

Wearables technology data use in professional sports

The development of wearable technology to collect live data from training and competition has opened a valuable information market in the sports industry. Leagues, teams, players, even agents and the media now demand a constant supply of intricate performance information. Brian Socolow, Partner at Loeb & Loeb in New York, discusses the recent evolution of the use of wearable technology in professional sports and raises important questions concerning the legal challenges that this new market represents.

They are virtually omnipresent and seen on the arms of everyday athletes chasing goals from walking 10,000 steps during waking hours to improving the quality of a night's sleep. Whether tracking cycling mileage in Prague or caloric intake in Pittsburgh, fans of wearable technology like Fitbit and Jawbone, and their many competitors in the wearable technology sector, are the consumer face of a global industry that is expected to be worth in excess of \$53 billion by 2019 (a more than 11-fold increase over 2014 sales), according to the International Data Corporation.

But these wrist activity trackers are just the tip of the wearable technology iceberg. Professional sports leagues, clubs, teams and athletes are heavily invested in collecting and analysing the minutest elements of athletic performance for an ever-growing list of uses, including enhancing training and performance, preventing injury, and increasing fan engagement and experience, whether it's live, broadcast or second screen.

Along with the creation of vast databases of performance measurement, however, comes a host of difficult-to-anticipate legal issues, many of which are the result of technology outpacing the law.

Wearables are all about the chips

Early adopters, such as European football clubs began to measure the overall workload placed on players more than six years ago. In fact, a chip designed by Adidas and implanted in players' boots helped Germany take home the 2014 FIFA World Cup. Fans may have been surprised to learn that the miCoach elite team system was transmitting each athlete's acceleration, heart rate, speed, distance, power and other details in

real time to iPads used by Germany's coaches and trainers during training sessions before and during the competition. The International Football Association Board ('IFAB'), the governing body that determines the rules of international football, also approved the use of wearable electronic performance and tracking systems ('EPTS') in competition during its annual business meeting in February 2015. The use comes with two conditions - that the EPTS cannot be used during a real time match until it has been proven to have preventative medical benefits and that it does not pose any danger to players on the field, and that the data is not transmitted to coaches during play (although half-time review of data has reportedly not been ruled out by IFAB). In July 2015, FIFA followed suit, announcing its approval of the use of EPTS and wearable technology during matches. At the end of 2015, FIFA and IFAB were reviewing proposals by wearable technology manufacturers to establish the companies as FIFA EPTS providers.

Players throughout Australian Rules football and Australian professional rugby use Catapult Technologies' OptimEye S5, which utilises satellite reception (both GPS and Glonass), and ClearSky, a local positioning system (or indoor GPS). A vest fitted with a small device at the top of the back captures data in real time, allowing staff to make evaluations during training or competition. There is also the option to upload data from the device's hard drive following a session.

Once collected, raw data can be run through algorithms to translate into information that is useful to coaches and trainers. A number of cricket organisations around the world use Catapult's

products - including Cricket South Africa, Cricket Tasmania and the England and Wales Cricket Board, according to the company's website - and there is a cricket bowling algorithm that measures the speed of a ball based on a bowler's run up and release, and a goalkeeping algorithm that monitors dives and jumps. This type of analysed data has a number of uses. In 2010, the Marylebone Cricket Club ('MCC'), known for its role as the guardian of the Laws of Cricket, began funding research into wearable technology to better detect illegal throwing or 'chucking'. The MCC entered into discussions with the International Cricket Council to further explore the issue and technology as a solution.

In the United States, wearable technology is widely used throughout the National Football League ('NFL'), National Basketball Association ('NBA') and Major League Baseball ('MLB'). Pitchers from at least 27 of 30 MLB teams are benefitting from the Motus mThrow smart throwing sleeve and iOS app. In a pocket over the elbow, a small removable sensor's accelerometers and gyroscopes track arm movements with an eye toward maintaining arm health. The device wirelessly transmits the three-dimensional motion data to an app that calculates stress caused by torque on the ulnar collateral ligament. Companies including Zepp Baseball, Diamond Kinetics and Blast Motion have also developed in-bat motion sensors to track and analyse player swings. Data collected during training helps trainers, coaches and players learn how to optimise performance and reduce the risk of injury.

Professional basketball has also embraced the wearable technology revolution. More than two dozen NBA teams use Catapult's OptimEye (or similar technology) to track and analyse player

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performance for using motion sensors on player jerseys. The combination of hardware and software provides biomedical data, including impact forces, turn rates and orientation, as well as tactical information, such as two-dimensional animations of the play in real time or post-practice.

