

Vialle, Pierre; Whalley, Jason; Parisot, Xivier

Conference Paper

How disruptive are disruptive operators?

22nd Biennial Conference of the International Telecommunications Society (ITS): "Beyond the Boundaries: Challenges for Business, Policy and Society", Seoul, Korea, 24th-27th June, 2018

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Vialle, Pierre; Whalley, Jason; Parisot, Xivier (2018) : How disruptive are disruptive operators?, 22nd Biennial Conference of the International Telecommunications Society (ITS): "Beyond the Boundaries: Challenges for Business, Policy and Society", Seoul, Korea, 24th-27th June, 2018, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/190339>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

How disruptive are disruptive operators?

Pierre Vialle^{1*}, Jason Whalley^{1,2}, Xivier Parisot³

1 – Institut Mines-Télécom Business School, Evry, France

2 – Newcastle Business School, Northumbria University, Newcastle, UK

3 – Institute for Knowledge and Innovation, Bangkok University, Bangkok, Thailand

**Corresponding author*

E: pierre.vialle@telecom-em.eu

Abstract

The issue of disruptive operators has recently gained interest among researchers and regulators. From a regulator's perspective, disruptive operators can increase competitive rivalry in markets dominated by a handful of large companies, thus allowing consumers to obtain more benefits in terms of price and quality. However, the “disruptive” qualification of an operator in related studies does not rely on a precise definition of disruption. The disruption theory, as developed by Christensen, provides such a definition but may be too restrictive. In addition, it may not be adapted to the analysis of disruption in regulated industries such as telecommunications. In this paper, we aim at deepening our understanding of disruption in the case of the Telecommunications industry, by analysing cases of mobile operators who entered the industry thanks to 3G or 4G licences. To this end we first analyse the disruption theory literature and highlight its characteristics and limitations. It allows us to propose an eclectic analytical framework of disruptive innovations that does not restrict to Christensen's theory. We then apply it to different cases of disruptive mobile operators in order to identify the level and pattern of disruption inherent to each case, and to compare them. We conclude by discussing our findings and further research perspectives.

Keywords

Disruption, innovation, telecommunications, regulated industries, business model, strategy, policy

1. Introduction

The issue of disruptive operators has recently gained interest among researchers and regulators. From a regulator's perspective, disruptive operators can increase competitive rivalry in markets dominated by a handful of large companies, thus allowing consumers to obtain more benefits in terms of price and quality. In 2016, Ofcom, the UK's telecommunications regulatory, published a cross-country economic study that analysed the impact on prices of the presence of disruptive operators, finding that where disruptive mobile operators are present prices are lower in the order of between 10.7% and 12.4% compared to countries where there are no disruptive operators (Ofcom, 2016). Other authors have focused on specific markets and companies in order to provide a fine-grain analysis of disruption. For example, Berne, Vialle and Whalley (2016) show that the introduction of Free Mobile in France had a strong impact in terms of prices, profits, market shares, market growth, employment and market structure. They suggest that such a notable and wide-ranging effect results from the disruptive business model adopted by Free Mobile and may not have been possible if the new entrant was a 'traditional' competitor. On a more general level, there has been also recently a renewal of the debate on disruptive innovation (i.e., Christensen, 2015; Hagel et al, 2015; King and Baatartogtokh (2015); Weeks, 2015).

Ofcom (2016) has adopted a rather pragmatic attitude when defining disruption. They argue that there is no precise definition of 'disruption' but identifies three broad categories of behaviour that a company may display. It may introduce a product or service that supersedes existing ones, or produce an existing product or services differently using new technologies. The company can also show 'aggressive behaviour', such as through competing aggressively and prioritising gains in market share over profitability.

There are, however, diverging perspectives among authors on how to define disruption, by putting the emphasis on the process or on the outcome. For the main stakeholder of this theory, Clayton Christensen, disruption is defined as a process with precise characteristics, through which a smaller competitor with limited resources is able to successfully challenge established incumbent businesses (i.e. Christensen, 1997). As Christensen (2015) highlights: "success is not built into the definition of disruption: Not every disruptive path leads to a triumph, and not every triumphant newcomer follows a disruptive path". Disruption cannot be only defined by an outcome, such as gaining a significant market share; it has to exhibit a particular pattern of evolution over time. Would-be disrupters start with a foothold on low-end or new markets that are neglected by incumbents, but can only become true disrupters after they improve their products and services and move upmarket to further compete with incumbents.

Despite its obvious merits, the definition and patterns defined by Christensen seem to be quite restrictive and may not be encompassing enough to account for every kind of disruptive behaviours. Other authors have adopted an outcome-based perspective. For example, Hagel et al. (2015) analyse several cases in which incumbents have been significantly displaced, and identify patterns that not necessarily complying with Christensen's theory. Christensen's theory also does not explicitly consider the influence of external factors, such as country or industry characteristics; or internal (firm-specific) factors; such as resources and competences.

In this paper, we aim at deepening our understanding of disruption in the case of the Telecommunications industry, by analysing cases of mobile operators who entered the industry thanks to 3G or 4G licences. To this end we first analyse the disruption theory literature and highlight its characteristics and limitations. It allows us to propose an eclectic analytical framework of disruptive innovations that does not restrict to Christensen's theory.

We then apply it to different cases of disruptive mobile operators in order to identify the level and pattern of disruption inherent to each case, and to compare them. We conclude by discussing our findings and further research perspectives.

2. Definition of an eclectic analytical framework of disruption

2.1 Definition and evolution of the disruptive innovation theory

The disruptive innovation (DI) theory has been developed as a quasi-exclusivity of Clayton Christensen and his co-authors. A few other authors have reviewed his work and raised some critics of the theory, others have brought complementary contributions, or have even departed from the initial theory. In this review we explain the main features of the DI theory and raise a few issues that allow us to elaborate a broader way to analyze disruptive innovation.

Initial conceptualization

The main intent of the DI theory is to explain why incumbent firms fail to respond accordingly when confronted with innovations introduced by new entrants. It provides a different perspective from previous contributions on the same topic, such as the notion of architectural innovation (Henderson and Clark, 1990), or the distinction between competence-destroying technologies and competence enhancing technologies by Tushman and Anderson (1986)). It must be kept in mind that Christensen's theory is about competitive behavior (response) and is market-based (incumbents behave according to their perception of mainstream customers' expectations, rather than according to their resources and competences).

The initial conceptualization of disruption theory is based on the PhD thesis of Christensen and exposed in a few seminal articles (Bower and Christensen, 1995; Christensen and Bower, 1996; Rosenblum and Christensen, 1995)) and in his book: *The innovator's dilemma: When new technologies cause great firms to fail* (1997). This conceptualization was based on the in-depth analysis of the disk-drive industry and examples from several other markets.

In his book, Christensen (1997) asks why established incumbents fail to respond to the threat of new entrants introducing disruptive technologies and are eventually displaced by them. His explanations are based on the distinction between sustaining and disruptive technologies. Sustaining technologies improve "established products, along the dimensions of performance that mainstream customers in major markets have historically valued" (Christensen, 1997, p. XV), while disruptive technologies improve products on dimensions that are different from the ones valued by mainstream customers. They initially underperform on these latter dimensions, compared to sustaining technologies, but become disruptive after they improve and match the preferences of the main markets.

The pattern of disruption is the following: a new entrant introduces a new technology that has a lower performance than the established technology on the dimensions historically valued by mainstream customers in the core markets, but has a better performance on other dimensions. The products based on this innovation are "typically cheaper, simpler, smaller, and, frequently, more convenient to use" (Christensen, 1997, p.XV). They are introduced in over-served low-end markets which have lower performance expectations on the main dimension and also value other dimensions. These low-end, least profitable customers are satisfied by a good enough product which is not expensive. Incumbents rationally choose to ignore this competition, focus on the most attractive and profitable markets, and invest in improving the performance of the dominant technology in order to satisfy the most demanding customers. After its introduction, the new technology will mature in fringe markets and improve its performance on the dimensions valued by the main markets. As the

performance of the dominant technology also improved, there is still a performance gap between the two technologies. However, the performance of the mainstream technology may exceed the needs of most customers, so the new technology only needs to meet the level of performance required by the mainstream market. When the new technology meets this level of performance, it displaces the dominant technology and the new entrant displaces incumbents.

