

**THE DISRUPTOR'S DILEMMA:
TIVO AND THE U.S. TELEVISION ECOSYSTEM***

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ABSTRACT

Firms introducing disruptive innovations into multisided ecosystems confront the 'disruptor's dilemma' – i.e., they must gain the support of the very incumbents they disrupt. We examine how firms may address this dilemma through a longitudinal study of TiVo, which pioneered the Digital Video Recorder. Our analysis reveals how TiVo navigated paradoxical tensions by continually adjusting its strategy. In the process, TiVo progressively modified its technology platform and its relational positioning within the US television industry ecosystem. We contribute by theorizing how (a) disruption may affect not just specific incumbents, but also the entire ecosystem, (b) co-opetition is not just dyadic, but also multilateral and intertemporal, and (c) strategy is both a deliberative and emergent process involving continual adjustments as the disruptor engages with different ecosystem sides.

There is considerable interest in disruptive innovations threatening the fortunes of incumbent firms (Christensen and Rosenbloom, 1995; Christensen, 1997; 2006). Most discussions around disruptive innovation (new technologies, products and business models) (Markides, 2006) focuses on the challenges confronted by incumbent firms (e.g., Christensen, 2006; Danneels, 2004; Hill and Rothaermel, 2003), and how they might address these challenges (Ansari and Krop, 2012; Christensen and Raynor 2003; Wessel and Christensen, 2012). What is missing is a consideration of the challenges that disruptors, often start-up firms, confront in their efforts to establish their innovations as the basis for firm survival and growth. This lack of focus is surprising given the low survival rates of entrants (O'Reilly and Tushman, 2011; Stubbart and Knight, 2006).

We address this gap by drawing on several related literatures. The literature on industry ecosystems places emphasis not just on firms operating in isolation, but also on an ecology of interdependent firms (Adner, 2012; Iansiti and Levien, 2004; Moore, 1996; Wareham, Fox and Giner, 2014). An appreciation of ecosystem dynamics draws attention to the need for disruptors to stitch together their own value networks (Brandenburger and Nalebuff, 1996; Teece, 1986) to establish their disruptive innovations. These value networks may also include ecosystem incumbents with potentially conflicting interests, especially in multisided markets (Eisenmann, Parker and Van Alstyne, 2006; Rochet and Tirole, 2003).

The juxtaposition of the literatures on disruptive innovation and multisided industry ecosystems highlights a paradox (Van de Ven and Poole, 2005; Smith and Lewis, 2011). Specifically, to survive and grow, firms that introduce innovations that disrupt existing ecosystem dynamics (henceforth disruptors) may need the support of the very incumbents whose technologies, products or business models they disrupt. In other words, to graft its innovation into an existing ecosystem, the disruptor needs cooperation from the incumbents who, threatened by the innovation, will resist and even retaliate (Markman and Waldron, 2014). The presence of such simultaneous forces for cooperation and competition represents co-opetition (Bengtsson and Kock, 2000; Brandenburger and Nalebuff, 1996; Gnyawali and Park, 2011; Ketchen, Snow and Hoover, 2004).

When considered together, these literatures highlight a key question: *What are the challenges that a new entrant confronts in introducing a disruptive innovation into an ecosystem, and how does it address them?* We examine this question by conducting a longitudinal study of TiVo, a firm that pioneered the Digital Video Recorder (DVR) within the U.S. television (TV) industry ecosystem. TiVo's DVR technology stood to fundamentally transform television viewing and the relationships among members of the TV industry ecosystem. First, the DVR enabled asynchronous à la carte viewing of television programs and changed a network-centric program schedule to a demand-driven one (Gartner, 2005). Moreover, the DVR enabled the fast-forwarding of commercials by viewers thereby rendering ineffective the existing practice of placing (and charging for) commercials during primetime or popular programs.

Our analysis of the longitudinal data on TiVo and the TV industry ecosystem generated three themes that we develop in this paper. First, a disruptor confronts three kinds of co-opetitive tensions – dyadic, multilateral, and intertemporal. Second, the disruptor continually adjusts its strategy to address these co-opetitive tensions by shifting between cooperation and competition. Third, as the disruptor's innovation and relational positioning within the changing ecosystem co-evolve, the disruptor has greater latitude to frame its innovation as being sustaining to the operations of ecosystem members. Overall, these themes contribute to an understanding of strategy as an emergent process (Burgelman, 1988; Mintzberg, 1978).