As a league, the National Hockey League ('NHL') has been slower to adopt analytics, but it is coming around. Catapult is developing wearables that interpret skating load and volume, player speed, force sustained in collisions and even which of the skater's legs is working harder - all crucial training information for a sport that loses more player time due to injury than any other major sport. An average team loses 242 player games each season, according to a Toronto-based research study. It's unclear how the NHL will use the statistics generated by wearable technology in the future, but avoiding injuries will undoubtedly be the main focus as it ramps up use of analytics.

Perhaps the most exciting development in the use of data in American pro sports will occur after this season's NFL draft and free agency are completed in May. That's when NFL team general managers will get access to mountains of data known as 'Next Gen Stats', which the league gathered during the 2015 season. The lead-up to this development began when all NFL players agreed to wear sensors as part of their collective bargaining agreement in 2011. Fast forward three years and the NFL established a partnership with Zebra Technologies to outfit its stadiums with radio frequency identification signals ('RFID') technology and accumulate information collected using sensors on players' shoulder pads. The sensors capture precise location measurements to within six inches

in real time during indoor and outdoor games, as well as speed, acceleration and distance data. Zebra's MotionWorks server software processes the information and produces a variety of statistics.

The NFL teams will shortly have access to the RFID data, and each team will decide how it wants to use the metrics. Last year alone, 2,500 players were tagged with sensors, netting more than 180 billion bytes of player position data. At the NFL owners meeting in Florida in March the league announced that it will provide information to each team on its own players. Additionally, the NFL will unveil a platform to crunch the numbers into useful information for any team that wants it. The league's software will undoubtedly compete with quite a few outside vendors selling their techniques for slicing and dicing data. At the MIT Sloan Sports Analytics Conference in March, there was significant buzz about the possibility of a new landscape for the sport, as analytics become more mainstream in the NFL. While most franchises don't know precisely all the ways that the data will be used, a significant number of analytics professionals are being hired by teams that are also investing in technology systems to manage metrics. In the most profitable of American sports, wearable technology statistics are already influencing everything from strategy on the field to scouting and salary cap management. The combination of scientifically tracking players' competition and practice performance is viewed as a highly valued tool.

Wearable technology from the fan perspective

NFL fans taking in the game at the stadium or at home are experiencing a radically different

event than their grandparents - or even their parents - did in the past. The mountains of new information and statistics about the performance of their teams and players, which are made possible by the RFID, are broadcast in real time. Media partners receive data including player velocity, effort and fatigue to be used to add to the fan experience - with real time overlays and visualisations, as well as Xbox One's data enriched replays. Thanks to their \$400 million contract with the league, Microsoft has also incorporated NGS in a number of ways. Their NGS Pick 'Em competition during the 2015 season encouraged fans to use the sensor driven statistics to select the player that would post the best overall Next Gen Stats and awarded tickets to Super Bowl 50 as part of the prize package. Microsoft's Xbox One NFL app even features the ability to watch replays from multiple angles of key plays. Those that take their passion to the fantasy league level enjoy access to the same data gathered from wearables. Fantasy football coaches have the capacity to drill down into the data collected from each athlete in every play of the entire season.

The league is also using data to enhance fans' 'second screen' experience. In 2014 the NFL found that 60-70% of fans use a second screen while watching live games - either in the stadium or at home. The league noted spikes in tweet traffic that perfectly aligned with the interesting moments in games. At the same time, viewers of the live game on TV were at an all-time high. At the rollout of NFL Now, an app that collects content created 24 hours a day, seven days a week from all 32 teams, the league noted the deep, wide well of information available to fans, including historic data culled from the NFL Films Library.



Brian Socolow

Other sports are following suit. The NHL's San Jose Sharks and Columbus Blue Jackets collaborated with tech startup Guitammer to develop a fan engagement experience that could one day extend into the wearable technology arena. When players are cross-checked into the sensors around the rink, their seats in the stadium shake with the impact. A \$300-\$600 home adaptor kit is available for those fans who want to experience more of an arena feel of the crashes and slams from the comfort of their couches. ButtKicker Live's 4D Sports began with sensors placed on the boards at the San Jose and Columbus ice rinks; the sensors captured and distributed the impact of skater hits to seats in their home arenas and fans' homes. Since the NHL team collaborations, the ButtKicker Live collection of kits has grown to include kits for fans of car racing, the NFL and other live events. The potential exists to enhance the fan experience in myriad sports with wearable technology transmitted from sensors embedded in athletes' uniforms and equipment.