Theory extension

In a second book, *The innovator's solution*, Christensen and Raynor (2003) refine and extend the theory. Firstly, they address the issue of how incumbents can avoid being displaced by developing themselves disrupting technologies. They recommend, among others, to create separate organizational units to manage disruptive technologies, as IBM did with personal computers. Secondly, they extend the scope of the theory beyond technological innovations to all kind of business model innovations: discount department stores; low-cost airlines; products such as copiers, and motorcycles; and various online businesses such as bookselling, education, and travel agents. Thirdly, they distinguish between low end disruptions and new market disruptions. Low end disruptive innovations initially targets current customers with low price and lower performance. New market disruptive innovations instead target markets that are not served by incumbents by offering higher performance on other dimensions and create a new value network (and are not necessarily cheaper. In an interview, Christensen cites another type of innovation, efficiency innovations: "The third type of innovation," says Christensen, "which we missed in earlier versions of disruption theory, are efficiency innovations. The purpose of efficiency innovations is to do more with less" (Denning, 2016, p.).

It is important to highlight some key elements of the theory. (1) it is based on the existence of performance improvement curve and the fact that the sustaining technology's performance will eventually exceed customers' needs. (2) disruption is a process showing a particular pattern of evolution: disruptive companies start operating in low-end or marginal markets and progressively move upmarket in order to ultimately displace incumbents. (3) it outlines that managers in incumbent companies behave rationally by applying what they have learned in Business Schools and concentrate on the most profitable markets. By abandoning low-end markets to disruptive competitors, they may even get a sense of appropriateness as profitability may likely improve on short-term. (4) in this process, the incumbents are nearly always dethroned. (5) there is a view that incumbents can only fight disruptive innovations by adopting themselves these innovations.

2.2 Critics of the DI theory

Christensen's work has raised several critics that are related to three main issues: the scientific validity of the theory; its explanation and predictive power; and the definition of concepts.

A criticized methodology and assessment process

The methodology by which Christensen has designed his theory has been highly criticized. In particular, he has been accused of using "hand-picked" case studies (Cohan, 2000; Lepore, 2014; Tellis, 2006). Cohan notes that the cases used are only cases in which the disruptive technology did succeed and that Christensen did not consider cases in which they failed. Lepore (2014) even seems to challenge the integrity of Christensen by accusing him of hand-picking case studies and also criticized his analysis of these cases. She notes that the choice of the disk-drive industry, which Christensen himself describes as incomparable, makes an odd choice for an investigation aiming to design a model applicable to other industries. She

also observes that the outcomes of its main case study could be considered differently by adopting a longer time frame.

Tellis (2006) is more moderate and admits that Christensen's sampling is acceptable for building a theory. Chesbrough (2001) also remarks that this theory focused more on internal validity than external validity, and that it may be context dependent as all cases were based in the USA. Most empirical work has been in the form of very well-documented and thorough case studies of particular industries, but the extent to which findings from these case studies generalize across industries has not been addressed. However, according to him, it does not allow testing and validating the theory. Weeks (2015) notes that anomalies identified in several cases by other authors have not been sufficiently addressed by Christensen. He also suggests that the perceived deficiencies of the theory may be caused by the fact that the main contributions have not been subject to peer review, as they have been published in books or in Harvard Business Review. Weeks (2015, p. 419) assumes that "a more rigorous peer review of his methodology and of some of the disruptive innovation concepts may have allowed Christensen to refine the exposition of his theory more thoroughly through the years".

Poor predictive power

The reliance on analyzing cases post hoc raises the issue of the predictive power of the theory. Actually, Christensen also made himself famous for his poor predictions. For example, Christensen predicted that the iPhone would fail (McGregor, 2007), as it was a sustaining technology relative to Nokia. Lepore (2014) also relates that Christensen launched on March 10, 2000 a "Disruptive Growth Fund" in which stocks were selected according to his theory. The fund actually performed less than the Nasdaq and was liquidated less than one year later. Weeks (2015) also questions the relevance of Christensen's analysis of digital photography and of his prescriptions for Kodak.

A theory that seems to only partially account for the cases studied

A more problematic issue is whether the theory actually accounts for the cases that Christensen himself has investigated, as several authors have come to different conclusions from the very same cases. For example, on the disk-drive industry, which constitute one of the key case on which Christensen based his theory development, McKendrick, Doner, and Haggard (2000) challenge the conclusion drawn that most disruptive innovations have been introduced by new entrants and that incumbents mostly failed. Similarly, King and Tucci (1999) and Chesbrough (2003, analyzing the same industry) found out that established incumbents were more likely to introduce innovations in new niche markets, and also to exhibit a higher survival rate. King and Baatarogtokh (2015) reviewed 77 cases discussed by Christensen in his two books, by interviewing experts on the industries concerned. They tested four key proposition of the disruption theory and found out that they were only partly verified. In 24 cases (31% of the total), leading incumbents were not following a trajectory of sustaining innovation. In 60 cases (78%), sustaining innovation was not outperforming the mainstream customers' expectations. In 30 cases (39%), incumbents did not have the capability to respond to the disruption threat. In 29 cases (38%), incumbents have not been displaced. Actually, the four key propositions have been verified in only 9% of the cases.

2.3 Critics of the theoretical framework

The main critics of the theoretical framework are the lack of precise definition of disruptive innovation and of its scope, the lack of a consistent unit of analysis, the lack of consideration for the context, and also some assumptions of the theory.

Lack of precise definition disruptive innovation

A first remark is that the theory seems to be outcome-based and not outcome-based at the same time. The key difference between disruptive innovation and sustaining innovation is that the former disrupts incumbents while the later sustains incumbents. So it is in some way outcome-based and relative, as the same innovation can be disruptive for a given firm and sustaining for another one. However, according to Christensen, it is not outcome-based. Christensen et al. (2015) highlight: “success is not built into the definition of disruption: Not every disruptive path leads to a triumph, and not every triumphant newcomer follows a disruptive path”. Disruption cannot be only defined by an outcome, such as gaining a significant market share; it has to exhibit a particular pattern of evolution over time. Would-be disrupters start with a foothold on low-end or new markets that are neglected by incumbents, but can only become true disrupters after they improve their products and services and move upmarket to further compete with incumbents. Danneels (2004) also raises the time issue, and wonders at what point of time an innovation can be characterized as disruptive: once it is marketed or only after it disrupts incumbents? As developed later by Tellis (2006), that makes it difficult to identify ex-ante which ones, among the multiple underperforming innovations on the market, may become disruptive?

Danneels (2006, p.249) proposes an interesting definition of disruptive innovation: “In my opinion, the core of the definition of a disruptive technology is this: A disruptive technology is a technology that changes the bases of competition by changing the performance metrics along which firms compete”. We think this definition is particularly relevant for our research, as it is more encompassing than the initial definition by Christensen.

Schmidt and Druehl (2008) extend the initial distinction between low-market disruption and new-market disruption, and propose a more comprehensive and analytical framework that classifies innovations according to their diffusion pattern. High end encroachment is a classical diffusion pattern in which a sustaining innovation starts with a high price for the high end market. Low end encroachment corresponds to the progressive disruption pattern described in Christensen (1997). New-market disruption is divided into two types, fringe-market low-end encroachment (in a new market in which customers’ needs are incrementally different) and detached-market low-end encroachment (customers’ needs are dramatically different). Finally, immediate low end encroachment corresponds to low end disruptions that start immediately to sell on the market

Very few authors have attempted to propose an alternative conceptualisation to Christensen’s DI theory. A notable exception is the study by Deloitte consulting firm (Hagel et al., 2015). They have adopted an outcome-based perspective and empirically designed another conceptualisation of disruptive innovation. Hagel et al. They analyze several cases in which incumbents have been significantly displaced, and identify nine patterns of disruption. These patterns belong to two broad categories: harnessing network effects and transforming the value-cost equation. They also consider that disruption may differ between various industries according to their characteristics, and also to the trends affecting them.

Undefined unit of analysis

Weeks (2015), also highlights the lack of specification of the unit of analysis: “What unit of analysis is the research targeting? There are several choices including the technology (or innovation), the industry, the firm, or firm leaders. “At various times, Christensen’s work makes statements about each potential unit of analysis” (Weeks, pp. 421-422). Weeks further comments (p. 426): “If the unit of analysis is the firm, one might consider which firms are more likely to be able to introduce disruptive innovations....If the industry is the unit of analysis, one encounters other possible questions. Are certain industries more likely to survive

disruptive innovations? What characteristics influence these outcomes: supplier networks; customer networks; rivalry; labor practices?”