THEORETICAL MOTIVATION: THE DISRUPTOR'S DILEMMA

A steady stream of work has been published on disruptive innovations (e.g., Chandy and Tellis, 2000; Christensen, 1997; 2006; Danneels, 2004; Markides, 2006; Shanklin and Ryans, 1987), wherein a new technology, product, or business model adversely impacts the financial model of an incumbent (Christensen, 2006).¹ Most studies are from the perspective of the firms that are “disrupted,” i.e.,

¹Disruptive innovations are new technologies, products and business models that are financially unattractive to incumbents (Christense, 2006; Markides, 2006). They can be (a) “low-end” innovations that target customers “overserved” by the functionality of their current provider, such as discount department stores (e.g., Walmart), (b) “new-market” innovations that target “non-served” customers, i.e., those unable to access, use or even afford the product, such as online auctions (e.g., eBay), or (c) hybrids, that combine both overserved and non-consumers, such as low-cost airlines (e.g., Southwest Airlines) (Christensen and Raynor, 2003; Christensen et al., 2004). While much

established or incumbent firms that either lose ground (e.g., Anderson and Tushman, 1990; Christensen and Rosenbloom, 1995; Henderson and Clark, 1990; Tripsas and Gavetti, 2000) or survive and prosper (Chandy and Tellis, 2000; Leifer *et al.*, 2000; Richman and Macher, 2004; Tripsas, 1997). But, there are fewer studies that examine the challenges that disruptors encounter in their efforts to introduce and promote their innovation into an existing ecosystem (Ansari and Krop, 2012).

Industry ecosystems are business networks characterized by interconnected firms that depend symbiotically on one another for their mutual effectiveness and survival (Adner, 2012, Iansiti and Levien, 2004; Kapoor and Lee, 2013; Moore, 1996). Constituting an industry's ecosystem are producers (including suppliers, competitors, and complementors) from the supply side, distribution channels and consumers from the demand side, and regulators and other interested stakeholders from the institutional side (Adner and Zemsky, 2006; Garud and Karnoe, 2001). Each firm's value network, encompassing its respective suppliers, complementors, rivals and customers, overlap and become intertwined to generate multiple value propositions that may be complementary or substitutive (Brandenburger and Nalebuff, 1996).² Such situations are especially likely in systemic industries (Garud, Jain and Kumaraswamy, 2002; Katz and Shapiro, 1985) forged around multisided platforms (Boudreau, 2012; Gawer and Cusumano, 2014; Rochet and Tirole, 2003)³.

Disruptive innovations disturb the business models of incumbents who are likely to resist and counter-mobilize (Garud et al., 2002; Glasmeier, 1991; Jelinek, 1997; Markman and Waldron, 2014). For instance, Sun Microsystems confronted resistance and then counter-mobilization from Microsoft – a dominant incumbent in the computer industry ecosystem – when it attempted to disrupt Microsoft's Windows franchise and gain platform leadership by sponsoring its Java software technology as an

of this work focuses on how disruption affects specific firms (incumbents), disruptions that are systemic in nature may affect not just specific firms but may also jeopardize the existing linkages among the different members of an ecosystem.

² We thank Adam Brandenburger for clarifying this point.

³ Multisided platforms connect multiple groups who seek access or links to one another. For instance, eBay and PayPal link consumers with merchants; and Google's search engine connects advertisers and users. Other platforms, such as Microsoft's Windows, have several sides (application developers, users, and OEMs), as does the Blu-ray standard for DVDs (content providers, manufacturers of DVD players, and consumers) (Hagiu and Yoffie, 2009).

industry standard (Garud et al., 2002). In the browser space, Netscape faced strong counter-mobilization when it openly confronted Microsoft, which it labeled the “Death Star” while casting itself as the rebel alliance that would “liberate the galaxy” by making Microsoft obsolete (Cusumano and Yoffie, 1998; Yoffie and Kwak, 2002).