Warning: uncharted legal territory lies ahead

Data ownership, access and privacy

Wearable technology in pro sports raises a host of issues around who owns and has access to the data, and what constitutes acceptable use of that data. Currently, the rule appears to be 'he who collects the data owns the data' - and it appears that, at least in major league sports in the US, the leagues and teams own at least the raw data, as well as whatever aggregation and analysis they undertake.

Here's the rub: what can they acceptably do with that information?

Data collection by any employer carries significant concerns, and

overlap certainly exists with the issues that face professional sports and other types of employment, which is especially true of questions concerning privacy and confidentiality. At what point does the information become so personal to the player that the player's privacy rights may be violated? Does a player have any reasonable expectation of confidentiality in any information about him - including the data that the team or the league collects?

In a non-sports context, litigation around Dutch employee wellness programmes using wearables has halted such initiatives in their tracks. The Netherlands' Data Protection Authority investigated two companies with wearable technology programmes and ruled earlier this month that employees are financially dependent on their employers and therefore don't have the power to give consent when it comes to revealing sensitive personal data including movement and sleep patterns. Experts believe the Dutch ruling could potentially impact the development of policies around the globe with regard to wearable technology use.

There are also questions unique to pro sports.

If, for example, the NFL collects the RFID data on players from all of the teams, are teams and players entitled to see and use that data? If so, what data should teams have access to? Their own? Other teams?

Beyond teams and leagues, who in the outside world can - and does - have access to the data, and for what purposes? Whether - and to what extent - analytical data on individual players will be shared (with or without confidentiality protections) with broadcast partners, sports commentators and analysts. What about video games and fantasy sports - do the individual players have any say in what information is given to game

manufacturers or fantasy sports platforms under agreements with sports leagues?

Protecting players' privacy is certainly top of mind for their unions. Representatives from the players' unions for the major US sports leagues reportedly met last fall with the law firm that has represented them for several decades to discuss how technology is being used in their sports and the many privacy concerns faced by their players.

Beyond the sanctioned use of data by the league and teams, there is the very real risk of inadvertent data leaks and purposeful hacks. The vast amount of data that professional sports teams and leagues may eventually collect, store and use would give 'stealing the other guy's playbook' a whole new meaning. Chris Correa, a former scouting director of the St. Louis Cardinals, recently admitted he hacked the Houston Astros' player database and email system. Correa pleaded guilty to five counts of unauthorised access to a protected computer from 2013 to at least 2014. Correa's use of the stolen information cost Astros about \$1.7 million. The charges carry up to five years in prison each; Correa will be sentenced in April.

At the moment, it is still unclear what regulatory scheme, if any, would offer any protection and, in the professional sports realm, what constitutes reasonable cyber security protection for information collected from wearable technology devices. And, as the data becomes increasingly detailed, the risks increase: hacking by stalkers, improper use by management, demands by insurers, or requests for discovery in litigation.

Employment and labor concerns
Whether and to what extent teams and leagues can impose the

collection of personal data on players, and what can then be done with the player data - including who has access to it - is certainly an issue to be covered by collective bargaining agreements and player contracts. For example, the announcement by the IFAB and FIFA that approved the use of wearable electronic performance and tracking systems in matches has created an atmosphere that favours increased adoption of technology in international football, but the pace and level of adoption remains an open issue to be resolved between leagues, teams and players. For example, while Major League Soccer's most recent collective bargaining agreement reportedly calls for the league to approve the use of wearable devices in consultation with the players' union, whether teams can compel players to wear the technology at the team level during matches is an open issue.

While player performance statistics and other data have always played a role in salary and contract negotiations, until recently the categories of data available have been limited. As the availability of data grows, however, so too does the possibility that analytics may reveal information, including previously undetectable biometric data, minute changes in player ability, or indicators of long-term health and future injury tendencies - information that teams may interpret to predict future declines in performance, even for athletes currently performing at the top of their games, and use this data in salary and contract talks. And access to this data may be one-sided, if teams and leagues are collecting but not sharing data.

What's next for pro sports?

In the world of professional sports, as in the world at large, innovation

in wearable technology tends to outpace the development of rules, regulations or guidelines on its use. Pro sports leagues and teams will continue to grapple with important issues - privacy, data security and ownership, and labour concerns, as the applicable body of 'law' - rules established through collective bargaining agreements, regulations enacted by governing bodies, legislation developed in countries around the world, and the inevitable litigation - takes shape around the collection, use and distribution of information gleaned from wearable technology.

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