

# **Beyond ‘Moneyball’ to Analytics Leadership in Sports: An Ecological Analysis of FC Bayern Munich’s Digital Transformation**

*Emergent Research Forum (ERF) Papers*

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## **Abstract**

Since Michael Lewis’ thesis on Oakland Athletics’ analytical approach to assemble a competitive baseball team and the release of the feature film “Moneyball”, the interest in sports analytics has grown rapidly. Existing research on sports analytics, though nascent and limited, paints a rather different picture compared to data analytics in the business context, mostly due to the nature of the sports industry and its organizations. Therefore, it is our focus in this study to further unpack such differences through a case study of FC Bayern Munich and its digital transformation to achieve analytics leadership. More specifically, we strive to understand 1) what analytics leadership entails for professional sports teams; and 2) what type of IT-enabled capabilities are required to realize such leadership position within a sporting and entertainment ecosystem. Our initial analysis identified three main applications of analytics, namely player and team performance, event management, and customers.

**Keywords:** Sports Analytics, Football, IT Capability, Analytical Leadership, Ecological Analysis.

## **Introduction**

The interest in sports analytics has surged, such that advances in digital technologies increases the capacity to produce data for enhancing market and leadership development in professional sports business organizations (Ferguson 2013; Travassos et al. 2013). Michael Lewis’s thesis on Oakland A baseball team is a key reference of sports analytics research such that the thesis demonstrates that creativity, framing, and robust technical analysis over intuition is behind the development of a successful sports business organization (Lewis 2004). On the other hand, sports analytics has the potential to inform management about alignment, performance improvement and business ecosystems (Davenport 2014b). According to Davenport (2014a), analytical leadership can broadly refers to an analytically-driven level of excellence and competitive advantage as a result of a better execution of existing analytical concepts. Although analytics have been used widely to inform on-field performances such as athlete decisions, the adoption of analytics to assist other business activities in professional sports organization is often limited and anecdotal (Mondello and Kamke 2014; Troilo et al. 2016). For example, little work has been done to understand fans’ relationships to their favorite teams and athletes (Fry and Ohlmann 2012).

Sports analytics refers to specific use of data analytics in the industry of professional sports (Davenport 2014b). Though regarded as one form of data analytics, the specific context of the sports industry refers to processes and operations involved in the sports analytics, which are different from generic business analytics or enterprise analytics. Davenport (2014a) identified three areas of activities sports analytics involve: team and player performance analytics, sports business analytics, and health and injury prevention analytics. In this sense, sports analytics entail a much more complicated and diversified process. It is for this reason that, to engage in sports analytics, professional sports teams often have to work within an ecosystem and collaborate with a range of data, software, content and services providers.

As painted in the Moneyball, it is often hard to get teams to accept data-driven ideas (Mannerich 2016). Relevant to this notion, working in a broader analytic ecosystem is therefore particularly important for businesses to draw on partners while maintain key internal capabilities (Davenport 2014b). Consider the sparse research in the area of sports analytics, we take an exploratory approach to investigate such phenomenon through a case study. More specifically, we would like to understand what it takes to achieve analytic leadership for professional sports teams, and what type of IT-enabled capabilities are needed to realize such leader.

## **Theoretical Lens: IS Capabilities and an Ecological Perspective**

Drawing from the resource-based view on organizations, our study adopts IS capabilities as a theoretical notion. IS capabilities refer to an organization's "ability to mobilize and deploy information technology (IT) based resources in combination or co-present with other resources and capabilities" (Bharadwaj 2000, p. 171). Wade and Hulland's (2004) provides a comprehensive set of different types of IT capabilities that can be held by a firm, which include outside-in capabilities which deal with responding to the market, inside-out capabilities that deals with internal operations, and spanning capabilities which integrate the previous two. The justification for using IS capabilities as a framework are twofold. IT resources are unequivocally critical to modern organisations and firms. Second, IS capabilities are a widely accepted and deployed framework within IS studies but have yet to be applied to sports analytics.

On the other hand, strategic research calls for capabilities to be studied in larger units of analysis (Gawer and Cusumano 2014), such as extended (multitier) supply and distribution chains or "ecosystems," which are understood as loose sets of organizations engaged in the creation and delivery of product and service offerings (Iansiti and Levien 2004). Companies in an ecosystem include not just customers and suppliers, but also, for example, producers of complementary products and services, logistics providers, outsourcers, and financiers. IT capabilities in digital ecosystems are evolutionary, where the capabilities varies a lot along the digital transformation (Tan et al. 2015). Digital ecosystem are orchestras through extended network of partners that operate on (1) standardized - digitized business processes that employ open standards and may be tailored (by selection and extension) to an orchestrator's unique preferences, and (2) shared digital platform supporting simultaneous use by multiple companies, each of which can independently customize business processes for its own ecosystem.

