

Design thinking in responding to disruptive innovation: A case study

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Abstract

How can the design thinking approach assist firms in developing response strategies to momentum-gaining disruptive innovations, along the lines of effectively exploiting established technologies and corresponding products/services? Such exploitative response strategies, implying successfully strengthening and leveraging the disrupted firm's existing technology without embracing the disruptive elements, have been, to a large extent, overlooked in the disruptive innovations literature. Using an inductive analysis of a critical case (a major cork stopper producer), the current study aims at developing a systematic understanding of exploitative strategic options and the role of design thinking in enabling them. The findings shed light on the effectiveness of the design thinking mindset to respond to disruptive innovations. In addition, we present evidence that a design thinking method can be successfully applied to process innovation. Finally, we demonstrate that to achieve a radical innovation based on design thinking principles, the establishment of design discourse is required.

Keywords

Disruptive innovation, Design thinking, Incremental innovation, Product innovation, Process innovation

Introduction

Today's business environment is characterized by constant disruptive pressure, threatening established players at both the local (i.e. industry and market) and global (i.e. shifting the societal institutions, norms, and structures) levels (Lehner and Simlinger, 2019; Schuelke-Leech, 2018). The unpreparedness of incumbent companies to adapt to industry turmoils produced by disruptive innovations hence becomes a growing trend in management scholarship and practice (Christensen, 1997; Christensen et al., 2015; Ho, 2021). Although the responses to disruptions have been extensively studied in the management literature, the optimal strategy still remains unclear (Christensen et al., 2018; Hopp et al., 2018; Yu and Hang, 2010). Numerous academic studies and the popular literature assume—implicitly or explicitly—that the only proper response to a disruptive innovation is in embracing it by displacing the established technology/product/service altogether or embracing the disruption and integrating it into the business by

establishing spin-off units with different degrees of autonomy (Adner and Snow, 2010; Crockett et al., 2013; Fuzes, 2020).

This approach suggests that established firms must proactively respond to each potential disruption, which is hardly optimal and not practical (Markides, 2006; Charitou and Markides, 2003). It is well documented that some early stage disruptions never gain momentum, and investing in pursuit of every potential threat through establishing numerous spin-off units is a resource waste. Furthermore, the frequently observed situation of successful co-existence in the same industry of competing technologies or business models (Yu and Hang, 2010) suggests the potential existence of other optimal incumbent responses;

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for instance, ignoring the disruption and concentrating on the existing approach might be a viable strategy (e.g. not all airlines should transition to low-cost carriers or open low-cost divisions). As a result, Osiyevskyy and Dewald (2015b) proposed that strengthening the existing business to defend against the disruption (“exploitative” response) is another viable strategy to respond to disruptive innovation.

However, extant studies do not provide a concrete answer to how firms can effectively adopt an exploitation strategy (Christensen et al., 2018). Therefore, further research is needed in this area to analyze the possible effective response strategies of established companies to disruptive innovation gaining momentum in their industries *without* embracing these innovations. Following the lead of recent studies emphasizing the role of design thinking (DT) in facilitating organizational learning (Cousins, 2018a) and serving as a crucial dynamic capability (Cousins, 2018b) for successful organizational adaptation to turbulent environments, we respond to the discussed gap by suggesting that adoption of DT can assist the incumbents effectively. This involves designing an exploitative response strategy (i.e. strengthening the existing business to defend against the disruption). DT is an analytic and creative process based on creating empathy with users (Brown, 2008; Dorst, 2011; Razzouk and Shute, 2012). Considering its systematic process in developing empathy with users and redefining the problem in human-centered ways, DT has been recognized among managers as the best method to be creative and innovative (Dam and Siang, 2018; Gobble, 2014; Johansson-Sköldberg et al., 2013). Furthermore, the DT process in organizational settings serves as the basis for a firm’s absorptive capacity and corresponding dynamic capability (Cousins, 2018b), allowing to sense and seize the opportunities emerging during the industry turmoil, preempting the incumbents’ disruption (Cousins, 2018a).

Therefore, in this paper, we address the following *research question*: how can DT principles assist incumbents to effectively respond to momentum-gaining disruptive innovations along the lines of exploiting the established technology/product/service?

To answer the focal research question, we empirically explore a critical case study of the global market leader in wine cork stopper manufacturing, Corticeira Amorim (COR), facing a decline and then a revival in the face of emerging disruptive innovation—alternative wine stoppers (Carvalho and Williams, 2014). The threatening rise of new stoppers (plastic stoppers and aluminum screw caps) created the “new market disruption” context (Christensen and Raynor, 2013). In the focal case, new products based on disruptive technologies emphasized alternative performance dimensions (practicality, absence of contamination risk, ease of use, and resealing) as opposed to traditional cork’s dimensions (romance, tradition, and formality) (Isohata, 2005).

After presenting the inductive case analysis, supplemented with ex-post deductive reasoning linking the emerging empirical insights to the literature on disruptive innovations and DT, we demonstrate that the DT approach is highly relevant and may have a positive impact on an incumbent firm’s performance. Our study contributes to the limited body of knowledge on disruptive innovations and DT by showing the effectiveness of incumbents’ exploitative response strategies developed using the principles of DT (Brown, 2008; Osiyevskyy and Dewald, 2015a). In addition, since this study mainly concerns applications of DT and its effectiveness in supporting a firm response strategy to a disruptive threat, it also reveals some interesting novel insight into DT and its capabilities. For example, it has been argued that the adoption of the DT process by entrepreneurs or incumbents only leads to an incremental product/service innovation (Jahnke, 2012; Luchs et al., 2015; Norman and Verganti, 2014; Valliere and Gegenhuber, 2014; Verganti, 2009). However, our study demonstrates the effectiveness of DT in a broad spectrum of radical product innovation and process innovation. These findings increase the value of DT as an innovation tool for entrepreneurs and incumbents.

Literature overview

Exploitative response strategies in the disruptive innovation context

Disruptive innovation is a particular kind of business model or technological change that is “initially financially unattractive for the leading incumbent to pursue, relative to its profit model and to other investments that are competing for the organization’s resources” (Christensen, 2006: 49). Assessed by established firms and their most valuable customers as inferiors, the disruptive innovation tries to locate a new customer base, usually within the group of price-sensitive non-consumers (Christensen, 1997) or consumers valuing product’s or service’s attributes that differ from those emphasized by a traditional approach (Markides, 2006; Schmidt and Druehl, 2008). Over time, the inferior disruptive approach gets developed, and ultimately exceeds the minimum requirements of mainstream customers (Schmidt and Druehl, 2008). At that time, the mainstream customers start switching to the disruptive alternative, attracted either by the new value proposition and affordable price (Christensen, 1997) or decreasing marginal utility from the performance improvements of the established technology in major dimensions (Adner, 2002). This shift will result in the incumbents’ ultimate decline (King and Baartartogtokh, 2015).