Markides (2006) observed that the theory, initially designed for technologies (Christensen, 1997), has been inappropriately widened to other types of innovations (i.e. Christensen, 2003). “A disruptive technological innovation is a fundamentally different phenomenon from a disruptive business- model innovation as well as a disruptive product innovation: These innovations arise in different ways, have different competitive effects, and require different responses from incumbents’ (p.). He further states that “To qualify as an innovation, the new business model must enlarge the existing economic pie, either by attracting new customers into the market or by encouraging existing customers to consume more....It is important to note that business model innovators do not discover new products or services; they simply redefine what an existing product or service is and how it is provided to the customer.” He stresses that while the process by which these innovations emerge and grow is similar to the case of technologies (i.e. performance dimensions), they are quite different on some aspects. In particular, a business model innovation does not usually eventually dominate the market for three reasons (1) the new business model may not be superior to the incumbent’s one, (2) the best incumbent’s response is not necessarily to adopt the innovation, (3) if the incumbent adopts it, it is not necessarily better to create a separate unit for it.

No context contingency is considered

Christensen’s theory does not explicitly consider the influence of external (country, industry) or internal (firm) factors, other than anecdotally. It can be reasonably assumed that such factors could well explain the observations made by other authors about cases which don’t, or only partially fit the disruptive theory.

It seems that sector differences are only considered through differences in performance trajectories: “In some industries the trajectory of technological improvement is very steep, like the disk drive industry where every eight years some firm was getting eliminated. In others, the trajectory of improvement is gentler, like in discount retailing. And finally, in others, the trajectory is flat.” (Christensen, cited by Denning, 2016).

Few articles relate disruption with external influences. When they do, they do it marginally, or are not well recognized contribution. Among the first category, Chesbrough (1999) found that, contrary to the USA, incumbents in the disk drive industry in Japan have not been disrupted. He attributes this difference to country-specific factors, such as regulations, culture and financing system. Weeks (2015), raises the issue of the possible characteristics that would make some industries more likely to be disrupted. Hagel et al (2015), put more emphasis on the external context: market conditions, such as product characteristics, demand characteristics and industry structure and catalysts, such as macroeconomic factors and public policy. King and Baatartogtokh (2015) found that in 40% of the 77 cases analysed by Christensen, changing economies of scale played a role in disruption as it reduced the number of players who could profitably serve the market. Yu and Chang (2010) raise a few issues about context and environment: the environmental determinants of disruptive innovation, the factors explaining why disruption happens in some countries rather than others, and the identification of emerging markets and of the needs of new customers.

Intellectual contributions dealing mainly with external factors seem to be marginal. Chiaroni et al (2015) highlight the relevance of context factors by analyzing the case of Uber in four different cities in the world (however, Uber is not considered as a disruptive innovation by Christensen). They suggest that the market concentration, the regulatory

system, the offering diversification and the culture of a country, can play a key role in explaining the different patterns observed. Corsi and Di Minin (2014) add a geographical dimension to the theory by relating disruptive innovation to the case of emerging economies.

No firm-specific factors are considered

The disruptive innovation theory makes no link with firm-specific factors, and in particular with the resource and competence approach which is dominant in strategic management and in the analysis of technologies (i.e. the distinction between competence-destroying technologies and competence enhancing technologies by Tushman and Anderson (1986)). Christensen argues that:” A primary conclusion of this paper is that when significant customers demand it, sufficient impetus may develop so that large, bureaucratic firms can embark upon and successfully execute technologically difficult innovations-even those that require very different competencies than they initially possessed “(Christensen and Bower, 1996, p. 199). (Actually, it is one of the reasons he made instead a distinction between disruptive and sustaining innovation)

Contrary to Christensen, all the authors we have cited before outline the critical role of resources and competences in explaining why incumbents fail or not when faced with disruptive innovations (and why a firm should or not adopt or develop a disruptive innovation).

2.4 An eclectic framework for analyzing disruption

Following our literature review on DI theory, we have designed an eclectic framework for analyzing disruptions, that integrates Christensen’s theory in a broader framework. The main characteristics of this framework is that it takes into account the external context -such as the level of competition before entry or regulatory factors-, as well as internal factors –in particular the resources and competences of the parent company of the new entrant (Table 1).

[Insert Table 1 about here]

This framework (Table 2) also considers a broader definition of disruption by adopting Danneels (2006) definition that an innovation is disruptive when it changes the bases of competition by changing the performance metrics along which firms compete. We also add a distinction between changing the performance metrics at the market level (i.e. product attributes), at the firm level (change of strategic stance, i.e., from differentiation to cost), or at the industry level (i.e., the whole industry adopts changed strategic performance metrics).

[Insert Table 2 about here]

3 Case studies

3.1 Free Mobile¹

External factors

The main catalyst of the entry of Free Mobile has been regulatory.

Firstly, it has been made possible by the decision to grant a fourth mobile operator license due to the introduction of 3G technologies and the auction of related frequencies. Prior to this, the most recent entry in the mobile telecommunications market has been that of Bouygues Telecom, which has been awarded a 2G GSM license in 1996.

¹ The full case description can be found in Berne, Vialle and Whalley (2016) and in a forthcoming article.

Secondly, the entry of Free into the French mobile market was facilitated by the conditions set by the national regulator. It benefitted from a lower license cost as it only paid €240 million (for 5MHz) while its competitors paid €619 million for their license (but for 15MHz). Free was also allowed to sign an initial roaming agreement, which it did with Orange in 2011, that provided it to start operations with a full market coverage footprint. This had not been the case when Bouygues Telecom entered the market in 1996 – it had to slowly and painstakingly build its own network to add customers, but the market was still expanding at that time. Moreover, Free Mobile could pay reduced call termination charges compared to its competitors. In addition, Free also benefitted from the introduction of number portability in France as well.

The relatively low competitive pressure in France before the entry also made it easier. It was dominated by three incumbents following a policy of market share stabilization since the beginning of the 2000s: France Télécom (now Orange), SFR and Bouygues Telecom, with 46.5%, 35.4% and 18.1% market share respectively at the end of 2008 (ARCEP, 2008)². MVNOs had not been successful and were not in a position to challenge the incumbents. In 2007, they only represented 5% of the market, compared to 35% in Germany and 16% in the UK (Quantifica, 2008). As a result, prices were also higher from 19% to 32% in France (depending on usage level) than the OECD average (OECD, 2009). The price difference was at maximum for the low-end market (low users).

One consequence of this lack of competition was an identifiable presence of non-consumers on the market that Free Mobile could target. The penetration rate end of 2011 was only 102% in France, compared to 140% in Germany, 115% in Spain, 152% in Italy and 131% in UK³.

Other general trends have created an advantageous context for innovative business models. The diffusion of mobile Internet allowed by both the introduction of 3G and 4G technologies, as well as of smartphones (the Iphone has been launched in 2007) was obviously a determining factor. It induced not only the rise new needs to satisfy, but also changing cost economics for operators. In particular, the 2010's corresponded to a trend of fixed/mobile integration by operators (Idate).

The market was also somehow over-served. The existence of numerous shops (owned by operators or other businesses) at nearly every street corner suggest a lack of rationalization of the distribution system and high distribution cost. It was becoming increasingly over-serving as customers were increasingly used to buy online for other goods.

Internal factors

The main internal factor was the characteristics of the parent company, Iliad. Iliad has been an innovative ISP founded by a visionary leader who has successfully entered and disrupted the French fixed Internet market by being the first to introduce low-priced double and triple-pay packages (Daidj and Vialle, 2011). In addition to its visionary and charismatic leader, this ISP brought its subsidiary Free Mobile significant resources and competences. From a technical point of view it had a significant know-how in managing telecommunications networks and services, and owned a modern core network infrastructure. From a market point of view, it had a significant installed base of 4 849 000 customers⁴, with a market share of

² Actually the three operators have been fined in 2005 for anticompetitive behaviour. Collectively the fines amounted to €534 million – Orange France paid €256million, SFR €220 million and Bouygues Télécom €58 million (Autorité de la concurrence, 2005).

³ <https://www.arcep.fr/fileadmin/reprise/publications/chiffres-cle/chiffres-cle-2011-juin2012.pdf>

⁴ https://www.iliad.fr/finances/2012/CP_080312.pdf

around 22%. It also had intangible market-based assets: established and recognized brand and a brand image of innovative and good value for money disruptor of established companies.

Business model of the disruptor and offer characteristics

The business model of Free Mobile is in line with the business model previously applied by Iliad to broadband Internet access. Firstly, this also offered low-priced plain integrative packages⁵ with “unlimited” features. The offerings were also “SIM only” without a handset subsidy, and there was neither contract duration obligation nor termination penalty. Free Mobile claimed its packages were twice as cheap as the current incumbent’s offering.⁶ These packages are attractive and easy to understand for consumers. They are also easy to communicate, to manage and bill, which, from the supplier’s perspective, is cost effective. Secondly, as in the case of Free, transactions are made nearly exclusively online, and the customer service is limited to and often delegated to users through various forums. This also helps keep costs low. It also illustrates the concept of “freedom” as customers are not bound by contractual limitations and/or handset subsidies. Finally, in both cases, Iliad took advantage of using another operator’s network during the launch phase, before switching progressively to its own infrastructure.

