

# FROM RADICAL TO DISRUPTIVE INNOVATION: THE RELEVANCE OF THE CONTEXT FACTORS

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## ABSTRACT

*Many scholars within the innovation management field have investigated for a long time the concept of radical innovation, i.e. of an innovation that significantly changes the state-of-the-art of knowledge and technology in a certain field. In this stream of research, several scholars have focused on the concept of disruptive innovation, i.e. of an innovation that changes the nature of competition in a given industry, bringing new companies to the top ranks and “disrupting” the position of incumbents. However, the characteristics of the context in which the “disruption” takes place are rather under-researched; therefore, the work attempts to examine if the disruptive phenomenon arises from specific context factors, apart from the innovation itself or the innovator firm. In this respect, the paper leverages on Uber as an explorative case study and conducts a longitudinal analysis of secondary sources, which described and studied all the evolutionary phases of the innovation. The context factors analyzed in the paper are the market concentration, the regulatory system and the diversification of the offering in four metropolitan areas in which Uber slipped in. The case study shows that the regulatory system represents the most influential variable on the Uber’s capacity to “disrupt” the taxi industry.*

**Keywords:** radical innovation, disruptive innovation, context factors, Uber.

## 1. INTRODUCTION

Within the innovation management field, scholars have studied the concept of radical innovation for a long time. In particular, they evaluated technological changes either by looking at how features of extant products or services have improved over time or by examining the characteristics of new products or services. In this case, scholars analyzed whether an innovation had an incremental or a radical behavior.

In the field of radical innovation, several scholars focused on the concept of disruptive innovation, i.e. of an innovation, which is radical in nature, whose impact “disrupts” extant business models in a given industry. More recently, several executives in the field of disruptive innovations shed light on peculiar cases of “disruption”, which not only change the nature of competition in a given industry, but also the whole industry becomes “disrupted” by an innovation brought to the market by a newcomer or by an incumbent firm belonging to a different industry. However, scholars have focused on the innovation itself or on the innovator firms, neglecting the characteristics of the context in which these “disruptions” take place, as possible enablers of the disruptive phenomena. Therefore,

this paper aims to analyze which context factors determine the disruptiveness of an innovation.

## **2. LITERATURE REVIEW**

The concept of radical innovation have been investigated since years. There is a clear understanding about what a “radical” innovation is (Abernathy and Utterback, 1975; Suarez and Utterback, 1995; Henderson and Clark, 1990; Wind and Mahajan, 1997; Tripsas, 1997; Sull et al., 1997; O’Connor and De Martino, 2006; Chiaroni et al., 2010), i.e. an innovation that significantly changes the state-of-the-art of knowledge and technology in a certain field. According to Chiaroni et al. (2010), the nature of innovation radicalness resides in the change of established managerial practices, performance dimensions of both products and processes, specialized complementary assets, and sources of rents due to the innovation. The radicalness of an innovation can therefore arise in three peculiar domains of a firm that correspond to the technology, to the business model and to the processes linked to final users.

Several scholars within the field of radical innovation management have dealt with the issue of understanding the concept of disruptive innovation (Abernathy and Clark, 1985; Bower and Christensen, 1995; Christensen and Bower, 1996; Christensen, 1997; Veryzer, 1998; Adner, 2002; Christensen and Raynor, 2003; Kostoff et al., 2004; Danneels, 2004; Markides, 2006; Govindarajan and Kopalle, 2006). In particular, this kind of innovation (that is radical in at least one of the radicalness domain) significantly changes the nature of competition in a given industry, bringing new companies (coming from other industries or being newcomers) to the top ranks and “disrupting” the position of incumbent firms. Abernathy and Clark (1985) underline how by intensifying the nature of “technology” and “market” domains limited to the “radical” approach, can be possible to obtain a disruptive innovation that substitute extant technologies and sometimes “when deep and extensive, such innovation creates new industries”. According to Bower and Christensen (1995) and Christensen (1997), many large companies fail to stay at the top of their industries when disruptive technologies, mainly brought to the market by newcomers, enter established markets. In this case, their relevance arise from the offer of a very different value proposition characterized by a different package of performance attributes. In particular: a) disruptive products are simpler and cheaper than the mainstream ones, they generally promise lower margins, not greater profits; b) disruptive products/services are first commercialized in emerging and small markets; c) established firms’ most profitable customers generally do not want products based on disruptive technologies (due to their poor performance and lower price); and, finally, d) the start-ups, newcomers or second-tier firms that aggressively promote disruptive products do not appear as a challenge to their market position.

