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## Doping in Professional Cycling: The Underestimated Organizational Dimensions

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**Abstract.** The cycling champion Lance Armstrong was at the heart of a doping system that gave rise to one of the most important scandals the sports world has ever known. Numerous studies have been devoted to the topic, adopting a medical, ethical, legal or psychological point of view. However, no research has addressed the organizational dimensions of an extremely sophisticated doping system that allowed Lance Armstrong to win seven successive Tours de France. The objective of this paper is to propose a reflection on these underestimated organizational dimensions, in particular as regards the management of the supply of doping products during the different stages (“étapes”) of the Tours de France. Beyond the specific case of doping in professional cycling, lessons can be drawn on the understanding of the logistical mechanisms related to the traffic of illicit substances.

**Keywords.** doping products, Lance Armstrong, organization, professional cycling, supply management, Tour de France

### 1. Introduction

Lance Armstrong is a name that is widely known outside of professional cycling. The Texan athlete has left his mark on the 2000s, as much by his controversial sports performances as by his extraordinary personal trajectory. Shortly after his participation in the 1996 Olympic Games, his sporting career was put on hold when he was diagnosed with cancer. Successfully treated, Lance Armstrong returned to competitive cycling in the late 1990s, winning an exceptional and unsurpassed seven consecutive Tour de France races between 1999 and 2005. He announced his retirement from the professional sport in the summer of 2005, before making a comeback in 2009, taking third place in that year’s Tour de France. In early 2011, Lance Armstrong put an end to his career, before being caught up in a huge scandal. As Travis Tygart, president of the United States Anti-Doping Agency (USADA), vehemently pointed out to the French Senate in April 2013, “the Armstrong case confirmed that cycling had succumbed to doping and that there was a culture of corruption in the sport, and the use of EPO (erythropoietin) was common. Our concern was to protect the athletes, the future generations of athletes, because there was a real public health problem” [1].

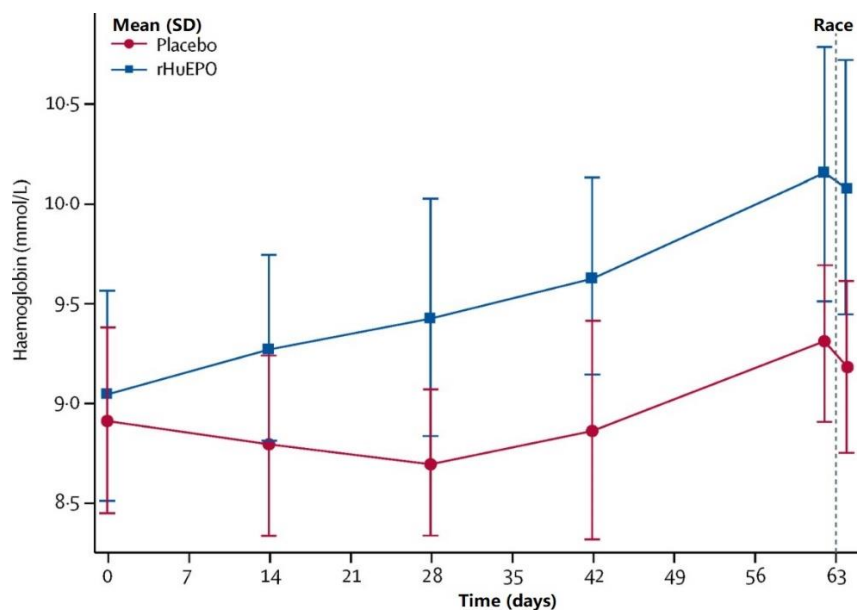
This statement is a clear statement that follows several years of investigation to break the silence. Indeed, after a long period of denying allegations that he had used doping products, including EPO, Lance Armstrong was accused in 2012 by the USADA of being the mastermind of the “most sophisticated, professionalized and successful doping program that sport has ever

seen” [2]. The story of Lance Armstrong’s doping program is, in large part, the story of an astonishing system in which organizational dimensions are a key element. Racing for a team sponsored by the U.S. Postal Service (USPS), Lance Armstrong built an outstanding record of success thanks to his entrepreneurial spirit, including by relying on “neoliberal myths” of individual resilience in the face of adversity [3]. In a book that is now a reference, Tyler Hamilton and Daniel Coyle [4] describe him as a true CEO who ran his teammates with an iron fist, even in a dictatorial manner, and the use of coercive power is certainly the key element to his personal leadership [5]. However, it is essential to understand that we are in the presence of an organized system, and not just a “bad apple” [6], at the risk of believing that the Lance Armstrong saga will not be repeated with other athletes.

