales revenue.

The organization also uses analytics to estimate the demand for tickets on a game-by-game basis. Statistical analysts incorporate regression modeling to forecast ticket sales and attendance demand on a game-by-game level. This modeling identifies significant factors affecting sales and attendance. For example, through modeling, the Lightning analyst identified the month of March as a significant factor affecting ticket sales. A Lightning game played during the month of March yielded "X" more tickets than a game against a comparable opponent played in December. This practice, conducted monthly prior to the season, allows the Lightning to variable price tickets based on individual game demand and then target promotions accordingly. Variable ticket pricing conducted prior to tickets going on sale is a static solution for market demand. Because demand for sporting events is knowingly influenced by current events, the sport industry has adopted dynamic ticket pricing strategies similar to the airline industry. Dynamic pricing is a valuable strategy to help sports teams address changes in market demand and compete against the secondary ticket market businesses including ecommerce websites StubHub and TicketsNow.

Through daily dynamic pricing, measurements on several factors such as online search frequency or secondary ticket market ticket transactions are analyzed to measure variations in team interest. With these measurements, management can decide if an increase in ticket price is justified by demand by targeting specific sections or individual seats. Conversely, the Lightning can also lower ticket prices

to avoid being drastically undercut by the secondary ticket market when ticket demand decreases. By applying demand modeling, the Lightning use both proactive and reactive analytics to drive both primary and ancillary revenues as well as support community and consumer initiatives.

Sport teams today face almost overwhelming amounts of data, complex and disparate systems, and a multitude of consumer behaviors. Data and digital technologies provide unprecedented amounts of opportunities for sport teams to understand consumer needs, preferences, and behaviors. In this environment of surplus data, effectively gathering actionable information is a key factor in operating a successful business. Actionable data allows teams to implement data-driven strategies across the organization.

Future Directions

The future direction of sports analytics and technology appears to be expanding in both scope and breadth. To fully capitalize on this trend, we would recommend that sport organizations invest in integrated and automated approaches encouraging large-scale data processes and create better and more relevant interactions with consumers. This would also include a call to hire trained statistical analysts to work closely with senior management.

Investments in technology by sport teams continue to grow as evidenced by the recent move in the National Basketball Association (NBA) to outfit each of their 30 arenas with specialized cameras installed to help capture thousands of data points within each game. Specifically, six motion cameras capable of filming the game at 25 frames per second provide team analysts with unprecedented data. Furthermore, the league has made this a mandatory policy and all of the available data is openly shared with the public on NBA.com (Goldich, 2013).

From ticket operations to social media measurement solutions, teams continue to increase their analytic capabilities. While this growth has largely produced positive results, it has also resulted in many teams possessing technology systems with highly complex architecture loosely stitched together. As the complexity of the architecture increases, data becomes increasingly difficult to fully leverage. One primary goal of investing in technology is to provide stakeholders with data and insights they can leverage to enhance organizational effectiveness.

Recently, the Lightning partnered with TIBCO, a company specializing in data management and real time pricing, to utilize their "Spotfire" data visualization software to facilitate the next step in the organization's integrated use of data. Spotfire will permit the Lightning to integrate multiple data sources and automatically connect, source, and process data in real time to create business dashboards and provide data insights across the organization. Previously, the Lightning have faced time-consuming challenges by manually and repetitively merging data from ticketing, database marketing, point of sale, and other sources. Moving forward, the team aspires to share and integrate data and insights more efficiently.

Within the last decade, the sports industry has identified one key to future business success is developing a greater understanding and ability to serve its respective fans. Previous research has consistently demonstrated the passion and loyalty sports fans have towards their team. While sport organizations have a general sense of their fans, only a select few if any, can realistically proclaim they possess a true 360-degree understanding of their customers. By engaging fans more effectively, sport organizations such as the Lightning believe they can acquire, strengthen, and retain customer relationships. Data analytics, technological advances, and system integration will all be important factors as sport teams look to expand their customer views to 360 degrees.

Although data and technology can introduce additional complexity and complications to an organization, the Lightning management views them as opportunities. The sport teams addressing and also conquering data through technological initiatives will be the teams positioned to lead sport business innovation in the future. Finally, we strongly encourage sport business/management faculty to creatively think about different strategies to successfully incorporate projects into the classroom potentially benefitting practitioners. As noted by Sutton (2012), assignments focusing on business analytics, marketing, and sales would likely be well received by sport organizations looking to improve their operations. Furthermore, when students first hand observe how research can be a useful tool for identifying and providing viable solutions to sport organizations they may then continue this practice upon entering the industry.

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