It is possible to highlight the main features of a disruptive innovation, as shown in Table 1, on the basis of a) the market targeted by the “disruptor”, b) its initial performance, c) its cost and, finally, d) the kind of innovator firm.

TARGET MARKET	PERFORMANCE	COST	INNOVATOR	REFERENCES
Initially a niche, then expands into the mainstream market	Worse than existing products or services, but different value propositions	Lower cost to buy or use the innovation (→ lower profits for the innovator)	Start-ups / Newcomers	Abernathy and Clark (1985) Tushman and Anderson (1986) Bower and Christensen (1995) Christensen and Bower (1996) Christensen (1997) Danneels (2004)

**Table 1: Disruptive innovation features.**

Following contributions moved along two perspectives. On one hand, some scholars have suggested a more specific definition of disruptive innovation, either trying to differentiate the concept of “disruption” among different typologies (Markides, 2006), or by “formalizing the disruptiveness concept with a reliable and valid measure” (Govindarajan and Kopalle, 2006). On the other hand, several scholars shed light on the capabilities of incumbent firms to detect (Bower and Christensen, 1995; Christensen and Bower, 1996; Christensen, 1997; Christensen and Overdorf, 2000; Adner, 2002; Kostoff et al., 2004) and to react (Bower and Christensen, 1995; Christensen, 1997; Christensen and Overdorf, 2000; Birkinshaw and Gibson, 2004; O’Reilly and Tushman, 2004) to a disruptive phenomenon.

Within the literature about disruptive innovation, the characteristics of the context (Schumpeter, 1934, 1950; Philips, 1971; Tushman and Anderson, 1986; Romanelli and Tushman, 1986) in which this phenomenon takes place are rather neglected. However, the development of innovations in a given industry is affected by the context variables according to the innovation literature. In this respect, the *market concentration*, the *regulatory system*, the *offering diversification* and the *culture* of a country, can play a key role in the developing process of an innovation. In particular, *market concentration* assesses the number of firms operating in a given industry and their market share. The *regulatory system* typically represents the main obstacle for newcomers to entry into a regulated industry. It also shapes the competition, determining or influencing the competitive mechanisms. The *offering diversification* represents the different ways to provide the same service (i.e. the taxi service in this case) in order to satisfy different consumers’ needs. Finally, the *culture* of a country represents values, beliefs and behaviours that drive people inside the country itself. Such context variable will not be considered in the following analysis due to its complexity of evaluation.

In the light of this, the paper attempts to fill the above-mentioned literature gap, answering the following research question: “Which are the context factors that enable a disruptive innovation?”

In order to understand which of the context variables affect the disruptiveness of the “disruption”, an exploratory analysis regarding Uber is conducted, an emblematic case of disruptive phenomenon, which not only temporarily upset extant market conditions, but also shocked the taxi industry in record times. The research is conducted through a longitudinal analysis of beyond 100 documents, among which articles published in the most relevant secondary sources dealing with economic topics, and publicly available reports, which have described and studied the different evolutionary phases of the company.