## **Research Method, Data Collection and Ongoing Analysis**

Given our research agenda, we adopted an interpretive case study methodology. The methodology is particularly appropriate for such an inherently complex and multi-dimensional phenomenon of analytics leadership in competitive sports, where an objective approach to research might be difficult (Koch and Schultze 2011). In particular, the method adopted here has allowed us to delve into operational processes (Gephart 2004) and address 'how' research question (Walsham 1995). In this study, we present a case study of FC Bayern München - a professional soccer club based in Munich, Germany. The case company we have chosen is regarded as one of the leading soccer teams in the world. It is also one of the leading users of information technology through its long-term collaboration with SAP AG (McKenna, 2014).

The first stage of building our empirical corpus was a field trip by two of the authors to Alliance Arena – the home field of FC Bayern. The field trip started with a visit to the museum of the club, with informal interviews conducted along the way. Later, a formal interview was conducted with the CIO and his executive team and implementation partners from SAP which lasted for roughly two hours. All semi-structured interviews were recorded and later transcribed. In addition, we also supplemented our interview data with press releases and new articles. We performed data analysis concurrently with data collection (Eisenhardt 1989), comparing the preliminary findings of the case against our theoretical lens to shape our initial theorizing. We then iterated between subsequent interview data, our theoretical perspectives, and the relevant literature and sources to build an explanation (Walsham 1995).

In the analysis, we coded the data in four broad phases. The first phase, empirical analysis aimed to capture the event-time series of Bayern Munich's digital transformation. The second phase, conjunctural analysis aimed to identify the ways of acting, e.g. identifying and, more importantly, examining the intersection (the conjunctures) of various patterns of action (practice and meaning) and the role of IT. The third phase, integrational analysis into discussing the complexity of social relations examines the

intersecting modes of social integration and differentiation. The fourth phase, categorical analysis based upon an exploration of the ontological categories (categories of being such as time and space).

## **Preliminary Research Findings**

In our findings, we present how FC Bayern's leading status in sports business is an expression of analytics exerted by good leadership. In the 2000s, FC Bayern enters its second golden area at the field. They built their own arena together with large sponsors – Allianz Arena. The club has some 200,000 members and been using information technology over the past 20 years. Before launching the sports analytics strategy, the infrastructure at FC Bayern is fragmented with many different systems patched together. At some stage, there were 56 different systems from SAP AG. Most of them were consumer facing, but failed to provide any comprehensive overview of their fans and members. FC Bayern have revealed plans to completely overhaul their digital channels in a move that will see them cut out all intermediary digital agencies in favor of running the club's digital platforms from within the Allianz Arena. The ambitious project, dubbed 'Digital 4.0', is designed to give the Bundesliga champions greater control and flexibility of what content they produce as well as enabling them to control how fans around the world consume it.

### **Platform building at FC Bayern**

The digital transformation started with a simple purpose – strengthening the area of membership management. Club membership is a key domain for football clubs, since members control 51% of ownership according to German law. FC Bayern realized that the lack of integration among various systems was the root of the problem (as pointed out above), and hence approached its IT provider - SAP AG to crack the issue. Thus, the first phase of the transformation process regards infrastructure building, aiming at integrating existing systems and establishing a unified platform. As part of the process, FC Bayern built its own data center, embarking its journey on data analytics.

Another turning-point event happened after 2014 world cup, when German national team was crowned the world champion. Throughout the tournament, data analytics tool provided by SAP AG largely facilitated the process of which German team trained and prepared for different matches. Based on such successful experience, several of the German national players who also played for FC Bayern approached the club management and suggested the deployment of the same analytical tool at the club level. This led to the further collaboration between FC Bayern and SAP AG through the deployment of SAP sports 1, a system that would meet various needs in data analytics across different units at the football club. Such system is also built on top the unified platform resulted from the abovementioned integration efforts.

### **Identifying Eco-system Constituents**

In parallel to the platform integration, FC Bayern re-organized its business and created 16 business units, each with its own emphasis. On top of the business unit, FC Bayern has also engaged in extensive collaborative efforts with a wide range of partners. For instance, besides the partnership with SAP AG the platform provider, FC Bayern also works closely with data provider, such as Opta, a leading provider of sports data about individual matches, individual teams, and individual players.