So this business model and offer innovation fits the characterization of being “typically cheaper, simpler, smaller, and, frequently, more convenient to use”, made by Christensen, (1997, p.XV).

Level of disruption

The first observation is that Free Mobile effectively quickly gained market share and overtook Bouygues Telecom as 3rd operator in March 2015, 2 years and one quarter of operations only. Free Mobile managed to attract 2 million customers within only a month of launching its services. It has quickly and constantly improved its market share: 11.5% in 2012, 14.3% in 2013, 16.4% in 2014, 17.7% in 2015, 18.5% in 2016.

The offering and business model of Free Mobile is congruent Christensen’s (1997, 2003) observation that disruptive innovations initially have a lower performance on the dimensions historically valued by mainstream customers in the core markets, but have a better performance on other dimensions. Free Mobile’s offering had a lower performance on distribution and customer service, as it was only available online and did not offer any handset subsidy. These two dimensions were traditionally perceived as important at the time of the launch. The network coverage was similar to other operators due to the roaming agreement with Orange. However, core service quality was initially lower than competitors at the beginning, due to various implementation issues and to the fast increase in number of customers. Free Mobile performed better on price, which is also a traditional dimension. It also relied on other dimensions than the other operators. It performed better on “freedom”: the offer was sim-only, without contractual limitations because of handset subsidies or other

⁵ The first package included unlimited calls to 40 countries, unlimited SMS and MMS, and 3 GB of data, was proposed costing just €19.99 per month. Compared to previous packages offered by competitors (handset subsidy deducted), this package was around 50% cheaper. Another “social” package including 60 minutes of calls and 60 SMS for only €2 per month (that was later extended to 120 minutes of calls and unlimited SMS) was also launched. It was 80% cheaper than previous packages by competitors. Free mobile also demonstrated its strategy of harvesting its installed base of ADSL customers with special prices: €15.99 for the first package and €0 for the social package. <http://www.clubic.com/telephone-portable/operateur-telephonie-mobile/free-mobile/article-468124-4-forfait-free-mobile.html>

⁶ http://www.dailymotion.com/video/xnkz0q_free-lancement-de-l-offre-mobile_news

reasons. It also offered unlimited features (voice, SMS), while other operators were initially offering post-paid subscription with a given number of minutes of use per month.

Free's business model and offering also fit the extended definition of disruptive innovation by Danneels (2006, p.249), as it "changes the bases of competition by changing the performance metrics along which firms compete". As noted before, this definition is interesting because it considers the impact on the innovation on the whole industry. This is perceptible at the market level (product attributes) and at the strategic level. At the market level, it is remarkable that the "sim-only and no commitment" (and usually available only online) model has been widely adopted by competitors and is now dominant on the postpaid subscription market. End of 2017, it represented 68.8% of the total post-paid market and 73.5% of the residential post-paid market⁷. At the strategic level, the resulting price and profitability decrease has led to a growing emphasis on cost control in the industry. Telecom operators and other firms have been led to reduce costs by rationalizing the distribution system and increasing the share of online sales. At the industry level, the necessity to reduce cost has spurred cooperation and mergers between operators. Mobile operators also made agreements to share infrastructure: SFR and Bouygues decided to share part of their networks in 2013 to reduce operational costs by between 20% and 25% (Abboud, 2014; Sahota, 2014). The (concluded or tentative) merger and acquisitions in this industry also reflect the necessity to reduce costs. It is also noticeable that SFR, the second French operator, has been acquired by Altice, a company heavily relying on LBOs for its acquisitions, which has therefore developed a particular competence in cost-reduction.

Pattern of disruption

The pattern that characterizes disruption according to Christensen (1997, 2003) is the following: a new entrant introduces an innovation on fringe markets that has a lower performance than the established offer on the dimensions historically valued by mainstream customers in the core markets, but has a better performance on other dimensions. After its introduction, it improves its performance on the dimensions valued by the main markets and eventually disrupts incumbents by conquering also the best customers. We did not find any precise information on adoption by market segments. It can be assumed that the 2 euro package reached customers of cheap 1 hour package and also non-consumers, and therefore consisted in low-end immediate encroachment and fringe market low end encroachment (the 2 euro package). For the "unlimited" package, it is more difficult to establish. Previous comparable unlimited packages were obviously targeting the high-end market, which was offered a cheaper version by Free Mobile. However, it also allowed less affluent segments to get access to high level of consumption and to Mobile Internet.

The fact that the penetration rate of non-commitment packages is higher on the residential market also suggests that the higher-end professional market was late in adopting this innovation. Actually, the offering by Free Mobile improved significantly over time, for example by increasing the data allowance to 20Go, then to 100Go and unlimited. It has also invested in 56 retail shops (for both fixed and mobile), as of May 2018⁸. However, it does not compare with other operators, for example with Orange which had 661 shops in 2016⁹. Free Mobile's offerings are also not distributed by independent distributors. Free Mobile has also developed an offer of handsets sold on credit to compensate for the absence of subsidies.

⁷ <https://www.arcep.fr/index.php?id=13858>

⁸ <http://www.free.fr/freecenter/>. Accessed 4/05/2018.

⁹ https://www.lesechos.fr/14/03/2017/lesechos.fr/0211879844470_orange-accelere-la-reorganisation-de-ses-boutiques-sur-2017.htm

In fact, the main pattern observed is that customers widely accepted to change their preferences to match the performance of the mix of attributes offered by Free mobile and that competitors quickly adopted the same type of mix along bundled handset traditional packages.

Incumbents' reactions

According to Christensen (1997, 2003), when confronted with low-end disruption, incumbents tend to focus on the most attractive and profitable markets and invest in improving the performance of the dominant offering in order to satisfy the most demanding customers. Such a pattern could also be observed. None of the incumbents has followed Free Mobile in proposing a package as cheap as 2 euro per month. Bouygues Telecom also accelerated investment in 4G in order to compete more on service quality than on price. However, incumbents unanimously chose to cannibalize their own traditional business, by proposing the same type of offerings as Free Mobile. This is congruent with Christensen's theory as their mainstream customers responded positively to Free Mobile's offering. In this case, they did it by establishing separate brands and distribution channels, so that the sets of attributes for the two types of offers remained different.

In summary, the main pattern observed is that customers widely accepted to alter their preferences to match the performance of the mix of attributes offered by Free mobile and that competitors quickly adopted the same type of mix along bundled handset traditional packages.

3.2 Hutchison 3 UK

External factors

Regulation is at the heart of Hutchison's entry into the UK mobile telecommunications market. In line with the desire of the European Union to increase the number of companies active in the market, more 3G licences than the number of existing 2G operators was offered in the UK. From the perspective of the government, the auction, which ran in April 2000, was a great success – it raised more than £22 billion, several times more than anticipated. The prices paid for the five licences was as follows:

- Licence A: TIW, £4.38 billion
- Licence B: Vodafone AirTouch, £5.96 billion
- Licence C: BT, £4.03 billion
- Licence D: One-2-One, £4 billion
- Licence E: Orange, £4.09 billion (BBC, 2000)

At the time of the auction, the market was divided between four mobile network operators: BT Cellnet, One-2-One, Orange and Vodafone. At the end of the 1Q00, there was 27.196 million mobile subscribers (Global Mobile, 2000). The subscribers were shared between the four operators as follows:

- BT Cellnet – 7.407 million subscribers (27.24%)
- One-2-One – 5.018 million subscribers (18.45%)
- Orange – 5.980 million subscribers (21.99%)
- Vodafone – 8.791 million subscribers (32.32%)

Interestingly, mobile number portability was launched in the UK in January 1999 (UK Mobile Number Portability Operator Steering Group, 2009). This allowed customers of one mobile operator to take their number with them when they moved to another operator, thereby reducing switching costs within the marketplace. Significantly, the mandated time to switch a consumer from one operator to another has changed over the years. Not only has an Ofcom review questioned the whole process (Ofcom, 2009), giving rise to changes, but an industry

body has sought to ensure a smooth and efficient process (UK Mobile Number Portability Steering Group, 2017). As a consequence, the time taken for consumers to churn between operators has substantially declined, thereby, in theory, reducing the barriers to switching present in the market.