### 3. EMPIRICAL ANALYSIS

#### 3.1 UBER BUSINESS MODEL

In March 2009 Travis Kalaninick and Garrett Camp founded Uber, a taxi-hailing company based in San Francisco. Uber launched its taxi-hailing service in San Francisco in June 2010 and now the service is available in more than 250 cities in 55 different countries. Uber has a particular business model: it cannot be considered as a taxi or a transport company, since it does not own taxi and it has not drivers as employees. Uber is a marketplace; it plays the role of matchmaker, matching drivers with customers that require the service through its smartphone app. Uber holds 20% of the fare paid by customers and gives the rest to its drivers. The core activity of the company refers to the selection of drivers and the verification of the service quality. Uber assigns to candidates who passed the selection a smartphone application that allows them to manage incoming customer requests. Uber app is one of the core elements of its business model: it is available for smartphone devices and it uses GPS to display the map of all available Uber cars in the area. In addition, the app reports the requests of customers to the closest driver, who effectively provides the service, and shows to customers themselves an estimated pick-up time. Moreover, the app handles electronic payments (allowing passengers to split the trip payment) and at the end of the service, it requires both customers and drivers to leave a rating. Uber offers five different levels of taxi-hailing service, depending on the different customers' needs (especially in terms of price and quality). In particular, a) *UberLux* serves the high-end market; b) *UberSuv* panders those customers who require more seat or a bigger trunk for their travel; c) *UberBlack* serves the medium-high market; d) *UberTaxi* allows customers to use Uber such as a taxi (in this case Uber handles the transaction through its application applying the rates of taxi service set by the local regulator); finally, e) *UberX (or UberPop)* that is the low-cost service with non-professional drivers.

In Table 2, the main aspects of the company's business model are summarized according to the main features of a disruptive innovation summarized in Table 1.

INNOVATION	TARGET MARKET	PERFORMANCE	COST	INNOVATOR
Use of <i>taximeters</i> based on GPS technology and new methods for calculating the fee Usage of non-professional drivers for the <i>UberX</i> taxi service Job flexibility due to the usage of non-professional drivers for the <i>UberX</i> taxi service Lower fixed costs for Uber because the service is provided by sub-contractors Double rating mechanism Electronic payment	Taxi users that are technology-addicted and disposed to spend more or less money for a better or a less quality of service	Greater availability of service Heterogeneous quality of the services (Worst → <i>UberPop</i> ; Best → <i>UberLux</i> )	Heterogeneous prices (Lowest → <i>UberPop</i> ; Highest → <i>UberLux</i> )	Start-up / Newcomer

**Table 2: Disruptive features of Uber.**

From Table 2, it emerges that the Uber's features are only partially close to the ones of a disruptive innovation as shown in Table 1. For example, the low price-quality balance related to *UberX* service is aligned with the typical characteristics of a disruptive innovation, whereas other high-quality services offered by Uber (i.e. *UberLux*) are not consistent with such characteristics. This is basically due to the fact that Uber's business model is mainly characterized by a multiple offering that takes into account different requests of customers.

### **3.2 THE INFLUENCE OF THE CONTEXT VARIABLES ON UBER DISRUPTIVENESS**

The present paragraph attempts to comprehend the effects of the context variables previously mentioned, i.e. the market concentration, the regulatory system and the diversification of the offering, on the disruptiveness of Uber in the taxi industry. Given the very heterogeneous situation within each country, the chosen area of investigation is the city. In particular, four metropolitan areas where the service has expanded are chosen, due to their comparability and availability of data.

#### **Milan**

##### ***Regulatory system***

In May 2015, Uber has been completely blocked, because the company is performing unfair competition and it is infringing the laws that regulate taxi service, with particular reference to the role of drivers, which are not qualified to offer the service, and the lack of authorization to operate within the area.

##### ***Market concentration***

Actually in Milan there are 4,855 licenses for the taxi service, with a density of 3,7 taxis per 1,000 inhabitants, while in the airport area the licenses are 5,323 with 2,4 taxis per inhabitants. Thus, Milan is the first Italian city for the taxi density and the second, after Rome, for the number of licenses issued, but it is far from cities as Paris that have in their metropolitan area 15,500 licenses.

##### ***Offering diversification***

The taxi service is basically standardized and the offering is not diversified. However, considering the transportation industry as a whole, a consumer can use many alternatives. Indeed, Milan is served by 4 metro lines, by 1,503 buses, and by 19 tramlines. In addition, there are also two main railway stations, which connect the city to the rest of the Lombardy through 14 suburban lines.