Following this reasoning, when faced with disruptive innovations gaining momentum in their markets, the management of established firms must come out with appropriate responses. Despite its importance and attention from the

management literature, the question of optimal response to disruptive innovations remains largely unanswered (Christensen, 2006; Yu and Hang, 2010).

Particularly scarce are studies of *effective* “exploitative” response strategies, implying improvement and leveraging the core technology amidst the rise of the disruptive alternative. A partial explanation for this deficit comes from the early works on a disruptive innovation phenomenon (Bower and Christensen, 1995; Christensen, 1997; Christensen and Bower, 1996), which portray this strategy as a typical response of incumbents leading to a dead-end. In a nutshell, the argument of these studies is the following: when facing disruptive innovation, guided by the feedback from their most profitable customers, companies move to high-end markets, incrementally improving their products by adding complex features that high-end clients are supposed to appreciate. Yet, with time the effectiveness of these improvements along the established trajectory becomes marginal, and customers switch to alternative technology, which has substantively developed. This view essentially neglects the possible effectiveness of the exploitative approaches, despite ample empirical evidence of the effectiveness of this strategy. Consider, for instance, the cases in Charitou and Markides (2003): the effectiveness of Gillette’s sticking with the existing technology as opposed to disruptive “disposable razors” products, or the successful strategy of Edward Jones Investments concentrating on traditional, person-to-person brokerage and investment advice versus disruptive on-line services.

Charitou and Markides (2003) demonstrated the viability of incumbents’ alternative response strategies, including two types of exploitative development of existing approaches (focusing on and investing in traditional business, and retaliating through new disruption). Later, Osiyevskyy and Dewald (2015b) proposed a two-dimensional typology of established firms’ responses to disruptive innovations, comprising two distinct yet not mutually exclusive generic strategies: (i) strengthening the existing business to defend against the disruption (“exploitative” response) or (ii) adopting the disruptive approach (“explorative” approach, through imitating the disruptive as it is, or embracing its particular elements with adjustments to match the firm’s existing competencies and capabilities). These authors emphasize that the incumbents’ choice of exploitative rather than an explorative response to a disruption can be rational: for example, a disruptive innovation might leave attractive niches for incumbents to occupy, and this demand heterogeneity serves as the source of potential effective incumbent response strategies beyond embracing the disruptive approach (Adner and Snow, 2010).

Unfortunately, extant studies do not provide a concrete answer to how firms can adopt an exploitation strategy (exploitation as a “refinement of an existing technology” as opposed to exploration as “invention of a new one” (March 1991, p. 72)). To respond to this gap, we are

exploring the application of DT in exploitative response strategies.

Design thinking

DT as a concept has emerged and was developed during the last 40 years by practitioners and academics. However, among both groups, there is still no agreement on a unified definition of DT (Carlgren et al., 2016; Johansson-Sköldberg et al., 2013; Liedtka, 2015). Through the past decades, the primary underlying field of design has evolved from a concept focusing on the creation of artifacts, engineering design, industrial design, or communication design, to a problem-solving activity and an innovation mindset (Brown, 2009; Buchanan, 1992; Carlgren et al., 2016; Dell’Era et al., 2020; Martin, 2009; Rowe, 1987; Simon, 1969). The modern manifestation of DT as a human-centered approach to problem-solving, creativity, and innovation was mainly developed by IDEO, a leading design consulting firm based in California (Kelley, 2005; Liedtka, 2015). According to IDEO’s understanding, DT is “a human centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping and concurrent business analysis which ultimately influences innovation and business strategy” (Lockwood, 2010a, 2010b: 15). Despite all differences among design scholars and practitioners, there are, however, three main elements in this definition that designers and design researchers can agree upon (Carlgren et al., 2016; Liedtka, 2015).

First is the role of empathy in the DT field (Leonard and Rayport, 1997; Patnaik, 2009). Although there are different interpretations of DT, most scholars and practitioners agree that human/user-centered design, which is based on a full understanding of the social, economic, political, and cultural circumstances of the users (Buchanan, 2001) is fundamental to the DT method’s philosophy. However, obtaining such understanding by designers requires tools beyond traditional marketing methods, such as focus groups and surveys. Users cannot tell designers what they want and need; as Henry Ford once mentioned, “If I’d asked my customers what they wanted, they’d have said ‘a faster horse’” (Brown and Wyatt, 2010). In addition, internal designers have such a strong bond with their company’s approaches and products that they often struggle to achieve a deep understanding of the users (Bruce and Jevnaker, 1998). Thus, obtaining such understanding by designers requires them to co-create and co-design (Buchanan, 1992; Norman and Verganti, 2014; Verganti, 2008), which leads to the second widely agreed element of the DT field: collaboration (Beverland et al., 2016). It has been considered that “collaboration is perhaps the most overlooked experience that is essential to design thinking... Cross-disciplinary collaborative teams are more likely to create innovative solutions than focused groups of likeminded people since

varying opinions and sources of expertise can lead to valuable insight” (Davis, 2010: 6536).

To develop such a collaboration, Verganti (2008) suggests creating a design discourse, which is a research network consisting of designers within and outside of the organization, users, organizations in other industries, suppliers, media, research and education centers, and competitors (Figure 1). According to Verganti (2008: 446), “The key capability in design-driven innovation is to access and share knowledge with the design discourse and, more precisely, to identify the key interpreters, to attract them and develop with them a privileged relationship, to share and recombine knowledge to build unique proposals, and to rely on the design discourse to communicate with users.” However, practitioners and academics have yet to fully understand how an organization can strategically establish a design discourse and effectively collaborate within it (Dell’Era and Verganti, 2010).

Third, there is a unified agreement on utilizing “prototyping” in DT as a tool to experiment, stimulate imagination, play to learn, instead of a tool to “display, persuade or test” (Brown, 2009; Hargadon and Sutton, 1997; Liedtka, 2015; Schrage, 1999). Prototypes enable designers to evaluate their approach in matching people’s needs with what is technologically feasible (Brown, 2008; Seidel and Fixson, 2013).

Based on these three elements, most studies agreed on three “spaces” for the DT process: inspiration, ideation, and implementation (Brown, 2008; Brown and Wyatt, 2010; Seidel and Fixson, 2013). Inspiration refers to the activities that are used to unveil problems or opportunities that, in turn, lead to searching for solutions (Brown and

Wyatt, 2010). During the ideation, designers are tasked with generating, developing, and testing ideas (Carlgren et al., 2016). Finally, in the implementation space, designers develop the novel ideas into a preliminary model and try to build the path to the market (Seidel and Fixson, 2013).

As mentioned, practitioners and scholars have frequently considered innovation and creativity as two major attributes of the DT approach (Micheli et al., 2019). Innovation is a continuous variable, ranging from incremental innovations (i.e. minor refinements, “doing better what we already do”) to radical innovations (major changes, “doing what we did not do before”). The innovations falling within the radical group are substantively distinct from the current practices and technologies (De Araújo Burcharth and Ulhøi, 2011), and thus require “new skills, levels of market understanding, leaps in new processing abilities, and systems throughout the organization” (McDermott and O’Connor, 2002: 424). However, they also offer either unprecedented performance features or significant cost savings that “advance the price/performance frontier by much more than the existing rate of progress” (Gatignon et al., 2002: 1107) and as such underpin renewing and sustaining the firm’s ability to create and capture rents.