Around the turn of the millennium there was discussion in the UK regarding national roaming.¹⁰ After the initial set of proposals suggested by the regulator were objected to by both One-2-One and Orange, Ofcom successfully persuaded both O₂ and Vodafone to offer national roaming. Hutchison signed a national roaming agreement with O₂, thereby gaining national coverage while it built out its own infrastructure. Just a few years later, Ofcom, which had replaced Ofcom as the telecommunications regulator, sought to remove the obligation of Vodafone and O₂ to offer national roaming to Hutchison on their 2G networks. It was suggested that commercial means would deliver the necessary roaming agreements to Hutchison. Ofcom delayed its decision until Hutchison had agreed its new contract, which saw, in May 2006, Orange replace O₂ as its national roaming partner for those parts of the UK where it did not have its own infrastructure (Sutherland, 2011).

In late 2007, Hutchison formed an infrastructure sharing joint venture – Mobile Broadband Network Limited (MBNL) – with T-Mobile (TeleGeography, 2008a). Through this joint venture, both companies would enhance their 3G coverage while reducing their associated costs with the savings being suggested at around £2 billion over a 10-year period. It would also appear that the joint venture helped Hutchison speed up the pace at which its network was rolled out, as the company installed its 10,000th base station in January 2010 (TeleGeography, 2010a). With the merger of T-Mobile and Orange UK to create Everywhere Everything (EE), the number of base stations operated by MBNL was expected to increase though the company itself would remain as a 50/50 partnership between Hutchison and EE (TeleGeography, 2010b).

Beginning in late 2008, MBNL has signed a series of contracts with Ericsson which sees this manage the 3G infrastructure of the joint venture (TeleGeography, 2008b). This saw employees from the T-Mobile being transferred to Ericsson, and the decommissioning of around 5,000 overlapping cell sites. The contract was extended in 2015 and 2017 (TeleGeography, 2015).

Given the significant role that spectrum plays in shaping the competitiveness of a mobile operator, Hutchison has twice intervened in the awarding of licences. In late 2012 Hutchison threatened to leave the UK if it was not treated favourably in the forthcoming 4G licence (Cellular News, 2012). This, of course, did not happen but it is symptomatic of an increasing acrimonious and fraught debate that saw Everywhere Everything reform existing spectrum to launch its 4G services before its rivals and the auction itself raise a lot less than anticipated (Curwen and Whalley, 2013). Hutchison also objected to the 5G auction proposed by Ofcom, arguing that ‘spectrum caps’ should be imposed on BT/EE and Vodafone to prevent them dominating the market (Fildes, 2017a). Although Ofcom did seek to impose ‘spectrum caps’ on operators, these were objected to by Hutchison on the grounds that they were too high who eventually sought a judicial review of the auction (TeleGeography, 2017). Hutchison lost its legal challenge in December 2017, as well as its appeal in February 2018 (Fildes, 2017b; TeleGeography, 2018). This allowed Ofcom to proceed with the auction in March / April 2018.

Internal factors

¹⁰ See, for example, Sutherland (2011) for further details.

The aforementioned purchase of a 3G licence by Hutchison marked its re-entry into the UK telecommunications market. After a brief and unsuccessful flirtation with a fixed wireless company called 'Rabbit', Hutchison successfully acquired a 2G licence and launched its services in April 1994 (Curwen and Whalley, 2008). This business was Orange, which was listed on the London stock-market just two years later in a move that valued the company at £2.45 billion (BBC, 2001).

In October 1999, it emerged that Mannesmann had approached Hutchison regarding its 44.8% stake in Orange. Mannesmann subsequently bid \$31 billion plus debt for Orange, with Hutchison taking a 10.2% stake in Mannesmann (Curwen and Whalley, 2004). As this, however, would change the 'balance of power' between Vodafone and Mannesmann in a string of joint ventures across Europe, Vodafone launched its own counter-bid for Mannesmann that initially valued the German company at €100 billion (Curwen and Whalley, 2004). Vodafone did succeed in acquiring Mannesmann in a share-based merger valued at €178 billion. Orange was then sold to France Télécom in May 2000.

As the consequence of these deals, Hutchison exited the European telecommunications market on arguably favourable terms. Rather than invest in cash in other lines of business,¹¹ Hutchison instead opted to return to the European mobile telecommunications market through the 3G licensing process (Curwen and Whalley, 2014). Significantly, this re-entry would see Hutchison do so without an installed 2G subscriber base but with a considerable amount of cash to fund its entry.

Hutchison's re-entry into the UK market initially took the form of a joint venture. After it has won the licence, Hutchison sold 35% of its UK operations to NTT DoCoMo and KPN Mobile (Hutchison Whampoa, 2001). This transaction raises a total of £2.1 billion (NTT DoCoMo, 2000). This relationship, however, soon turned sour. In early 2003 KPN refused to contribute additional funds to the joint venture (Leahy and Nuttal, 2003), and sold its stake in the company back to Hutchison in November of the same year for £90 million. NTT DoCoMo sold its stake for £120 million, though Hutchison did not complete the transactions to acquire outright control of its UK operations until 2005 (Lau, 2005).

Business model of the disruptor and offer characteristics

In essence, the business model of Hutchison is characterised by cheaper prices and enhanced (larger) bundle components. Thus, Hutchison was able to attract customers through charging customers similar or lower prices as other mobile operators while providing them with more minutes, SMS etc. Similar to other mobile operators, Hutchison sold via third party retailers like Carphone Warehouse as well as through its own retail stores.

It has been suggested that over time the business model of Hutchison has changed. In early 2016, one commentator noted that while Hutchison may have been a disruptor in the past, this was no longer the case (Williams, 2016). Hutchison withdrew its unlimited data tariffs in 2014 in anticipation, it was suggested, of the pressures this would place on its spectrum. If this is a correct assessment, then it is perhaps unsurprising. Unlike some European countries, the UK mobile market is characterised by the presence of several innovative and price sensitive mobile virtual network operators (MVNO).¹² These either

¹¹ As befits a conglomerate, Hutchison Whampoa is present in a range of different markets such as infrastructure, retailing and property. A recent reorganisation saw the consolidation of variously separate but related businesses into CK Hutchison, a company listed in Hong Kong but domiciled in the Cayman Islands.

¹² In January 2017, it was claimed that Tesco Mobile had 4.6 million subscribers (Grant Thornton, 2017). This is considerably larger than the next two largest MVNO: it was reported that Virgin Mobile had 3 million subscribers while Giffgaff had 2 million customers.

compete on the basis of a well-known brand (e.g., Tesco Mobile), bundling (e.g., Virgin Mobile) or by focusing on a niche market (e.g., giffgaff). While they pay for access to spectrum provided by a licence holder, they do not have to make significant infrastructure investment which, among other things, reduces their costs and enables them to compete on prices.

But Hutchison is not a MVNO. It has acquired licences for three successive generations of mobile technologies, paying a total of £4,756 million.¹³ In addition, Hutchison was required to roll-out its network across the UK to meet coverage obligations and then invest in the recruitment of customers through, for instance, subsidising hand-set costs. Without an existing 2G-based customer base to fund both the acquisition of spectrum and the subsequent development of the business, Hutchison needs to attract subscribers. To attract subscribers, Hutchison drew on funds from its parent company (Curwen and Whalley, 2014) and priced more competitively – that is, lower – than the other network operators. This starkly contrasts with the other network operators in the UK who could draw on their existing subscriber base to fund their expansion into 3G etc. Given the tensions that Hutchison faces it is, therefore, no surprise that its competitive focus has changed over time.

Level of disruption

Table 3 charts the growth of Hutchison over a number of years. The first point that can be made, is that Hutchison reported just over 10 million active customers in 2017. While this may sound like a large number, it is worth noting that it is considerably less than Vodafone UK, which has 17 million subscribers (Vodafone, 2018) and is the smallest of the other three operators in the UK. Hutchison is, in other words, the smallest of the four network operators in the UK. The relative position of Hutchison as the smallest of the four operators does not change when the number of registered customers is taken into account.¹⁴ Thus, while it has been able to grab market share, as demonstrated by its continued ability to attract subscribers, it has not been able to do to the extent that it has overtaken one of its rivals.

[Insert Table 3 about here]

As Hutchison has not been able to disrupt the market through organic growth, it sought to do so through acquiring a rival. In January 2015 Hutchison entered into talks to acquire O₂ from its parent company Telefonica in a deal valuing it at as much as £10.25 billion (Curwen and Whalley, 2016). To help persuade the European Commission to approve the purchase, Hutchison made a series of commitments including not raising prices for five years as well as agreeing to invest £5 billion over the same period. In May 2016, however, the European Commission rejected the purchase, arguing that it would have harmed innovation, reduced choice and resulted in prices increasing (European Commission, 2016). It is worth noting that if the deal had been approved, it would have changed the market structure: Hutchison/O₂ would have become the largest company in the market, followed by EE and then Vodafone.