#### **San Francisco**

##### ***Regulatory system***

Uber's legal problems started in October 2010, when Uber received a cease-and-desist notice from the *CPUC's Consumer Safety and Protection Division*, followed by a \$ 20,000 fine to unlicensed passenger carriers. In December 2014, Uber received a complaint by the *Superior Court of California (County of San Francisco)*, for a misrepresentation regarding background checks, an improper use of the app to measure distance for fare calculation, and an unlawful operation at airports. However, San Francisco is recently moving toward a greater deregulation of the taxi industry in order to encourage the competition.

### ***Market concentration***

In May 2015, there were 1,900 authorized permits to operate such as a taxi, organized in 28 taxi companies. Taxi drivers do not operate in independent way with a personal license, but they have to join a taxi company. In particular, license holders can operate directly as drivers or may lease their permits to a taxi company, who may then lease it to another driver. Currently, the top four taxi companies cover more than 60% of the market.

### ***Offering diversification***

The taxi service is basically standardized and the offering is not diversified. In addition to the taxi service, San Francisco inhabitants could use two more public transportation systems, BART (Bay Area Rapid Transfer) and MUNI (Municipal Railway). BART enables connections between the city centre and key locations of the Bay Area through 5 metro lines; on the other hand, MUNI is the public transportation system, which allows to travel within the city centre through 10 tram lines (3 lines covered by the historic cable car), 17 trolleybus lines and 54 bus lines.

## **New Delhi**

### ***Regulatory system***

In December 2014, New Delhi police filed a complaint against Uber for fraud and violation of government regulations, accusing the company of not carrying out checks on criminal records of its potential drivers. Moreover, other critical aspects refer to: a) lack of a valid license to provide the taxi service; b) absence of checks on the status and on seniority of cars; c) failure to have a regular fare meter; d) other issues related to *UberX* drivers.

Although these considerations seem to obstruct the Uber service, in fact the company could overcome these obstacles, conforming itself with the new proposal of the New Delhi transportation authority, which would regulate taxi aggregators (which are companies that do not own vehicles such as Uber) to apply for a licence alongside groups that own a fleet of taxis.

### ***Market concentration***

Currently, there are 53,739 regulated taxis for a population of more than 16 million and the market is growing fast at 20-25% rate per year. In the regulated market, there are three kinds of operators having a minimum fleet of 500 vehicles, as required by the law. One of them holds nearly 70% of the organized market share. However, the taxi industry also includes an unregulated market, which account for about 90% of the whole industry. In the unregulated market there is a huge amount of individual operators running in different parts of New Delhi area.

### ***Offering diversification***

The taxi service is basically standardized and the offering is not diversified, concerning the regulated market. In New Delhi, inhabitants could also use only one alternative transportation service, represented by 6 metro lines.

## **London**

### ***Regulatory system***

On July 2014, the local authority for transportation proved the compliance of Uber with the law, although according to the *Private Hire Vehicles (London) Act* of 1998 Uber may be considered as illegal for several reasons: a) any private hire vehicles driver must apply to the *Secretary of State* for a London PHV operator's licence; b) the vehicle must have a private-vehicle licence for that service; c) Uber cannot inspect and test any vehicle to

which a London PHV licence relates; d) vehicles have not “a disc or plate, to which a London PHV licence relates, which identifies that vehicle for which such a licence is in force”; e) UberX app can be considered such as a taximeter, and “no vehicle to which a London PHV licence relates shall be equipped with a taximeter”.

### **Market concentration**

Currently there are 25,000 authorized permits to operate such as a taxi, organized in 14 taxi companies. It is difficult to infer about the level of market concentration, because of a lack of information about the market share of each taxi company.

### **Offering diversification**

The taxi service in London is basically not diversified. However, taxis are not the only transportation systems, indeed there are: a) 11 underground lines; b) the Docklands Light Railway (DLR), an automated light rail system serving the Dockland area of east London; c) The Tramlink, which is a light rail/tram system in South London; finally, d) 26 lines of bus, served by the red double-decker London bus.