To further leverage the strength of their most important partner (or customer) – fans, FC Bayern analyzed the data they possessed regarding their fan base (thanks to the integrated platform for a more comprehensive overview of their members and fans), and created 80 roles for a fan (e.g., normal member, organizer of fan club, sponsor, etc.). Such effort allowed the club to engage in more effective communication with their fans (e.g. through different social media platforms across different regions), but moreover, to engaged in co-creation with the fans, as emphasized by a manager of the club:

“We have a group of fans who spend their lives [around Bayern Munich]. They're passionate about collecting data about Bayern Munich. They're going to archives in different cities, and trying to collect data on games that Bayern Munich had, [which] then we put into our database.” (Manager, FC Bayern)

In this stage, the ecosystem around digital means and data analytics has been built (in its preliminary format) with various constituents/stakeholders identified including various departments within FC Bayern (e.g., the team itself and its coaching/training staff, different business function departments, the IT department), the software/platform provider (i.e., SAP AG), the data provider/integrator (e.g., Opta),

various media and broadcasting partners, the FC Bayern fans, competing teams in Germany and Europe, the German national team, and the whole Bundesliga association. The SAP Sports 1 platform provides the digital means through which collaborations among stakeholders take place, for instance, data generated by Opta is integrated in the SAP platform to generate statistics for the team to analyze and prepare for matches).

**Leveraging and Leading a Sports Eco-system**

The digital transformation of FC Bayern has resulted in a digital ecosystem around sports analytics. Central in the whole process is the reorganized IT department, who historically was only acting as IT support, but now takes the leadership of the digital strategy. The IT department is currently responsible for all the data and the systems, and utilizing SAP solutions to analyze data and provide different business units with relevant information to act upon, see Table 1 for an overview of three main areas and Table 2 summarizes the three phases of digital transformation FC Bayern has gone through.

<b>Areas</b>	<b>Descriptions and Quotes</b>
Performance and health analytics	In this area, data is collected and gathered from different sources, through both internal and external efforts. For instance, 60 million pieces of data are captured during a game, through video analytics on the roof of the stadium. Further, match related data is also provided by Opta who comes to the stadium and films each match. Finally, data is also gathered at the training centre through different sensors to monitor the training condition for each player.
Business analytics	The area of business analytics at FC Bayern Munich deals with data analytics related to customers, which in this case, are fans and club members. 80 roles have been created for the fans, based on the analysis of the data gathered about the fans. On the communication/marketing side, content is then delivered to the fans in a specific form, depending on their defined roles. On the sales side, “dialog steps” are identified to pinpoint consumers’ decision journey to better inform communication and marketing.
Event management	The area of event management concerns data analytics around the match day to facilitate the carrying out of the event. Data is gathered in real-time on match day around different points of the Allianz Arena, such as the cash system, the parking garage, and the entry system. Such data is then processed and aggregated for the managers in charge of the match day event. Through a smartphone application, information such as number of cars in the garage, turnover of the stadium, number of people at the stadium, etc, is provided to the managers in charge in real-time.  “Anyone who manages this here knows that on game day at 19:30, 80% of people should be in the stadium. If that’s not the case, then the iPad/iPhone will send an alert saying that only 75% of people are in the stadium. Wow, we need to hurry up we need to get these people into the stadium. Then the staff in the arena will have to check why are we slow, why are there not as many people in the stadium as it should.” (CIO, FC Bayern)

At the moment, FC Bayern is working on two fronts. First, they continue to oil the well-functioning digital machine so that business ideas can be reacted upon in a more efficient way. Second, they exert their sports analytics leadership by laying the groundwork for other Bundesliga teams to follow:

“We are engaged in the DFL, meet together with the other IT crew. So, we are talking about what we are doing, and they talk about what they are doing. We are the leaders; most clubs are not able to talk about the things we are talking about. They are years behind.” (CIO, FC Bayern)

<b>Platform establishment</b>	<b>Partner building</b>	<b>Ecosystem construction</b>
<b>IT infrastructure</b> - Data center building - Platform unifying <b>IT development</b> - Implementation of SAP sports 1 <b>IT technical skills</b> - Advanced partnership with SAP	<b>Customer relationship management</b> - Role identification - Co-creation <b>Partner relationship management</b> - Partnership with content provider	<b>IT-business alignment</b> - Three main areas are supported by IT and data analytics <b>IT leadership</b> - IT being the driving force of business decisions <b>Analytics leadership</b>

	- Partnership with data integrator <b>Market responsiveness</b> - Collaborations with past and present player and fan groups	- Analytics being the competitive advantage and also determine the competitive performance of the football team and the business
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## Future Work and Conclusion

In this paper, we provide some initial results of a revelatory case study on FC Bayern and its transformation towards analytic leadership. We have identified three main areas of sports analytics, namely analytics related to player and team performance, analytics related to event management, and analytics facing customers. Further, we have revealed that the digital transformation of FC Bayern is also a process of gradual development of various IT-enabled capabilities across different levels. Future work involves ongoing analysis, further data collection, including a second field trip and interviews with different stakeholders of the sports analytics ecosystem. Our goal is to not only recognize the process through which digital transformation has taken place, but also to unearth the unique challenges related to sport organizations in realizing digitalization and achieving analytic leadership. For instance, it will be interesting to look at how FC Bayern has managed to address the issues related to resource constrains when obtaining various IT capabilities, a problem with sport organizations (Davenport 2014b).

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