## 2. Doping Program

At the end of the 1990s, while he will admit in May 2020 to having doped since 1992, at the age of 21 [7], Lance Armstrong understood all the advantages of using EPO, a molecule naturally produced by the body, which stimulates the production of oxygen-carrying red blood cells. A randomized, placebo-controlled study conducted by the Centre for Human Drug Research in Leiden confirms that taking EPO significantly enhances the performance of riders [8] (see Figure 1). From 1998 onwards, a very sophisticated doping program was set up by Lance Armstrong to use EPO in the best possible conditions. The objective is to take advantage of a medical and technological reality: doping products are always a few years ahead of the testing methods developed to detect them [9]. During training sessions, which are not subject to any control, Lance Armstrong takes micro-doses of EPO by intravenous with the help of the three doctors on his team. It is a question of testing up to which point EPO can be undetectable, thus anticipating the development of the detection test (in 2000). To avoid the risks of being positive to EPO, Lance Armstrong will benefit from regular blood transfusions, whose use was reinforced after the medical detection of EPO [10], including during the various Tours de France.

**Figure 1.** Long-lasting effects of EPO on performance



Source: Heuberger *et al.* [8].

The doping program is completed by the oral intake of testosterone, combined with oil to be directly absorbed by the lymphatic system, which makes it more effective and less dangerous for health, by a series of injections: on the one hand, of growth hormone, which improves muscle mass, motor strength and recovery time; on the other hand, of plasma and saline solution so that the hematocrit level does not exceed the authorized limit (50%). It is possible to speak of a real and efficient “business venturing” initiated by Lance Armstrong, with the establishment of a team of executors who prepared, fed and covered this organized and well-structured doping: the team manager Johan Bruyneel, the three doctors Pedro Celaya, Luis del Moral and Michele Ferrari (suspended for life from all sports activities), and the coach Jose Pepe Marti. As Hans de Bruijn, Martijn Groenleer and Theo van Ruijven [11] underline, a strict hierarchy of responsibilities within the team, but also the building of a network of strong friendships, largely explains the success of business venturing.

The doping program developed by Lance Armstrong and his teammates goes far beyond a situation of cheating contrary to sporting ethics. It also raises questions about public health, since the side effects of doping products are well-known: cancers, hormonal disorders, increased risk of strokes, and psychological problems [12]. In the case of EPO, for example, the side effects are linked to a sudden increase in red blood cells which tires the heart pump and favors the phenomenon of sudden death during exercise. Many professional cyclists have died of cancer in their fifties, such as Louison Bobet and Jacques Anquetil, or committed suicide as a direct consequence of psychiatric disturbances, such as Luis Ocaña [13]. This explains why many countries, like France, have set up anti-doping prevention programs for high-level athletes, but also for young amateur athletes tempted to increase their sports performance very quickly, regardless of the impact on their health.