## **4. DISCUSSION AND RESULTS**

In this paragraph, we will discuss the results deriving from the analysis of the case studies previously described on the basis of a qualitative connotation given to each context variable, and starting from data and information available for each city. In particular, we did the following distinctions for each context variable: a) the *market concentration* is “high” or “low” on the basis of the capacity of taxi drivers to organize themselves in a greater taxi company (high concentration) or to operate as a single entity (low concentration); b) the *offering diversification* is “high” or “low” based on the number of different substitutive services within each city; c) the *regulatory system* is “open” or “closed” based on its willingness to enable the entry into market of a new kind of competitor, such as Uber, in a regulated market.

Table 3 summarizes the results from the case studies.

METROPOLITAN AREA	REGULATORY SYSTEM	MARKET CONCENTRATION	OFFERING DIVERSIFICATION	UBER DISRUPTIVENESS
MILAN	Closed	Low	High	NO
SAN FRANCISCO	Open	High	High	YES
NEW DELHI	Open	Low	Low	YES
LONDON	Open	High	High	YES

**Table 3: Effects of Context Factors on Uber disruptiveness.**

### **Regulatory system**

The regulatory system in the analyzed metropolitan areas is quite heterogeneous. In San Francisco, the regulatory system enables the dissemination and the consequent disruptiveness of Uber in the taxi industry. Although it seems that Uber operates illegally in the city, local authorities are willing to change the local laws in order to encourage a greater competition in the market, thus showing an “open” regulatory system with regard to the company. The same can be said for New Delhi, in which a new regulation in favor of taxis aggregators is under development. Indeed, in these two cities there are several taxi operators, which act as taxi aggregators such as Uber. In London, the Uber service is

completely considered legal. On the other hand, in Milan laws banned the service as a whole, going to hinder both the dissemination and disruptiveness of the company.

### ***Market concentration***

Market concentration within the analyzed metropolitan areas is rather different as well. In San Francisco, the market concentration is “high” because taxi drivers have to be aggregated within dedicated companies in order to regularly operate within the market. No robust information are available to infer about the market concentration in London, nevertheless, considering the number of taxis in the metropolitan area and especially their aggregation in a number of dedicated companies (similar to what happens in San Francisco), such market can be supposed as concentrated. On the other hand, in Milan the most part of taxi drivers operate in independent way, not allowing a great concentration of the market, which therefore can be considered as “low”. Basically, the same can be said for New Delhi, where the most part of taxi drivers act as a single entity.

### ***Offering diversification***

Considering only the taxi industry, and in particular the regulated-side of this market, the offering diversification is generally “low” in all the analyzed metropolitan areas, given the standardization of such service. Considering the transportation services as a whole, which can be considered at least partially as substitutive of the taxi service, it emerges that in Milan, San Francisco and London the diversification of the offering is “high”, mainly because of the presence of several public transportation services. Instead, in New Delhi the offering diversification is “low”, due to the presence of just one “competitor” (i.e. metro lines).

Based on these assertions, we can conclude that the regulatory system has the most relevant weight for Uber disruptiveness. This clearly emerges comparing the “regulatory system” and “Uber disruptiveness” columns: only where the regulatory system is “closed”, i.e. in Milan, Uber does not represent a “disruption”. Even though the remaining context variables in the other metropolitan areas change between each other, Uber is a disruptive innovation. The high importance of the regulatory system is mainly due to the fact that the regulator imposes the entry barriers in the market and decides how taxi operators have to operate within the taxi industry.

## **5. CONCLUSIONS**

The paper aims to comprehend the effects of three main context variables, i.e. the market concentration, the regulatory system and the diversification of the offering, on the disruptiveness of Uber in the taxi industry. To this aim, four metropolitan areas, where the service has differently expanded, have been deeply investigated.

From the case studies, it emerges that the regulatory system is the main influencing factor on the Uber disruptiveness. It stems from the fact that the regulator imposes the entry barriers in the market and decides how taxi operators have to operate within the taxi industry.

The absence of a greater number of information and data available is the main limitation of this research that has allowed us to conduct a qualitative analysis than a quantitative one. Another limitation of this work can be connected to the restricted number of context variables considered in the case studies analysis. As far as future research is concerned, it should be relevant to consider the geographic characteristics of each city, the



preferences of choice by the single consumer between the different transportation services and, finally, the set of attributes valued in the purchase phase by all the customers.

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