Unfortunately, prior studies are not clear whether DT can effectively stimulate radical innovation (Micheli et al., 2019). Lockwood (2010b) argues that human-centered design can lead to an in-depth understanding of user needs which leads to the identification of new needs that are not yet fully realized by users. The identification of these new needs can lead to the development of a radically new product or service (Radnejad et al., 2020). On the other hand, Bruce and Jevnaker (1998) argue that internal designers have such a strong bond with their company’s approach and products that they often do not achieve such a deep understanding of the user, limiting their capacity for radical innovation. One might argue that the creation of design discourse, introduced by Verganti (2008), is the solution to reduce internal designer bias and expand the capability of DT to radical innovation. However, the evidence of successfully created design discourse leading to a radical innovation is limited.

In addition to radical versus incremental, firm-level innovative activities differ along with the object of the change (Fagerberg et al., 2006; Piening and Salge, 2015): product innovations (customer-facing changes: new or refined products or services offered in the old or new market) versus process innovations (internally focused changes usually unnoticeable to customers: new technologies or ways of organizing the development, production, and delivery of products or services). Process and product innovation are different in valuation, goals, rareness, imitability/substitutability, and competitive effect (Radnejad and Vredenburg, 2019; Radnejad et al., 2017; Un and Asakawa, 2015).

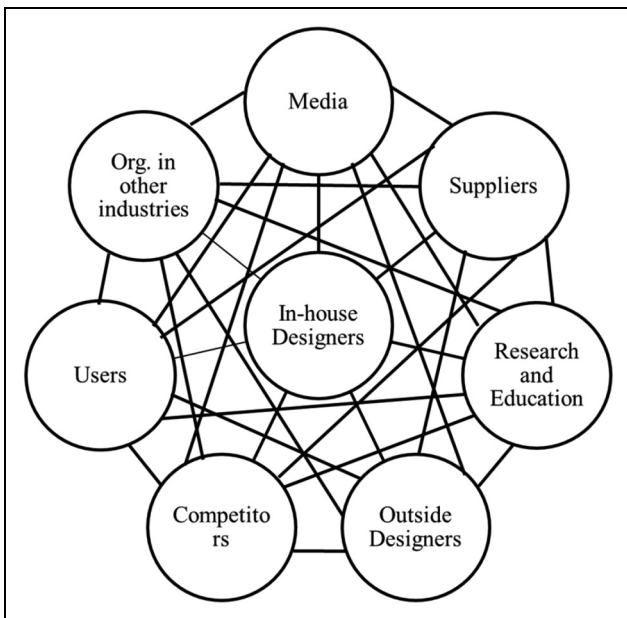


Figure 1. Design discourse recreated based on Verganti (2008) and Radnejad et al. (2020).

While process innovation is as important as product innovation in enhancing a firm's competitive position, it has been mostly ignored in the DT field. The design studies have mainly explored the effectiveness of design and DT in the field of new product development and product innovation (Luchs and Swan, 2011; Luchs et al., 2015, 2016; Micheli et al., 2012). One may argue that DT is a user-centered approach that aims to respond to user needs, so it only should focus on product innovation and new product development (Luchs et al., 2015). However, some user needs, such as the needs of those who are looking to enhance their value system by purchasing specific services and products (e.g. vegan users and environmental cautious users) might be satisfied by introducing process innovation. This paper seeks to provide an example of such circumstances.

Method

Critical case study: COR

To address this paper's research question, we have employed the empirical examination of a case study of COR, the global leader in cork stopper manufacturing. The selection of COR as the critical case subject is justified by its uniqueness, allowing us to extend the emerging theory in a transparently observable situation (Glaser and Strauss, 1967). In particular, COR serves as an "outlier" case of an established company successfully fighting off a disruptive replacement threat by exploiting the mainstream technology via DT, and as such important insights can be gleaned from such a case (Hill and Rothaermel, 2003).

In the wine closure industry, COR is the largest manufacturer, accounting for over a third of the global cork stopper market (around 5.5 billion cork stoppers annually), a dominance enjoyed over many decades. This changed quickly when the focal company faced a decline (forcing it to a fight-back and then revival) in the face of emerging disruptive technological innovation—*alternative wine stoppers*. Importantly for our study, COR is organizing and leading the entire cork stopper industry's response to rival technologies, and hence the critical case study of this company allows us to reveal the essential features of the exploitative response of incumbents to disruptive innovations, as compared to other smaller and less proactive organizations. In particular, throughout the whole studied period of disruption, the company refused to embrace the disruptive technology, concentrating instead on a wide search for methods of and for adaptation, while adhering to the established, natural cork technology. As such, the employed case of COR meets the required criteria for critical case studies of organizations undergoing substantive change during environmental turbulence (see, e.g. Dixon et al., 2014).

Our study is based on a longitudinal critical single case study, considered more appropriate at the outset of theory

generation, enabling "opportunities to explore a significant phenomenon under rare or extreme circumstances" (Eisenhardt and Graebner, 2007: 27). Moreover, ignoring processes enabled by a single case may be an obstacle to theory development (Siggelkow, 2007). Notably, the hitherto limited literature on established companies' responses to new technologies (e.g. Danneels, 2011; Rosenbloom, 2000; Tripsas and Gavetti, 2000) has also opted for single case studies.

The case of COR richly describes the existence of the phenomenon (Siggelkow, 2007) of how a dominant industry leader (i.e. a leading cork stopper producer) is facing the challenge of a possible existential threat posed by an ongoing disruptive technological innovation (i.e. alternative wine stoppers). The selected descriptive and exploratory method for approaching a case study allows investigating the in-depth, comprehensive, and diverse set of empirical evidence, leading to more precisely defined constructs, enabling the broad exploration of the research question (Eisenhardt and Graebner, 2007; Yin, 2009).

Data collection

To ensure the reliability of the research and construct validity, we intended to make it possible for an external observer to trace the data forwards and backwards, by maintaining a clear chain of evidence, developing the events database, and following the case study protocol (Yin, 2009). Moreover, the whole data collection process followed the principle of triangulation to ensure construct validity (Flick, 2004).

Firm data was collected over the course of nine years (2011–2020), when the research team tracked the process of the company management's understanding of the disruptive changes in the industry and conceiving of and implementing the response strategies. For the analysis pertaining to prior periods, we relied on retrospective historical data (from interviews, archives, and public sources).

The documental data collection began in early 2011, three months before the first interviews. We collected information and data about the cork stopper industry and the focal company from different publicly available sources: COR website and press releases, company publicly available financial reports, newspaper articles, practitioner books on the cork processing, industry journals, and trade statistics and data from the Portuguese cork trade association, APCOR. Information was also gathered from an industry conference held in April of 2011 in Portugal—the industry's major gathering of experts, entrepreneurs, trade body representatives, and senior personnel from different cork manufacturers of Portugal (together producing over half of the world's cork).