Secondly, Hutchison has increased its revenues. 2010 was the first year that Hutchison separated out its revenues by country. In this year, Hutchison reported revenues of £1,404

¹³ Hutchison paid £4,380 million for its 3G license, compared to £225 million for 4G and just £151 million for its 5G spectrum.

¹⁴ According to the company's 2017 annual report, the number of registered customers in the UK was 12.7 million. This is considerably more than the number of active customers of just over 10 million. While the gap between registered and active contract-based subscribers is relative small – 6.946 million cf. to 6.823 million – it is substantially wider for pre-paid – 5.664 million cf. 3.247 million (CK Hutchison, 2018).

million in the UK and has managed,¹⁵ perhaps surprisingly, to generate more revenues in each of the subsequent years so that by 2017 revenues in the UK totalled £2,425 million. Between 2010 and 2017 the growth between years was reasonably large, with the exception of 2013 to 2014 when revenues increased by just £19 million.

Thirdly, EBITDA has increased over the years. Proportionally this has changed, so that EBITDA is now around a third of revenues – this is a considerable improvement over 2014, when EBITDA was around a quarter of revenues. This is, arguably, somewhat surprising given the constant decline in ARPU from 2010 to 2017. Having said this, Hutchison has grown its subscriber base faster than its ARPU has declined and has been able to grow the proportion of ARPU accounted for by data.¹⁶

[Insert Figure 1 about here]

Interestingly, while Hutchison’s ARPU has declined more or less consistently since 2007, its performance is still better than the mobile industry as a whole. Indeed, it could be argued that Hutchison’s performance as measured by ARPU has been continuously and substantially better than the sector average – in 2016, for example, the sector reported an ARPU of £15.19 while Hutchison achieved £19.24.

Patten of disruption

As can be seen from above, Hutchison’s position within the UK market has changed over time. Initially it focused on offering services, often in the form of generous bundles compared to its rivals, that were competitively priced. A key issue behind this was Hutchison’s lack of an existing installed subscriber base that would fund its expansion into 3G, and the need to swiftly attract users to generate revenues.

Over time, however, Hutchison’s strategy has subtly changed. While it has continued to emphasis bundles, adding in new features, the price differential with incumbents has declined, in part because they have lowered their own prices. The proportion of contract-based subscribers in the UK mobile market as a whole has increased from 59.1% in 2013 to 66% in 2016 (Ofcom, 2017), while the figure for Hutchison has fallen from 72% to 68.8% over the same period – see Table 3. This would suggest that Hutchison is not seeking to attract customers based on minimal commitment (that is, pre-pay) but instead on the features that it offers.

Moreover, Hutchison would appear to be willing to provide a level of customer service that places it squarely between incumbent operators on the one hand and MVNO on the other (Ofcom, 2018).¹⁷ This could be interpreted as illustrating how Hutchison’s positioning within the market combines elements of the strategies adopted by both network operators and MVNO.

Incumbent reaction

¹⁵ Interestingly the annual report for 2011 restated the revenues for 2010, increasing the figure to £1,572 million (Hutchison Whampoa, 2012). On this increased amount of revenues, Hutchison reported EBITDA of £165 million.

¹⁶ While Hutchison does not present the proportion of APRU accounted for by non-voice sources consistently, it is possible to see that this has changed over time. In 2010 non-voice sources accounted for 41% of APRU, whereas in 2012 this figure had grown to 48%.

¹⁷ For example, 1% of Giffgaff customers complained, compared to 7% of Vodafone’s and 3% of Hutchison’s. Furthermore, 60% of Giffgaff customers who complained were satisfied with the process, compared to 57% of Hutchison’s customers and 47% of those who subscribe to Vodafone.

Given the position of Hutchison between existing mobile network operators on the one hand and MVNO on the other, the reaction of the existing four players was arguably muted. They copied elements of Hutchison's business model, such as lower prices and larger bundle components, but combined these with their inherent scale economies to enhance their competitiveness. The lower prices offered by Hutchison forced the other network operators to follow suit, a development that attracted negative comments from David Varney when he was chairman of mmO₂.

It could be argued that the reduction in prices brought about by Hutchison contributed to the decision of Orange to exit the UK market through merging with T-Mobile UK to create Everywhere Everything. At the time of the exit, some commentators noted their surprise that Orange was struggling to make a reasonable profit in the UK given its size. The merger created a substantially larger operator whose profitability would be boosted through scale economies and synergies.

3.2 Case comparison

Tables 4 and 5 summarise the material recounted in the previous two sub-sections. While there are some similarities between the two case study companies, it is also the case that differences exist as well. Both companies have also benefited from the increasing availability and popularity of the mobile Internet. A virtuous circle emerged, with greater online content encouraging consumers to purchase data that, in turn, encouraged content providers to go online. However, the two companies approached the greater popularity of the mobile Internet quite differently due to how and when they entered their respective mobile markets.

Free Mobile was able to draw on and leverage the resources and market position of its parent company as it entered the French mobile market. Of particular importance was Free's existing customer base, which Free Mobile could target in its marketing campaigns and profitably attract through low cost service offerings. In contrast, Hutchison could draw on the resources of its parent company to fund its expansion in the UK, but because it lacked an existing customer base its strategy was driven by the need to attract as many consumers as fast as possible. This inevitably lent itself to a price-oriented entry into the market.

[Insert Table 4 about here]

The entry of Free Mobile and Hutchison was facilitated by developments in their respective regulatory environments. In the case of Free Mobile, the lower license cost facilitated its entry into the market the UK auction was less favourable as the cost of the licence was substantial. The expansion of both companies was facilitated by national roaming, with Hutchison also benefiting from its infrastructure joint-venture that reduced the cost of rolling out its infrastructure nationwide.

Although the strategies of both companies have changed over time, this has arguably been more extensive for Hutchison than it has for Free Mobile. Hutchison has moved from being competing solely on price to instead emphasising the services that it offers. While its initial focus did result in its rivals reducing their prices and amending the components of the bundles that they offer, it has not been able to attract enough subscribers to overtake Everywhere Everything, O₂ or Vodafone. It has remained, unlike Free Mobile, the smallest network operator throughout the whole period it has been active in the market.

[Insert Table 5 about here]

Another significant difference between the French and British mobile telecommunication markets is the key role played by MVNO in the latter. The competitive threat provided by MVNO in the UK is multi-faceted; Virgin Mobile is integral to the quad-

play of Virgin Media, while Tesco Mobile competes on brand and price, Lebara Mobile on overseas tariffs. When combined with the rivalry of the network operators, the competitive landscape in the UK is arguably more diverse than it is in France.

As Hutchison has become more mainstream over time, Free Mobile appears to have permanently changed the nature of competition within the French market. Not only have its rivals adopted some elements of the business model of Free Mobile, but consumers also appear to be willing to accept how Free delivers its services. The disruptive impact of Free appears to be more extensive and long lasting than it has been for Hutchison. This may help explain why Free has been able to overtake rivals in the market, while Hutchison has not – quite simply, the disruptive nature of Free contains to make its service attractive to consumers, whereas the increasingly mainstream stance of Hutchison results in a less attractive set of services in the UK market.

4. Conclusion

In this paper we have explored what is meant by ‘disruption’ and found that although this issue has been extensively discussed in the literature, a lack of clarity and consensus can be observed. Disruption is multi-faceted, illustrating its complexity. To explore how disruption occurs within a regulated industry such as telecommunications, a framework based on the literature was developed and then applied to two companies that have been labelled as disruptive: Free Mobile in France and Hutchison in the UK.

Through applying this framework, it has been possible to identify a series of similarities and differences in the disruptive impact of the two companies. While regulation has played a key role for both companies, the specific set of circumstances faced by Free Mobile and Hutchison were different, and this has shaped their strategies. These strategies are not the same, with Free Mobile building on the success of its parent company to sufficiently grow to overtake one its incumbent rivals and Hutchison becoming more mainstream over time while remaining the smallest network-based operator in the UK.

The framework has highlighted how disruption differs between markets. In doing so, it has illustrated its usefulness as an analytical tool. At the same time, however, the application of the framework demonstrates the difficulties of consistently applying it in different circumstances. While both the French and UK mobile telecommunication markets are subject to the same overarching EU derived regulatory framework, not only does its application differ but the markets are also different. The French and British markets have been disrupted, but not in the same way. Disruption is, therefore, context dependent and this complicates any attempt to meaningfully compare between countries.