To add to the challenges, a firm that offers a disruptive innovation (disruptor, henceforth) needs to gain access to complementary assets (Teece, 1986) lest its innovation remain confined to small, niche markets. Therefore, a disruptor introducing its innovation into an existing ecosystem needs to stitch together a set of transactions, rules and roles governing the arrangements, relationships and interdependencies, especially with established incumbents (Adner, 2012; Glasmeier, 1991; Jacobides, Knudsen and Augier, 2006; Santos and Eisenhardt, 2009). While this is difficult enough, the challenge is exacerbated in multisided ecosystems where disruptors have to contend with the conflicting interests and demands of different sides. For example, even Sony, a company with deep pockets, failed to consider the challenges its disruptive innovation posed for the other sides (i.e., authors and publishers) of the publishing industry ecosystem, when it introduced the Reader for e-books in 2006 (Adner, 2012). Publishers did not sign on, and consequently neither did readers.

These issues point to a central dilemma that disruptors confront. Disruptors risk retaliation from incumbent firms potentially disrupted by their innovation. Yet, they need the support of these very firms. Underlying this “disruptor’s dilemma” is the conflicting pressure on disruptors to both cooperate and compete with other firms. This speaks to the notion of co-opetition (Bengtsson and Kock, 2000; Brandenburger and Nalebuff, 1996), which is the “sum of many different relationships and the cooperative and competitive parts are divided between different actors” (Gnyawali and Park (2011:651). A narrower view, one that Gyanwali and Park explored in depth, pertains to dyadic co-opetition, i.e., the “simultaneous collaboration and competition between two firms and [how] the different parts of the relationship are divided between activities.” The task of managing such co-opetitive relationships is all

the more challenging in systemic industries characterized by multisided platforms and complex ecosystems.

Given all these challenges, new entrants have low survival rates as evidence suggests (O'Reilly and Tushman, 2011; Stubbart and Knight, 2006). These challenges are further exacerbated for start-ups (Markman and Waldron, 2014) as they are disadvantaged by a paucity of resources. While large new entrants and incumbents may be able to endure challenges (such as the disruptor's dilemma and attendant co-opetitive tensions) to gain market share over time, the offerings of start-ups may remain confined to niche markets; at an extreme, the firm may not even survive entry (Chen, 1996; Shane and Venkataraman, 2000). These observations motivate our inquiry into how a new entrant, especially a start up firm, can deal with the challenges of introducing its disruptive innovation into an existing, multisided industry ecosystem.

RESEARCH CONTEXT AND METHODS

We chose TiVo and the U.S. TV industry ecosystem to conduct an exploratory study for a number of reasons. First, the events that unfolded as TiVo introduced its disruptive innovation (the DVR) represent a “revelatory case” (Eisenhardt and Graebner, 2007). Second, the TV industry ecosystem comprises multiple sides such as broadcast networks and content providers, advertisers, content distributors, hardware manufacturers, audience measurement and ratings firms, regulators, and television viewers. Each side, and individual firms within each side, has different interests and motivations vis-à-vis TiVo and its DVR technology. The industry itself has systemic characteristics (Katz and Shapiro, 1985), and exhibits the complex interdependencies associated with multisided platforms (Rochet and Tirole, 2003). All these make TiVo and the TV industry ecosystem a “strategic research site” (Merton, 1987) for the purpose of this study.

Sources of data

Table 1 presents details on our data and sources. We began by gathering extensive longitudinal data on TiVo and the US TV industry ecosystem from publicly available archival sources (e.g., news articles,

commentaries, product reviews, legal briefs, white papers, analyst reports) between the years 1995 (two years before TiVo's precursor firm was founded) and 2012 (for examples of prior studies relying on archival material, please see Garud *et al.*, 2002; Joseph and Ocasio, 2012). We gathered this data by searching multiple databases such as ABI/INFORM Global, Mergent Online, Lexis-Nexis and ThomsonOne using key words such as "TiVo", "DVR", "PVR", "disruption", "television", "content", and "service". We also gained access to scholarly articles and business cases on the U.S. television industry ecosystem and TiVo from a variety of sources including the *Harvard Business Publishing* website, the *Social Science Research Network*, *JSTOR*, and journals such as *MIT Technology Review*, *New Media and Society* and the *Journal of Interactive Advertising*. These publications dealt with the initial relationships among key incumbents of the U.S. TV industry ecosystem, the unfolding of DVR technology, the respective positions of TiVo and industry incumbents, and the changing behaviors of television viewers as the DVR was introduced. Besides, we downloaded all the US patents awarded to TiVo from the US Patent and Trademark Office (USPTO) and 'The Lens', and gained access to TiVo's SEC filings (e.g., IPO prospectus, Form 10Qs, Form 10Ks and Annual Reports) and company news releases over the years till 2012. Finally, to ascertain the perspectives of the industry regulator and diverse industry participants on DVRs in general and TiVo in particular, we downloaded documents published by the Federal Communication Commission (FCC) and key industry associations such as the National Cable and Telecommunications Association and the Motion Picture Association of America.