Over the course of the study, we also had access to updated secondary data on both the firm and on the cork

stopper industry from public sources (such as those listed above) and the company's internal reports and archives. Overall, more than 7000 pages of text, representing the secondary data, were read and analyzed, both in English and (approximately a third) in Portuguese. Archival data are frequently used as supplementary data to corroborate, triangulate, and augment evidence obtained from primary sources such as interviews and direct observations. This also enables a deeper understanding of the subject organization, its structure, and how it functions (Strauss and Corbin, 1994; Yin, 2009). The secondary data also provided a factual context with regard to the history of the firm, some of the response strategies (i.e. the relocation strategies), the evolution of the industry, and an understanding of the evolution of the alternative stoppers.

The primary data sources of this study comprised interviews of key company officers involved in the development and implementation of the firm's response strategy, as well as industry experts. Overall we have interviewed multiple highly knowledgeable informants from middle- and top-level management of the company (including the chief executive officer (CEO)), thus limiting the possible bias from possible retrospective sense-making and impression management (Eisenhardt and Graebner, 2007). The interviews were conducted between early 2011 and early 2015 with 10 key employees of the company in the head office of the cork stopper business unit in Santa Maria de Feira in Portugal. All informants were directly involved in COR's response to the disruption strategy. Each interview lasted between one-half hour and two hours, and most interviews were held at least twice. In addition, the CEO of COR, António Reis Amorim (ArA), who designed and applied the response and growth strategies, attended four separate interview sessions.

To gain an external, market perspective, we interviewed the chief executive of the Cork Association (APCOR), which includes over half of all the cork stopper manufacturers (and all the large firms). A total of seven meetings were held with Lima to gather data for this study, the last being on 28 November 2015. Overall, during the study, we conducted 50 interviews, totaling approximately 3200 min.

To ensure the accuracy of the emerging findings, an early draft of the manuscript was presented to COR for internal circulation (Danneels, 2011; Guba and Lincoln, 1994). To maintain the study's construct validity, the authors relied on different sources and employed different data collection approaches (Gibbert et al., 2008).

Qualitative data analysis

We employed the extended case method (Burawoy et al., 1991) to guide our data analysis, similar to prior studies in this field (Danneels, 2011; Rosenbloom, 2000). The

extended case study method deals with "phenomena not as instances of some potential new theory but as counter instances of some old theory" (Burawoy et al., 1991: 9), which provides us with the optimal approach for refining and extending extant theory. In addition, the COR case can be viewed as an anomaly, which makes it more suitable to be utilized as an extended case analysis (Burawoy et al., 1991: 9).

Within the course of the extended case analysis, we intended to integrate the emerging empirical patterns with the established theories and concepts of disruptive innovation and DT, to explain how COR has responded to alternate stopper technologies. The analysis and findings are organized and presented in two parts. First, we started by chronologically ordering descriptions of key events. A narrative was developed after organizing the case study data into an event history database, developed from field notes and interviews as well as company reports, newspaper articles, and books. The first part results are then summarized by tracing the history of the firm, and then COR's missteps. The second, and the more substantive and empirical part of our analysis, involved COR's strategic responses following the leadership change.

Building on Gioia et al. (2013), we carried out the data analysis in three steps: (1) open or in vivo coding of interview data (Strauss and Corbin, 1994), which involves searching for codes based on our interest (while remaining open to new themes emerging) on how COR was responding to the threat posed by rival stoppers. These first-order codes were developed from participants' language (Altinay et al., 2014). For instance, we systematically obtained statements that referred to user needs, for example referring to advantages that wineries had from alternatives due to low 2,4,6-trichloroanisole (TCA) that alternatives were much cheaper; ease of use when it came to screwcaps, etc. We also consistently found references (by COR officials) of outside collaboration with architects, design firms, and even entrepreneurs who using a venture fund created, proposed new ideas to COR. When cycling between the existing theory and the data ceased to yield substantial new findings, indicating reaching the first-order codes' saturation (Glaser and Strauss, 1967), the research team moved to the next steps. 2) Axial coding (Strauss and Corbin, 1994), which is based on searching for associations within and between the initial codes, resulting in the development of second-order themes. These categories remain faithful to the underlying data, yet are more general and abstract. Axial coding (Strauss and Corbin, 1994), which is based on searching for associations within and between the initial codes, resulting in the development of second-order themes. These categories remain faithful to the underlying data, yet are more general and abstract. Two second-order themes emerged, one emerging from user needs "appreciating user-centric approach" and the other was the "creation of a design discourse" following

consistent collaborations with external actors for design and ideas. (3) Reviewing the underlying data for the degree of emphasis on each of the second-order themes, and confirming a consistently recurrent pattern, we went back and forth between the existing literature and the data to settle on “exploitative strategy via DT” as the overarching dimension, which informed COR’s response to the disruptive technology without embracing it. Figure 2 provides an overview of the emerging data structure, and Table 1 reports the representative quotes underlying the key results of our study—the emerging second-order themes, forming the basis for the following section.

In what follows, we juxtapose data against theory (Orton, 1997) to describe how COR is fighting the influx of alternative stopper technologies while remaining faithful to its century and half of history and tradition with cork.

Case study

Industry context: Wine stoppers

Since the late 1680s, wine has been bottled almost exclusively with natural cork, a multifaceted natural material derived from cork trees (*Quercus suber*) found mostly in Portugal, Spain, and a few other Mediterranean countries. Cork has a number of outstanding properties derived from its unique honeycomb cellular structure: it is light, resilient, elastic, a great insulator of heat and sound, impervious to liquids, chemically stable, and fire-resistant (Gibson et al., 1981).

Rising threat: The TCA. Cork stoppers have by far been the closure of choice for over three centuries (Wilson and Lockshin, 2003), a role that both the cork and the wine industry had taken for granted. However, it had long been suspected that cork was behind an unpleasant, musty, off-flavor that led to about 5% of the wine being considered spoiled or “corked” (Isohata, 2005), something that the industry had always vehemently denied. This denial would no longer hold from the 1980s, with the discovery of the reason behind cork taint: the seminal study of Buser et al. (1982) demonstrated that it was the presence of a chemical compound (TCA) provoking a chemical reaction with the cork stopper and resulting in the contamination of wine.

Poor quality cork closures can cause immense harm to wine companies, not only by damaging expensive wine but also by hurting the reputation of the entire wine label. Despite the culprit behind wine contamination having been proven to be the cork stoppers, during the 1990s, the cork industry largely refused to accept responsibility for and take steps to overcome the problem. In the words of an industry observer (the scientist who first identified the TCA problem), the cork industry was ignoring the problem, hoping that it would go away; moreover, “they

were also afraid that if they examined their corks, too many of them would be rejected” (Weber, 2007: 35).