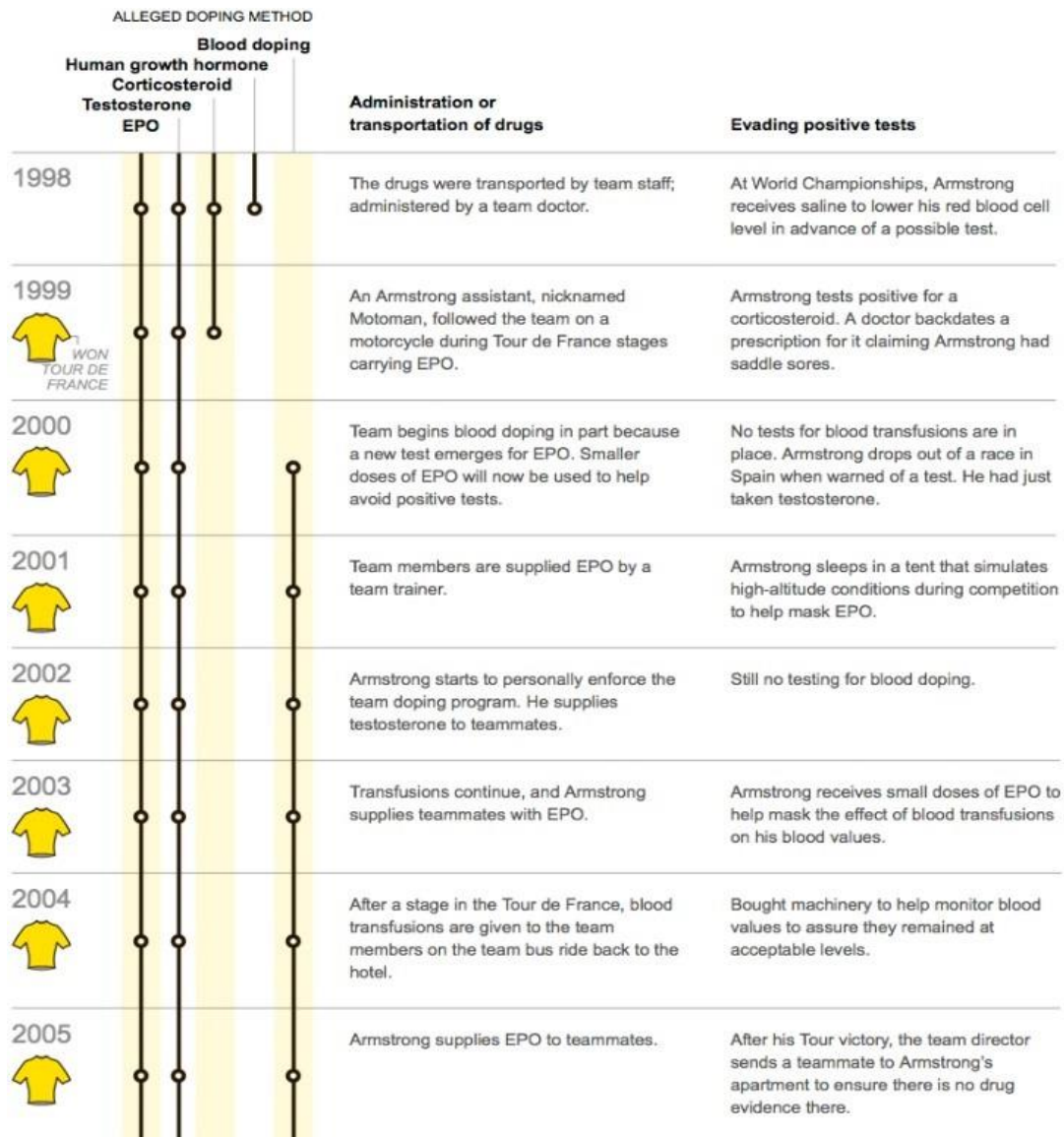
### **3. Organizational Support**

Like any commercial company, it is impossible to implement an ambitious business development strategy without thinking about how to organize the supply of resources necessary for that strategy to succeed; the seminal work of James Heskett [14] in the 1970s underlined how essential logistics is to strategy. In the case of the Lance Armstrong doping program, the key element is the supply of the doping products, using the most appropriate distribution channels, as in any corporate reality. This is not well known in the Lance Armstrong system, although it is essential and totally understood by the rider. Figure 2 summarizes the administration and transport of drugs during the different Tours de France. Thus, from the 1999 Tour de France, the USPS Team implemented *ad hoc* logistics to supply the members. Lance Armstrong himself devised a clever supply management in which his gardener followed the stages of the Tour de France on a motorcycle and delivered the doping products [15]. This gardener, known as “Motoman”, has both operational driving competences and interpersonal competences, cultivating the extreme discretion required of any illegal substance dealer.

The use of Motoman is similar to a logistical “*bricolage*” in the sense that the French anthropologist Claude Lévi-Strauss [16] gives to “*bricoleur*”, whose rule is to always make do with the “means at hand”. The “*bricoleur*” shows creative genius in planning tasks from the available resources, including a keen sense of improvisation. This is the case of Lance Armstrong and his teammates. The EPO is delivered directly by Motoman in syringes, and all the runners have to do is quickly inject themselves in the team bus, then throw the syringes into a can of Coca-Cola. It is then up to the team doctor to get the cans off the bus as quickly as possible [4]. As for blood autotransfusions, which prolong the doping effects, they require more time and organization because of the technical duration of the operation, which is much longer than the actual injection of the illegal substance (from an ethical point of view). With the help of his manager, Lance Armstrong was able to establish a strict schedule for each phase of the

doping process, just as a manufacturing company is able to establish a strict production schedule.

**Figure 2.** Doping and logistical methods during the seven Tours de France



Source: *The New York Times*, October 22, 2012.