-- Table 1 here --

In addition to archival sources, following Danneels (2010) and Capaldo (2007), we interviewed seven current and former senior executives of TiVo over the phone or in person, including one of its founders, CEO, CFO, Head of Design, and a former president. These executives had been intimately involved in several key facets of TiVo at various states of its evolution, including the development of technology, forging of relational ties, and strategy formulation. We started our open-ended interviews by requesting the informants to describe TiVo's evolving relationships with the other members of the

ecosystem and the changes to TiVo's technology platform over time. In addition to these interviews we conducted, we also accessed audio-video files (and in some cases, transcripts) of 24 interviews of TiVo executives (including company founders, CFO and Senior Vice President and the current CEO) conducted by others between 2002 and 2012. All in all, we had access to 31 interviews. These interviews confirmed what archival data also highlighted, and at the same time, enabled us to gain a deeper and more nuanced "insider's view" on the different strategies of the management team over time as it dealt with the ecosystem.

Data analysis

There are several advantages of using diverse longitudinal data generated from multiple sources. *First*, as Burgelman (2011:594) noted, "historical methods are inherently concerned with longitudinal development, and involve reconstructing the unfolding of individual and collective action patterns leading up to relatively unique events." *Second*, triangulation across these data (Jick, 1979) led to greater confidence in our findings, and enabled us to identify key themes. As suggested by Van de Ven and Poole (1990), we identified key actors in the ecosystem (e.g., TiVo, content providers, content distributors, hardware manufacturers, ratings & measurement firms, viewers, regulators and industry associations), associated contextual factors, and the outcomes or effects (e.g., positive or adding value vs. negative or disruptive) on TiVo and others.

Based on this analysis, we wrote a detailed 24-page case narrative of the events (Langley, 1999; Van de Ven and Poole, 2005). One TiVo executive read the case and verified that the details and our interpretations of events were accurate. This step represents a member check (Lincoln and Guba, 1985) to confirm the accuracy and adequacy of the data and the interpretations. To generate the themes that we report here, we constantly compared data from various sources with our emerging theoretical insights (Glaser and Strauss, 1967; Strauss and Corbin, 1990). We used NVivo 10 to identify key sub-themes and

themes in our data (Table 2 is an abridged examples of the larger analysis). We present the findings of our analysis using an abbreviated version of our case narrative to offer readers an overall context.⁴

-- Table 2 here --

NAVIGATING THE DISRUPTOR'S DILEMMA

The origins of the disruption from DVRs can be traced to 1999 when TiVo first introduced its DVR box into the TV industry ecosystem. TiVo's DVR box contained a hard drive that made it possible for subscribers to record television programs in digital form. Its services included an up-to-date electronic program-guide, the possibility to replay and watch recorded programs at viewer's convenience, and an ability to fast-forward through commercials to generate a more seamless TV viewing experience. In addition, the digital technology enhanced by two-way connectivity (initially through a phone line) had the potential to transform television viewing into an interactive experience.

Prior to TiVo's introduction of its DVR technology and service, the traditional television-broadcasting model rested on "the logic of linear flow," with strategic program schedules designed by content providers to capture viewers' attention around which advertising revenues could be generated, especially during prime time. Consistent with this broadcasting model, the TV industry ecosystem during the late 1990s comprised multiple sides or groups of entrenched and interdependent incumbents. Television viewers, who valued access to interesting programs/content, constituted one side. Content providers – cable networks (e.g., Disney, ESPN, Discovery), broadcast networks (NBC, CBS, ABC and Fox) and movie studios (e.g., Universal, Sony) – constituted another side. Content distributors – cable and broadband providers (e.g., Comcast, AT&T, Cox) and satellite providers (e.g., DirecTV, Dish Network) – collated programming to offer various packages of content that viewers could subscribe to. To do so, they relied on technologies and products supplied by hardware manufacturers (e.g., set-top box manufacturers such as Scientific Atlanta and Motorola, and consumer electronics firms such as Sony and Philips). Advertisers who attempted to reach television viewers (i.e., consumers of their products and services) by