Disruptors are on their way: alternative stoppers. The confirmation that cork was behind wine contamination provided an opening to emerging technological innovations, the first being synthetic closures. The insurgency began in earnest in the early 1990s, with California-based Supreme Corq using injection-molding technology to produce synthetic corks. Synthetic stoppers were TCA-free, uniform in terms of quality, did not affect the taste of wine, and did not require wineries to invest in new bottling machinery. With the early successes of Supreme Corq, other synthetic stoppers entered the market and quickly gained the attention and customers among wineries.

Later, an even more significant threat to cork closures emerged from aluminum screw caps. The modern-day pioneer of this technology is the French company, Le Bouchage Mecanique (L.B.M.), a subsidiary of the glass manufacturing company Saint-Gobain. Encouraged by the market acceptance of screwcap closures for aperitifs, spirits, and liqueurs, the company developed its first screwcap wine closure “Stelvin” in 1959. Many wineries perceive the aluminum screwcaps to be at least comparable and, in many respects, superior to the traditional cork product by providing an airtight seal. Screw caps contain a chemically inert wad facing, and are corrosion resistant and completely compatible with wine (Mortensen and Marks, 2002).

The alternative stoppers, namely synthetic and screw caps, possess the essential hallmarks of a low-end disruptive innovation (Christensen, 1997; Govindarajan and Kopalle, 2006a). Table 2 matches alternative stoppers with Christensen’s characteristics of disruptive innovation.

Interestingly, the process of disruption has taken more than a century. The 27 October 1901, issue of the *New York Times* had suggested the following: “Yet the beginning of the end may almost certainly be seen... as through a glass, darkly. After five centuries of using the cork-closing bottles are passing, slowly and with many an effort to hold their own, but passing nevertheless. Rubber, metal, glass, pasteboard, and pulp are the new coverings of the day that here and there are taking the cork’s place.” According to industry insiders, estimates point to cork enjoying a near-monopoly in the closure market right up to the beginning of 1990, with close to a 97% share of sales. A decade later that share had dropped to 70%, continuing the downward trend right up to today. This process of the ongoing disruption of the wine stopper industry sets the empirical context of our investigation of incumbents’ exploitative response strategies.

Cork and the disruptive industry turmoil

As it became increasingly clear that alternative closures were not only there to stay, but that an increasing number

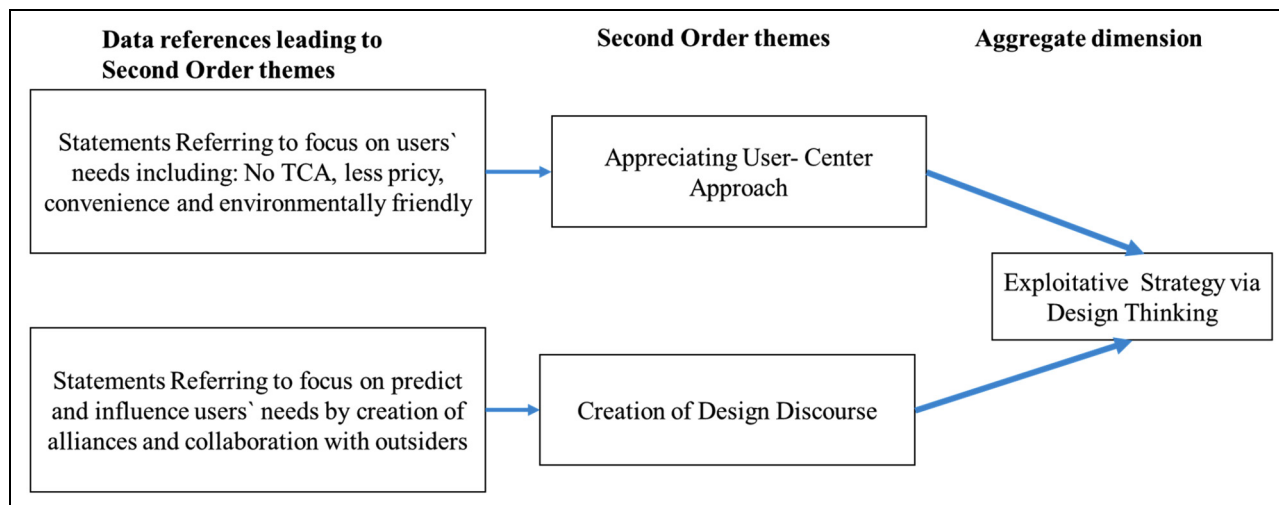


Figure 2. Data structure.

of clients were abandoning cork, especially for their lower-priced wines (a typical feature of the disruptive innovations; Govindarajan and Kopalle, 2006b; Schmidt and Druhl, 2008)), the principal shareholders of the family-owned company decided to act and hire a new CEO. Thus, in 2001, Américo Amorim gave his place to ArA, his nephew. The new CEO had extensive knowledge of the organization, and since 1997 had headed the crucial cork stopper division.

The new CEO's interpretation of the future was very clear—if cork could not respond effectively to the alternative closures and resolve the presence of TCA, then the organization did not have a future. Notably, although the contamination problem seemed to be the primary driver of change, ArA realized that it was only the tip of the iceberg and that the real threat was coming from emerging disruptive technologies, all enabled by the initial neglect of the TCA issue:

The major factor why the alternatives appeared in the market, was because of one problem that had historically existed and that cork had not resolved. So when a plastic product appears in the market and says **“I don't impart any taste to the wine, and I am also 30% cheaper,”** then we have to do something. We have to understand that wineries exist not to sell stoppers, but wine. The contamination issue was the best thing that happened to us in the long term... We in the cork industry had to speed things up and I think we did that. We must not become complacent.

One early and critical decision ArA had to make was whether to stick with cork (existing technology on the sustaining path: Christensen, 1997) or adopt in some manner the disruptive technologies (completely or partially integrated with the established approach). When inquired

whether COR had thought of adopting rival technologies in some form, the response was clear:

We were clearly on the side of cork and not on the side of quick profits tempted by alternatives. We believe in our product which is unique... However, this decision at that time wasn't easy. We had a lot of internal debate, and Rolland Berger [i.e., international consultants], worked for one year with us [in 2001] on our future strategy. The conclusion was that we should defend cork. However, this decision was not based on emotional reasons, but rational reasons. ... All of our competitors that adopted the rival technologies, all, with the eventual exception of one, have disappeared. There was a lack of identity. Selling to the enemy [i.e., abandoning cork] was not an option for us.

Therefore, the new CEO initiated a set of strategic responses to disruptive threats. Notably, all of the responses were based on the exploitation of the core company's technology—processing the natural cork; no real attempts were made to experiment with alternative technologies or materials. Even though the quote above suggests that the decision to stick with natural cork was based on the “rational” rather than “emotional” reasons, from a broader perspective, COR's response is predetermined by the incumbent's logic of preserving organizational identity and core beliefs in response to an identity-challenging disruptive innovation (Tripsas, 2009). In other words, COR's management perceived the company as a “natural cork” company, and this cognitive schema determined the dominance of the exploitative response strategies. This identity-based logic (i.e. exploitation) led COR to conceive and implement the DT approach to identify the needs of cork's customers, as years later, mentioned by its head of innovation:

Table 1. Representative quotes underlying a second-order theme.