If the team bus is the supply chain facility of choice for the execution of doping activities, Lance Armstrong knows how to find efficient logistical alternatives. During the 2003 Tour de France, he was forced to use his teammate George Hincapie's apartment in Gerona (Spain) to give himself an autotransfusion in an emergency [4]. Locked in a room with one of the team doctors, Lance Armstrong used a clever device: the bag of blood to be reinjected was attached to a coat hanger, which in turn was hung on the wall. Lance Armstrong's risk-taker profile is even more apparent in even more tense situations, such as the day the doctor dilutes the cyclist's contaminated blood with a bag of saline solution that he carries under his coat,

under the noses of the controllers. This testifies to an unquestionable capacity for successful improvisation that we find in the “*bricoleur*” model of Claude Lévi-Strauss [16].

#### 4. Discussion and Conclusion

Surprisingly, there was never any sophisticated drug use in Lance Armstrong’s system. The athlete simply resorted to repeated blood doping, coupled with the use of testosterone to aid recovery between races. Blood doping improves physical endurance by increasing an athlete’s ability to oxygenate their muscles. This is a significant advantage in cycling as riders spend up to six hours in the saddle daily and face some of the highest mountains in Europe, including the famous Tour de France. The exceptional longevity of Lance Armstrong’s doping program, and the climate of terror he instilled to keep his secret in the various Tour de France pelotons [17], leads to the conclusion that the strategy of absolute domination of professional cycling succeeded before the scandal was exposed in the early 2010s. The fact that the USPS company wants to become a competitive business [18], and therefore conducts an aggressive policy of market conquest, has probably also created the favorable conditions for developing the doping program.

It is also important to understand that Lance Armstrong’s victories have allowed professional cycling to experience an exceptional fad in the United States since the early 2000s. This fad has led to huge advertising investments, with US companies fighting to associate their products’ image with that of the champion, a true national hero. Thus, at the height of his fame, Lance Armstrong was under contract with the pharmaceutical groups Bristol-Myers Squibb (750,000 US dollars per year) and BrainLab (500,000 US dollars), the medical Internet site WebMD (500,000 US dollars), and the insurer AIG (300,000 US dollars). More traditionally, Lance Armstrong’s image was associated with sports equipment manufacturers such as Nike and Trek (500,000 US dollars each). In total, he received about 7.55 million US dollars per year from his sponsors, including 2 million US dollars from USPS, his main employer. His fall will have significant economic repercussions in the United States, while the Tours de France without his presence will see the level of interest in the US public plummet, as shown in Figure 3.

**Figure 3.** Relative search interest in “Tour de France” and “Lance Armstrong” on Google Search in the United States



Source: Google Trends (2022).

Indeed, after extensive investigations by USADA, Lance Armstrong loses in the fall of 2012 all victories accumulated between 1998 and 2010, including those of the Tours de France. In addition, he is permanently banned from participating in any future professional competition. In early 2013, during an interview with Oprah Winfrey on American TV, he will publicly admit that he was involved in the use of performance-enhancing drugs. Patrick Kiernan [19] points out how Oprah Winfrey used a *dramatized narrative* based on carefully selected clips to show that the Lance Armstrong saga was far from the fairy-tale career the rider wanted to leave in cycling history. However, there are still many “grey areas” regarding the *modus operandi* associated with the logistical “*bricolage*” at the heart of Lance Armstrong’s business venturing. More specifically, it would be interesting to draw on the work of supply risk management to analyze the incredible efficiency of a doping program that has lasted for a decade, and which has strong similarities with the organization of other criminal networks [20], including trafficking in cocaine and other illicit substances.

Indeed, in the trafficking of illicit substances, the question of the organization of supply arises in comparable terms. Conventionally, the focus is on the individuals who are at the origin of the traffic, and how they impose it on the people in charge of the flow of illicit substances, particularly in the underprivileged areas of large cities. Now, criminal networks are the object of a real supply innovation race, based on the use of specific routes [21]. For products with a very high value, such as cocaine or heroin, fast boats or even planes are used to transport illicit substances in a few hours. Once at its destination, the boat or plane is usually destroyed to avoid leaving any evidence. In the face of improvements in police detection methods, drones are now used for short distances, without any human element capable of providing information on the traffic drivers. It is obviously essential that public health policies address these organizational dimensions in order to combat more effectively the criminal networks that threaten the lives of thousands of people, including many adolescents whose addiction to cannabis, heroin and marijuana has been known for decades [22].

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