⁴ A detailed 24-page chronological case validated by a senior executive at TiVo is available upon request from the authors.

purchasing commercial spots on popular channels and programs constituted yet another important side. Not surprisingly, audience measurement and market research firms (such as Nielsen) were also important. They kept track of the programs that were popular with television viewers so that interested players such as content providers, content distributors and advertisers could fine-tune their respective offerings. Finally, overseeing all members of the industry ecosystem was the Federal Communications Commission (FCC), the regulatory body that maintained appropriate decency standards for broadcast content and also ensured that few powerful firms did not gain control of either content or distribution. Though these different sides had negotiated revenue/profit-sharing arrangements among themselves, their relationships were inherently conflict-ridden over who controlled access to television viewers and how value created from such access was appropriated.

In introducing its DVR, TiVo's strategy was to offer a platform that would result in a significant departure from the traditional television-broadcasting model and the relationships and negotiated agreements that this model implied. As noted in TiVo's final IPO prospectus (1999:3):

The TiVo Service allows viewers to watch what they want when they want and creates a richer and more enjoyable television viewing experience by offering viewers greater control, choice, and convenience. The TiVo Service also serves as a new platform for programmers, advertisers and network operators to deliver new types of advertising and in-home commerce.

The introduction of TiVo's services would disrupt many ecosystem incumbents. For content providers, the advent of TiVo's DVR (which enabled recording and time-shifting of programs as well as fast-forwarding of commercials), made it difficult to generate lucrative revenue streams by selling commercial spots during prime time or popular programs. Advertisers and marketers would need to rethink the value of the prime time "30 second spot" (Buell, 2001) and find new ways of reaching viewers who could now fast-forward commercials. Audience measurement and ratings firms such as Nielsen also would be adversely impacted, as measuring/monitoring viewers' preferences and behaviors would become significantly more difficult. Equally importantly, the DVR had the potential to compromise the hitherto direct access to viewers that content distributors (i.e., cable and satellite providers) enjoyed

through their distribution platforms. It was possible that TiVo's DVR could replace the proprietary cable or satellite set-top boxes, thereby hurting the manufacturers of these devices. In other words, TiVo and its DVR stood to disrupt the existing relationships forged between TV industry incumbents and, thereby, their business models and value propositions that were based on the traditional broadcasting model.

Our analysis of TiVo's attempts to enter and establish itself into the TV industry ecosystem by offering such a potentially disruptive platform reveals three key themes. First, TiVo confronted several co-opetitive tensions and challenges because it was perceived as a disruptive force by the existing industry ecosystem. Second, TiVo had to make continual adjustments over time to address these co-opetitive tensions, rendering its strategy emergent. Third, TiVo's DVR platform and its relational positioning within the ecosystem evolved over time as a consequence of continual adjustment.

Theme 1: Co-opetitive tensions and challenges in disrupting existing ecosystem

Our first theme underlines the disruptor's dilemma, i.e., the challenges and tensions disruptors confront in seeking the support of the very firms they disrupt in an existing ecosystem. An analysis of the data revealed three co-opetitive tensions – intertemporal (i.e., short term vs. long term), within dyadic relationships, and across relationships spanning multiple dyads and multiple ecosystem sides. We discuss each in greater detail.

Intertemporal co-opetition. Even at its inception, TiVo tried to gain buy-in from ecosystem incumbents by offering a vision of future benefits from its DVR platform. For instance, TiVo's services would generate fine-grained and real-time understanding of viewer preferences and behaviors. TiVo would also offer new interactive ways for advertisers and content providers to reach viewers, thereby transforming the passive consumer experience of viewing commercials on TV into an interactive experience tailored to specific consumer needs. A TiVo executive we interviewed described the company's strategy as "build it and they will come."