Second-order themes	Selected evidence
Appreciating user center approach	<ul style="list-style-type: none"> • We have to get similar [to plastic] cork products that they could buy. • There is a cork stopper for everyone, so we work constantly with our customers to develop the best solutions—adapting our product range to suit, and even creating new closures. (Carlos de Jesus, from an interview in <i>The Drinks Report</i>, 2014) • We started focusing on the environment as a business strategy, with the launch of our first Sustainability Report in 2006. We realized that our raw material cork, brings so many benefits to the environment. Why not leverage these benefits? We then started using the term “stakeholders” in our daily lexicon. (ArA, 2014)
Creation of design discourse	<ul style="list-style-type: none"> • Cork is a wonderful raw material, like no other. There are many things we can do with cork, not just create new types of cork stoppers, like we did with Helix, but also new non-stopper products. • Cork is a noble product, and it has many distinguishing properties that no other single material has. We can do many things with cork that have yet to be explored. Indeed, our Cork Venture project is precisely to fund entrepreneurs who want to use cork for novel applications. • Just imagine how many trees would be saved if all the boards had a “stringer” in cork! I am proud to be working with Mercedes Benz and Amorim in this project. (Garrett McNamara, world surf champion, quoted in a Portuguese journal, November 17, 2015)

It was at the turn of the century that we began to develop a new generation of products that directly responded to the market’s emerging needs and consumers’ expectations...The innovation process always begins by understanding what people are looking for and identifying the main market trends.

Adoption of DT as the center of the exploitative response

First: Appreciating the user-centered approach. DT is an innovation process focusing on identifying user needs and building empathy with users (Brown, 2008). The design processes begin with inspiration, which is “the problem or opportunity that motivates the search for solution” (Brown and Wyatt, 2010: 33). As Sebastien Moinier, head of Innovation at Amorim Cork Flooring mentioned:

We have to define where we want to go, and achieve success on a step-by-step basis. It is not enough to look at the norm. It is important to be close to users, to spend time with them, so that we can exchange viewpoints, and interpret and translate their needs. The relationship with users is part of the innovation process.

In the case of COR, the most accessible and easiest user problem to identify was a need for TCA-free stoppers and to resolve the contamination issue.

The only way to move forward for us was to align our interest with that of the wine industry, and this meant resolving the contamination issue. It is not plastic stoppers that keep me awake at night, but a bad cork (Carlos de Jesus, marketing and communications director).

To address the problem, ArA realized that there was a need for critical research on the sources and control of contamination (i.e. initiating the second space of the DT process: ideation). Thus, ArA’s first move was to hire a professor of microbiology from the nearby University of Porto, Miguel Cabral, to manage a newly created R&D division. Cabral had a clear task from the very beginning: to resolve the TCA problem. According to ArA:

We contracted Miguel Cabral, and also contracted four or five people (as researchers). They would do tests here, tests there ... and in our industry, this was a revolution.

Based on their analysis of how TCA contaminated cork, Cabral and his team of researchers proceeded over the years to test and create an extensive set of new routines (i.e. the final space of a DT process: implementation). These ranged from the way cork was cut and harvested to transportation, storing, cleaning, processing, and the extraction of the closure from the planks. The series of these process innovations reduced the incidence of TCA for cork 10 times (to 0.5%), comparable to available alternatives:

Corks are currently able to compete with any of their direct competition and now in the wine experience one can be in perfect harmony with Nature (M. Cabral).

However, resolving the immediate problem of TCA was not the only user need that should have been addressed by COR. Due to the changing social trend of wine consumers from connoisseur to mass market towards the end of the 20th century, users’ needs to be shifted from the attention to romance, tradition, and formality attached to cork

Table 2. Alternative stoppers (synthetic and screw caps) as a disruptive innovation.

Disruptive innovation characteristics	Alternative stoppers features
Inferior performance on crucial dimensions of quality New value proposition (dimensions)	(1) Lack of “romance,” “tradition,” and “formality” (1) Ease of use (2) Allow resealing (3) No contamination (2,4,6-trichloroanisole (TCA) problem)
Lower price as compared to existing products	Significantly cheaper (a natural cork stopper costs between \$0.3 and \$2.4, whereas synthetic rivals are priced between \$0.18 and \$0.50 (Hatton, 2011)).
Appeal to lower end and price-sensitive segments of the industry	At first, the providers of aluminum screw caps and plastic stoppers targeted price-sensitive wine producers (at the lower end of the market) and later, producers of alternative alcohol beverages that require other quality attributes (such as low price and reliability).
Improvement through time and penetration of the market from niche to mainstream	As the development of alternative cork stopper technologies went further while the customers’ perceptions were changing, the disruptive substitutes have the potential to slowly progress toward more exclusive segments of the wine stopper industry (to mid-tier wines), ultimately leaving only the high-end segment to the traditional cork stoppers.

stoppers to price, practicality, ease of use, and resealing. In line with this reasoning, COR first introduced the Twin Top product (in 1997), targeting the low-end of the closure market. Retrospectively describing the decision to launch this product, ArA suggests:

Only twenty-five percent of the cork boards (processed bark) can be used to make natural corks; the remaining seventy-five percent are left with only a tenth of the original value. ... They [commercial team] started taking alternative stoppers as a given, and no longer part of our market. So if a client buys 5 million stoppers, and 3 million of which is plastic, then they [commercial team] would consider that the market for us was only 2 million. But no, no! If the client buys 5 million stoppers, then our market is 5 million. We have to get similar (to plastic) cork products that they could buy.

Where formerly, COR would only manufacture the more expensive and profitable natural stoppers, the Twin Tops formed part of a new strategy of creating different cork stoppers using agglomerated cork from the leftovers. As of 2015, the company produces eight different types of cork stoppers not of natural cork (including Twin Tops), intended for wines bottled within two years. ArA considered the success of the Twin Tops as a key turning point and learning experience for him.

The latest of the additional stopper types, introduced in 2015, is the Helix stopper, which was designed in partnership with Owens-Illinois, the largest bottle manufacturer in the world. This stopper is a re-sealable, twist-off wine cork that does not require a corkscrew. It unites an ergonomically designed cork stopper with a glass bottle containing an internal thread in the neck. The Helix’s origins lay in a

market survey by a US client on the consumer experience related to the opening of wine bottles. The survey found that despite clients preferring cork stoppers because of their image of being associated with superior wines, cheaper screw caps were more convenient and easier to open. ArA realized that especially for users in the countries that are beginning to build traditions and cultures of wine drinking, the convenience factor would be essential. “We asked ourselves: ... How can we give the same convenience as screw caps? That was how Helix started.”