References

- BBC (2000) UK mobile phone auction nets billions, 27 April, from news.bbc.co.uk
- BBC (2001) Orange's bright future, 8 January, from news.bbc.co.uk
- Berne Michel, Pierre Vialle, and Jason Whalley (2016), "Is competition just a question of numbers? An analysis of the impact of the entry of Free Mobile into the French mobile telecommunications market," 27th European regional conference of the International Telecommunications Society, 7th-9th September, Cambridge, UK.
- Bower, J. L., & Christensen, C. M. (1995). Disruptive technologies: Catching the wave. *Harvard Business Review*, 73, 43–53.
- Cellular News (2012) Hutchison could sell UK network if 4G license terms are not favourable, 22 May, from www.cellular-news.com
- Chesbrough, H. (1999). Arrested development: the experience of European hard disk drive firms in comparison with US and Japanese firms. *Journal of Evolutionary Economics*, 9, pp. 287–329.
- Chesbrough, H. W. (2003). Environmental influences upon firm entry into new sub-markets: Evidence from the worldwide hard disk drive industry conditionally. *Research Policy*, 32, 659–678.
- Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail*. Boston, MA: Harvard Business School Press
- Christensen, C. M. (2006). The ongoing process of building a theory of disruption. *Journal of Product Innovation Management*, 23, 39–55.
- Christensen, C.M. and Bower, J.L. (1996). Customer power, strategic investment, and the failure of leading firms. *Strategic Management Journal*, 17(3), pp. 197–218.
- Christensen, C. M., & Raynor, M. E. (2003a). *The innovator's solution*. (Kindle ed.). Boston, MA: Harvard Business School Press.
- Christensen, Clayton M.; Raynor, Michael E. & McDonald, Rory (2015), "What Is Disruptive Innovation?", *Harvard Business Review*, December, pp. 44-53.
- CK Hutchison (2018) Solid foundations foster long term development – 2017 annual report, from ww.ckh.com.hk
- Curwen, P. and J. Whalley (2004) *Telecommunication strategy – Cases, theory and applications*, Routledge: London, UK.
- Curwen, P. and J. Whalley (2008) *The internationalization of mobile telecommunications – Strategic challenges in a global market*, Edward Elgar: Cheltenham, UK.
- Curwen, P. and J. Whalley (2013) *Fourth generation mobile communication – the path to superfast connectivity*, Springer: Heidelberg, Germany.
- Curwen, P. and J. Whalley (2014) *Mobile telecommunications networks – Restructuring as a response to a challenging environment*, Edward Elgar: Cheltenham, UK.
- Curwen, P. and J. Whalley (2015), "The licensing of mobile operators in European markets and the consequences of new entry for competition," *info*, Vol.17 (3), pp. 16-3.
- Curwen, P. and J. Whalley (2016) "European mobile markets and the doctrine of "4 networks good, 3 networks bad", *info*, Vol.18 (5), pp 1-23.

Danneels, E. (2004). Disruptive technology reconsidered: A critique and research agenda. *Journal of Product Innovation Management*, 21, 246–258.

European Commission (2016) Press release – mergers: Commission prohibits proposed acquisition of Telefónica UK, 11 May, from Europa.eu

Fildes, N. (2017a) Three threatens legal challenge to UK 5G auction, *Financial Times*, 22 March, from www.ft.com

Fildes, N. (2017b) Ofcom wins legal fight with BT and Three over spectrum auction, *Financial Times*, 20 December, from www.ft.com

Global Mobile (2000) Western European subscriber count: Cellular market shares by operator, 26 April

Grant Thornton (2017) State of the UK MVNO market, from www.grantthornton.co.uk

Hagel, J., Brown, J.S., Wooll, M. and de Maar, A. (2015), “Patterns of disruption: anticipating disruptive strategies in a world of unicorns, black swans, and exponentials”, November 12,

Henderson, RM and Clark, KB (1990), “Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms,” *Administrative Science Quarterly*, 35, 9-30.

Hutchison Whampoa (2001) Annual report 2000, from www.hutchison-whampoa.com

Hutchison Whampoa (2012) Annual report 2011, from www.hutchison-whampoa.com

King, Andrew A., and Baljir Baatartogtokh (2015), "How useful is the theory of disruptive innovation?" (<http://sloanreview.mit.edu/article/how-useful-is-thetheory-of-disruptive-innovation/>) *MIT Sloan Management Review* 57.1 (2015).

King, A. A., & Tucci, C. L. (2002). Incumbent entry into new market niches: The role of experience and managerial choice in the creation of dynamic capabilities. *Management Science*, 48, 171–186.

Lau, J. (2005) Hutchison Whampoa buys out UK 3G partners, *Financial Times*, 11 May, 28

Leahy, J. and C. Nuttal (2003) Li Ka-Sing’s 3G plan hits a snag, *Financial Times*, 13 June, 31

Lepore, J. (2014). The disruption machine. *The New Yorker*, 90, 30–36.

Markides, C. (2006). Disruptive innovation. In need of better theory. *Journal of Product Innovation Management*, 23, 19–25.

McGregor, J. (2007). Clayton Christensen’s innovation brain. *Bloomberg Business Week*. Retrieved April 10, 2018, from <http://www.businessweek.com>

NTT DoCoMo (2000) Hutchison Whampoa, NTT DoCoMo and KPN Mobile announce 3G mobile multimedia strategic co-operation, 12 July, from www.nttdocomo.com

Ofcom (2009) Mobile number portability – review of the porting process, 3 August, Ofcom: London, UK.

Ofcom (2017) Communications Market Review 2017 – UK, 3 August, Ofcom: London, UK.

Ofcom (2018) Choosing the best broadband, mobile and landline provider. Comparing service quality 2017, 3 May, Ofcom: London, UK.

Rosenbloom, Richard S. and Christensen, Clayton M. (1994). Technological Discontinuities, Organizational Capabilities, and Strategic Commitments. *Industrial and Corporate Change* 3(3): 655–85.

Statista (2018) Monthly ARPU through mobile subscribers in the United Kingdom (UK) from 2007 to 2016 (GBP) by pay type, from www.statista.com

Sutherland, E. (2011) The regulation of national roaming. Innovative ICT applications – emerging regulatory, economic and policy issues, 22nd European regional conference of the International Telecommunications Society, 18-21 September, Budapest, Hungary

TeleGeography (2008a) Nokia Siemens networks wins UK 3G contract, 27 August, from www.telegeography.com

TeleGeography (2008b) Ericsson inks deal to link up with MBNL, 3 September, from www.telegeography.com

TeleGeography (2010a) H3G UK announces activation of 10,000th 3G base station, 28 January, from www.telegeography.com

TeleGeography (2010b) Orange to link up with MBNL, 3 September, from www.telegeography.com

TeleGeography (2015) MBNL and Ericsson renew, update managed service agreement, 8 December, from www.telegeography.com

TeleGeography (2017) Three UK confirms legal challenge related to Ofcom’s spectrum auction, 3 September, from www.telegeography.com

TeleGeography (2018) Court of Appeals rejects Three UK’s bid to appeal over upcoming spectrum auction rules, 14 February, from www.telegeography.com

Tellis, G. J. (2006). Disruptive technology or visionary leadership? *Journal of Product Innovation Management*, 23, 34–38.

Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31, 439–465.

UK Mobile Number Portability Operator Steering Group (2009) MNP Status and background, 4 August, from www.mnposg.org.uk

UK Mobile Number Portability Operator Steering Group (2017) Mobile number portability operator steering committee porting process manual, Issue 1.34, December, from www.mnposg.org.uk

Vodafone (2018) Vodafone announces results for the year ended 31 March 2018, 15 May, from www.vodafone.com

Weeks, M. R. (2015), “Is Disruption Theory Wearing New Clothes or Just Naked? Analyzing Recent Critiques of Disruptive Innovation Theory,” *Innovation: Management, Policy & Practice*, 7(4): 417–428.

Wessel, M., & Christensen, C. M. (2012). Surviving disruption. *Harvard Business Review*, 90, 56–64.

Whalley, J. and P. Curwen (2012), “Third time lucky? An exploration of Hutchison Whampoa’s involvement in the mobile telecommunications industry,” *info*, Vol.14 (2), pp. 17-41.

Williams, C. (2016) It’s time for Three and O2 to be allowed to merge, *The Telegraph*, 14 March, from www.telegraph.co.uk

Table 1: External and internal factors influencing disruption. (C) means it is a core component of Christensen's theory.