Overall, the introduction of the Helix takes the fight to the disruptors by developing a solution based on COR’s competencies, yet matching competing technologies’ strengths in a vital dimension, contamination: there is zero TCA incidence in COR’s stable of technical stoppers. Importantly, even though the Helix product is intended to match some of the attractive features of the disruptive approach (e.g. user-friendliness), its introduction still falls within the realm of “exploitative” strategies, aimed at capitalizing on the sustaining innovations in existing technology, driven by the need to maintain the company’s natural cork-based identity, as opposed to embarking upon identity-challenging approach (Tripsas, 2009).

Another change in social trends among the cork users was the creation of new values, such as seeking environmental and social justice. These new values created new needs among users, such as sustainability and social validation. The prior studies of disruption contexts point out the benefits of emphasizing the societal parts of the company’s value proposition to gain a competitive advantage in such settings (Lehner and Simlinger, 2019). During the course of extensive discussions with the senior management, we discovered that COR puts a major emphasis on the environmental benefits of cork. The company’s emphasis on cork’s environmental benefits is exemplified through the following tactics.

The cork oak forests of Mediterranean countries are considered to be among the most prolific bio-diverse regions of the world. They are rich ecosystems, home to many species of plants, birds, mammals, reptiles, and amphibians. Many of these species, for instance, the Iberian lynx and the imperial short-toed and Bonelli's eagles, are endangered. Over the last few years, a strong, sustained, and multifaceted campaign has been launched by COR, promoting cork as an environmentally friendly product and linking the use of cork in wine bottles to the preservation of nature. Cork, being a completely renewable resource, is also recyclable. Worldwide campaigns invoking cork's green credentials have been launched, including ReCork, Intercork, the market-oriented research for cork (MOR FOR CORK) campaign, as well as "Save Miguel," where Hollywood was enjoined to "save cork forests." COR has also signed up to help forestry landowners with responsible farming techniques:

As the forests decrease, so too does the conscience of environmentally-friendly consumers globally. Having become the first packaging company to obtain Forestry Stewardship Council (FSC) accreditation in 2009, more than 30 of our production units have now gained that status. That means that, more and more, we can offer a closure that is not only 100% natural, but also 100% sustainable.

More generally, the detection of the new need (social and environmental values), corresponds to the "Disrupt the disruptor" dynamic response strategy (Charitou and Markides, 2003) described in the following manner. Before the rise of alternative stoppers, the originally emphasized value proposition of cork was built on the aspects of quality and historical heritage, albeit at a premium price. The disruptors offered an alternative value proposition, revolving around low price and ease of use, albeit without the claims of heritage or prestige. Then COR, as an incumbent, countered the disruptors by emphasizing satisfying an entirely new user need (after handling the TCA issue) coupled with the traditional heritage/prestige and reinforced sustainability and environmental friendliness claims.

Although COR's initiatives are still being played out, the performance results of over a decade and a half are encouraging, and indeed for the whole cork industry. Recently, the NDTech technology has been introduced, implying individualized screening technology for natural cork stoppers that delivers the world's first natural cork with a non-detectable TCA guarantee. Moreover, in the "developing" new cork stopper types, besides Twin Top and Helix, recently introduced Neutrocork stoppers are being well received in the market. These are individually molded corks, offering a high degree of consistency, providing closure from basic to premium wines. Other stoppers are also being developed, such as multi-purpose stoppers, which come in a variety of

standard sizes and are suitable for containers requiring shorter insertion, as well as new beer closures.

Second: Creation of design discourse. The adoption of DT not only helps the firm to achieve incremental innovation but also enables it to introduce dramatically new products or services (i.e. radical innovations) (Norman and Verganti, 2014). To be able to do so, COR needed to understand, anticipate, and influence its users' needs in all potential industries. Considering that COR's internal designers are not able to achieve such comprehensive understanding due to their bias toward the firm's products (Verganti, 2008), COR established a design discourse including non-cork companies, including major firms (such as Siemens, which uses "AluCORK" flooring systems for its metro trains), small firms (such as the ones using cork for sandals and various accessories), startups, universities (such as a partnership with the Design program at the Royal College of Art in London) and other stakeholders in different regions. In their design discourse, they created different initiatives.

For example, an MOR FOR CORK initiative was missioned to conceive and develop new cork products and to render technical support to the development of new business areas. In another example, the Collaborative Innovation and Applied Research center was tasked to work with other stakeholders in the different regions where the COR's business unit operates to also identify new opportunities. Additionally, Amorim Ventures was created to promote startups interested in using cork in their businesses. The design discourse of COR was supported by its employees (internal designers) to act as mentors of the projects (i.e. interpreters). Most recently, the City Cortex program has been initiated by COR, which is a partnership between the city of New York and leading architects and designers to create original projects for public or semi-public spaces in the city of New York.

City Cortex is a program conceived by experimental design, which will emphasize the unique characteristics of cork within the context of the 21st Century (COR press release, 2019).

In another example of collaboration, we can include the Lisbon Cruise Terminal (Valmor Prize in 2017, nominated for the Mies van der Rohe Prize, in 2019), designed by the architect João Luís Carrilho da Graça, whose walls and façades are formed by an innovative cork-and-concrete composite, resulting in an incredibly beautiful structure that is also 40% lighter.

The deliberate strategy of the creation of a design discourse is reflected in the current business structure of the company, comprising three distinct non-stopper cork business units, concentrating on floor and wall coverings, cork composite, and insulation materials. In 2018, floor and wall

Table 3. COR's alternative cork products: Examples.

Product	Year Launched	Partnership	Observations
Cork shoe by Nike Sportswear LeBron X	2012	Nike	The sneakers have cork uppers
Kayaks	2000	Nelo	Kayaks using cork won 20 medals at the 2008 Olympic Games. Enhances the technical performance both in fresh and saltwater
MBoard Project Surf Boards	2013	Mercedes Benz	The world record for the biggest wave ever surfed used this surfboard
AluCORK flooring in Metro trains	2012	Siemens	Launched in Poland, is 30% lighter when compared to traditional models
Vega (rocket)	2012	European Space Agency's (ESA)	Cork is placed in the nose cone and other areas sensitive to high temperatures
In many design elements	Different years	Different design teams (e.g. Cork chaise longue, by Daniel Michalik; Cork sandals by Stella McCartney, Birkenstock)	Many top luxury brands using cork as a material in their designs. Creates notoriety for cork.

coverings were over 112.2 million euros; cork composites had sales of 102.2 million euros (representing an increase of 3.4 million euros over 2017), and insulation materials had sales of over 12 million euros. In addition, alternative uses of cork were employed over a range of industries using it as an insulator, such as in housing, in airline cockpits, oil spill clean-up, home furnishings and construction, and footwear and fashion accessories. Table 3 gives some illustrative examples of different cork applications; most of these products are made by the composite cork division in collaboration with external partners. The new product categories now contribute to significant revenues for COR, of close to 214 million euros in 2016 (33.4% of total sales).

ArA's exploitative response strategies via DT seem to be effective. Despite the fact that the alternative technologies have not been outcompeted, crucial indicators point to a slowing of the dynamics of the alternative stoppers, particularly plastics. The sales of cork stoppers reached €393 million in 2015 (an increase of 45% over five years), and €423 million in 2016. Profits at COR increased by over 34% in the first half of 2016, when compared to the homologous period in 2015. Meanwhile, the alternative closure leaders have been feeling the pressure, with one of the largest synthetic stopper makers, Australian NuKorc, filing for bankruptcy, as well as the American Supremecorq, founded in 1992, having filed for bankruptcy in 2011. Cautious optimism is evident in the organization, even when compared against 2011 at the start of the study. ArA asserts:

What makes our increasing sales even more interesting is that we not only have a larger share of the closure sector, but that also this "cake" is growing rapidly ... We are enjoying a renaissance of cork,

and our biggest challenge now is to make sure that we don't become complacent again.

Table 4 summarizes COR's DT exploitative disruption-response.

Discussion

Summarizing over two decades of management literature on disruptive innovation, Christensen et al. (2018) pose the still unresolved question: "How do (should) firms respond to disruption, and which strategies are effective?" (p.1062). The current literature has, to a large extent, neglected the incumbents' possible effective exploitative response strategies (implying the strengthening of the existing approach in response to the disruption) (Osiyevskyy and Dewald, 2015b). In addition, the extant studies do not provide a concrete answer to how firms can effectively adopt an exploitation strategy. To address this gap, the current study concentrated on investigating the possible incumbent responses to disruptive innovations via deploying the principles of DT along the lines of exploiting the established product.

DT has widely been applied by firms in a variety of industrial contexts and has been branded as the most effective innovation tool in our century (Johansson-Sköldberg et al., 2013). However, there is relatively limited empirical research on the performance of DT and its accompanying tools (Cousins, 2018a; Seidel and Fixson, 2013). Consequently, there is also a need to study DT and its contribution to an organization's innovation strategy beyond what has been published based on anecdotal experience in the business press (Brown, 2009; Cousins, 2018a; Johansson-Sköldberg et al., 2013). Therefore, based on an inductive case analysis, we demonstrate a crucial role

played by DT principles in assisting incumbents in designing effective exploitative response strategies. Our finding demonstrated the effectiveness of two major components of the DT approach in conceiving and implementing effective exploitative response strategies: (a) a deep appreciation of the user-centered approach (i.e. concentrating on latent and explicit user needs) (Holloway, 2009; Lockwood, 2010b) and (b) the creation of the design discourse within the firm (i.e. leveraging external sources of insights for innovation) (Norman and Verganti, 2014; Verganti, 2008, 2017).

Our study *contributes to two streams of literature*. First, by observing the classification of exploitative response strategies emerging from the inductive case study, our study contributes to the limited body of knowledge on *managing disruptive innovations* with respect to effective incumbent responses utilizing the core technology to fight off the threat of disruptive innovation. Our findings demonstrate that developing and leveraging the established technology (i.e. low-risk, reliable exploitative approach) can be a viable direction to take, allowing the incumbent to preserve the value of its core capabilities in the current market while simultaneously engaging in the explorative search for the new markets and corresponding business models. As such, exploiting the established technology allows a firm to strike a proper balance between exploration and exploitation in the process of strategic renewal amidst the industry disruption. In particular, we demonstrate the effectiveness of incumbents' exploitative response strategies developed using the principles of DT (Brown, 2008; Charitou and Markides, 2003; Osiyevskyy and Dewald, 2015b), allowing leveraging of the existing technology for effectuating the exploratory distant search for new customers and/or new markets (Danneels, 2007). Furthermore, we believe our study is the first investigation linking the disruptive innovation theory and DT, empirically demonstrating the

effectiveness and efficiency of DT processes in the context of responding to industry disruptions.

Second, our findings provide two crucial insights into the *DT literature*. First, while there are limited studies on the effectiveness of DT in advancing process innovation (Brown and Wyatt, 2010), the COR case study demonstrates that DT principles (particularly, a user-centered approach) can be effectively used for stimulating both product and process innovations. For instance, by developing the capability of understanding, anticipating, and influencing the possible socio-cultural models of users, which is the center of the DT process (Verganti, 2008), COR internal "designers" identified new social trends and values (i.e. environmental and social justice) among the users. To deliver and reinforce these newly shaped values among users, COR designed process innovations to able to reduce its environmental footprints and produce products that fulfill the newly shaped value of users.

Our findings reveal that the DT approach can stimulate both radical and incremental product innovations, such as cork products in new markets (footwear, cloths, insulation materials, and aerospace) versus new cork products in the conventional market (e.g. Twin Tops), respectively. However, we reinforce the argument that for incremental innovations, internal designers are able to manage and deliver effective solutions themselves through using the user-centered approach. Yet, for more radical product innovations (such as new markets for the core technology), as suggested by Norman and Verganti (2014), the establishment of a design discourse seems to be necessary to leverage the external sources of the market and technology knowledge. In addition, our case study demonstrated the role of entrepreneurs as engaged participants in the design discourse. As demonstrated, COR's success to promote design-driven radical innovations was based on its initiative Amorim Ventures. This venture partnered with national and international entrepreneurs to develop and successfully commercialize design-driven radical innovations.

From a broader perspective of organizational learning (Edmondson and Moingeon, 1998; Senge, 2006), our findings corroborate the view of the DT process as the basis for organizational absorptive capacity (Cohen and Levinthal, 1990) as a dynamic capability (Zahra and George, 2002) enabling acquiring and leveraging the organizational knowledge in turbulent environments. Following the call of the first important study linking DT to absorptive capacity and dynamic capability for "for further empirical investigation relative to managerial interaction in a variety of contexts" (Cousins, 2018b: 112), we demonstrate the positive results of applying DT processes for exploitative strengthening of incumbents' core business in the context of salient industry disruption.

For practitioners, our study demonstrates a broad spectrum of possible disruption response strategies, all revolving around leveraging existing technology underlying

Table 4. Design thinking exploitative disruption-response framework.

Innovation impact	Radical	User-centered approach (e.g. non-toxic cork stoppers)	Creation of design discourse (e.g. footwear, cloths, insulation materials, and aerospace cork-based products)
	Incremental	User-centered approach (e.g. environmental friendly cork stoppers)	User-centered approach (e.g. Twin Top and Helix)
		Process Innovation type	Product

the “incremental” approach to strategic renewal. Moreover, COR’s case clearly demonstrates that—despite the gloomy example of Garmin—in many cases, the established firms can adapt successfully to defend themselves from disruptions, preserving their leadership in the market. The managers having to respond to disruptive threats should consider the implementation of DT principles, which allow effectuating the innovation process that results in both incremental and radical innovations. The latter insight warrants development of organizational DT as a management capability enabling successful and rapid organizational learning, as opposed to merely a tool for problem-solving or ad-hoc innovating (Cousins, 2018a). Its two facets, user center approach and company-wide creation of design discourse, must be institutionalized within organizational processes and systems to form the routine-based organizational DT capability.

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