Characteristics	Meaning
External Factors	
Regulation	Regulation may facilitate or hinder entry and disruption
Competition level	Low competition level facilitates entry and disruption
Price level	Initial high high price level facilitates entry and disruption, for example by a low-cost model
Significant nb.of non-users	A significant number of non-users represents a potential market that the new entrant may tap (i.e. new market disruption (C))
Over-served market	An over-served market may be encroached by offers with a lower performance on dimensions valued by the mainstream customers (C)
Sustaining trends	Changes in technology, consumption or social trends may provide a supportive background for disruption
Internal Factors	
Resources and competences from parent company	The resources and competences, developed by the parent company or the new entrant itself through previous activities, can be valuable for the new activity (i.e. complementary assets).

Table 2: Characteristics and pattern of disruption. (C) means it is a core component of Christensen's theory.

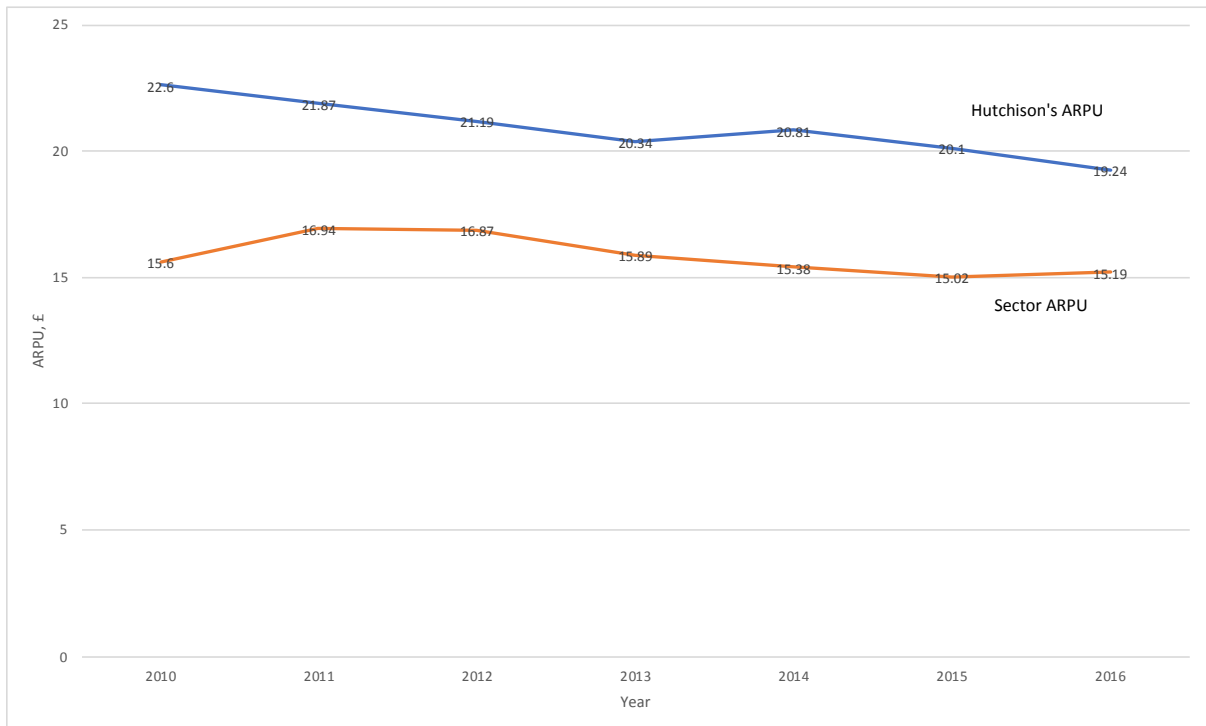
Disruption characteristics	Meaning
Level	The level of disruption can be assessed by the market share won during a given period of time, and the rank obtained by the new entrant.
Business model and offering characteristics	The characteristics of the business model and of the related offer.
Fit "cheap, simple, etc.." definition	Products based on disruptive innovations are often "typically cheaper, simpler, smaller, and, frequently, more convenient to use" (Christensen, 1997, p.XV)
Performance on mainstream dimensions	Disruptive innovations often initially have a lower performance on dimensions valued by mainstream customers (C)
Performance on other dimension	Disruptive innovations often initially have a performance on other dimensions than the ones valued by mainstream customers (C)
Changes the bases of competition by changing the performance metrics along which firms compete	<u>Market level</u> : changes in product/service attributes. <u>Strategic level</u> : changes of strategic emphasis of firms. <u>Industry level</u> :
Christensen's pattern of disruption (from low-end/new market to mainstream market)?	New entrants often move from low-end/new market to mainstream market in order to be actually disruptive (C)
Incumbents' reaction	Incumbents often choose to retreat from low-end markets, focus on the most attractive and profitable markets, and invest in improving the performance of the dominant technology in order to satisfy the most demanding customers (C).
Pattern summary	Each disruption may exhibit a specific pattern

Table 3: Performance of Hutchison 3 UK, 2010 - 2017

	2010	2011	2012	2013	2014	2015	2016	2017
Revenue, £ million	1404	1787	1948	2044	2063	2195	2276	2425
EBITDA, £ million	-	191	281	417	547	686	719	702
Registered customers, 000s	7426	8219	9052	9842	10286	10791	11409	12610
Active customers, 000s	-	-	-	7936	8414	8966	9179	10070
Contract 000s	-	-	-	5718	5931	6068	6320	6823
Prepaid 000s	-	-	-	2218	2483	2898	2859	3247
Average revenue per user per month, £	22.6	21.87	21.19	20.74	20.81	20.10	19.24	18.07

Sources: assembled by the authors from successive annual reports of Hutchison Whampoa and CK Hutchison

Figure 1: Hutchison vs. sector ARPU, 2010-2016 (inclusive)



Sources: successive annual reports of Hutchison Whampoa and CK Hutchison; Statista (2018)

Table 4: External and internal factors influencing disruption

Characteristics	Free Mobile	Three UK
External Factors		
Regulation	Lower license cost, roaming agreement, lower call termination charges	License reserved for new entrant, national roaming agreement
Competition level	Moderate. Only 3 Operators. Low MVNO presence	High. 3 operators and active MVNO presence
Price level	High. + 19% to 32%/ OECD 2009 average	
Significant nos. of non-users	Yes. -37%/Germany, -22%/UK in 2011	Yes
Over-served market	Yes (distribution)	No
Sustaining trends	Mobile Internet diffusion, fixed-mobile convergence	Mobile Internet diffusion
Internal Factors		
Resources and competences from parent company	Visionary leader, telecommunications know-how, core network, installed base of customers (4.9 million), recognized brand, Innovative image	Patient and supportive parent company willing to invest large amounts to fund development

Table 5: Characteristics and pattern of disruption

Disruption characteristics	Free Mobile	3 UK
Level	Fast market penetration: 14.3% in 2 years, 18.5% in 5 years. 3 rd operators after 2 ¼ years.	Slower growth than anticipated, remaining the smallest operator by subscribers throughout the period
Business model and offering characteristics	Sim-only, no contractual commitments, very cheap (around 50%) package with unlimited voice and SMS + data allowance, online only, minimal customer service	Enhanced bundle allowances cf. to existing operators
Fit “cheap, simple, etc..” definition	Yes	Yes
Performance on mainstream dimensions	Lower on distribution and customer service, no handset subsidy, initial lower service quality	Initial lower service quality, ‘middle of the road’ customer service
Performance on other dimension	Higher performance on “freedom”: no contractual commitment, unlimited features	
Changes the bases of competition by changing the performance metrics along which firms compete	<u>Market level</u> : no commitment packages dominate the post-paid market (68.8% after 5 years). <u>Strategic level</u> : lower prices and profits lead to cost control: HR reduction, distribution rationalization. <u>Industry level</u> : cooperation (network sharing) and restructuring	<u>Market level</u> : data increasingly important, declining number of prepay connections. <u>Strategic level</u> : pricing to grow subscriber base results in a slow transition to profitability; larger bundle components cf. rivals. <u>Industry level</u> : co-operation in network sharing and roaming to reduce costs and enhance coverage; aggressive regulatory stance with regards to spectrum
Christensen’s pattern of disruption (from low-end/new market to mainstream market)?	Partially: some clues of low-end and new market (non-consumers) but mainstream customers also adopted the offering early. No evidence of significant performance increase on previous main dimensions.	Increasingly mainstream provider of services, but lacking critical mass
Incumbents’ reaction	Have left the very low-end market to FM. Some tentative in upgrading quality. Have massively adopted FM business model, but with separate brands.	MVNO has emphasised price, while network operators have mimicked some aspects of bundling strategy
Pattern summary	Rather than FM improving performance on mainstream dimensions, consumers have adapted their preferences to FM’s set of attribute type. Incumbents have chosen to cannibalize themselves by marketing similar sets of attributes with separate brand	3 UK has become increasingly mainstream, improving quality and customer service while leaving solely price based competition to MVNO