Despite the possibilities of reaping these benefits in the future, incumbents felt the disruptive effects from the introduction of TiVo's innovation immediately. Indeed, as one TiVo founder we

interviewed observed, “Our DVR was especially disruptive to the networks (i.e., content providers) and advertisers”. It was therefore not surprising that reactions to the DVR were negative: “[D]VR is fast becoming a four-letter word in some advertising and media circles” (Forkan, 2000: 18). This strong negative reaction is exemplified by TiVo co-founder Mike Ramsey’s recollection during an interview,

And, when they [ecosystem incumbents] saw this thing [TiVo’s DVR], they’d just go completely nuts... (and show) every emotion [such as]...anger, hate...And not only did they have a negative reaction and throw us out of their office...but they talked to the press...and would tell them that we were evil and that, if this took off, it was going to have a massive negative impact on the US economy, and all sorts of doomsday kind of statements (iinnovate.blogspot.com, 2006).

Not surprisingly, industry analysts and the popular media too portrayed the DVR as a disruptive technology. For instance, the headline of the lead article in the New York Times Magazine (Lewis, 2000) proclaimed: “The End of the Mass Market” and discussed “how new television technology could destroy advertising as we know it.” In February 2000, Forrester Research analyst Josh Bernoff’s report on personal video recorders (another industry term used to denote DVRs), was titled: “The End of TV (As We Know It).” Analysts also noted how TiVo had the “potential to change how people watch[ed] TV” (Greenberg, 2000) and how television viewers rapidly were becoming “used to the idea that they never have to watch a commercial again” (Walker, 1999).

Such media rhetoric, in turn, heightened the disruptive threat perceived by ecosystem incumbents, thereby making it even more difficult for TiVo to gain acceptance for its innovation. A former executive and member of TiVo’s founding team recalled the initial response from media companies: “When I first approached the CEO of Turner Broadcasting (a key media company), the first thing he said to me was: This is a cancer on my business, so what is it that you really wanted to talk about?” Barry Diller, USA Networks chairman, reportedly asked TiVo executives who sought his support: “Let me see if I understand this. All the other companies are investing in you so they can preside over their own demise?” (quoted in Chen, 2001). Reflecting on the reactions that TiVo encountered during early years, a former TiVo executive observed: “They [the media companies] were already on razor-thin margins and it was logical for them to think of short-term effects on their business.”

The potential for future benefits for ecosystem members along with perceptions of immediate disruption generated counter forces for competition and cooperation between TiVo and incumbents that we label as intertemporal co-opetition. Intertemporal co-opetition represents a situation where a newcomer can offer ecosystem members benefits that might materialize only in the future while disruptive effects are felt immediately. In such situations, particularly threatening to incumbents is the uncertainty about how a disruptor's innovation will redistribute future revenues and profits among ecosystem members. Consequently, despite potential future benefits, it is likely that the newcomer will not gain ready support for its innovation.

Dyadic co-opetition. Realizing well the incumbents' adverse perception of the company and its DVR, TiVo's executives attempted to appease incumbents by emphasizing the immediate benefits that its innovation could offer. For instance, TiVo founder reported how, in a conciliatory gesture to the industry, TiVo chose not to offer a commercial skip button (unlike its competitor Replay TV), instead opting to give its subscribers the option to fast-forward commercials. The TiVo founder commented, "If you are going to take something away with one hand, you have to offer something else with the other."

In addition, TiVo hired an executive familiar with the media industry to reach out to ecosystem incumbents. This executive, an early member of TiVo's executive team, explained TiVo's initiatives to establish relational ties with ecosystem incumbents who stood to be disrupted:

It was clear that we needed to create relationships with the media industry. So, we started with people that I knew and began to explain through marketing, humor and vision where the world was moving for media/entertainment, and where the world could move with interactive TV/marketing that our DVR can provide. *Our intention was to find the champions of innovations within the organizations that we wished to partner with.* We wanted to embrace some of the forward-thinking media executives who saw the business potential of the DVR and wanted to take part.

The company also formed collaborative ventures such as *The National In-Home TV Lab* (with Nielsen and ASI Entertainment) to study how television viewers use new technologies such as the DVR. TiVo's founder noted that they persisted with their efforts to forge collaborative relationships with industry incumbents despite being rebuffed: "We knew that there will be a lot of resistance. We were

thrown out of the office the first time and we just said that we will come back another time.” For instance, in collaboration with advertising partners, TiVo developed interactive, customized advertising tools to reach television viewers (TiVo 10K report, 2000: p. 8).

Such persistence despite resistance by identifying people in the disrupted companies who could creatively work with TiVo generated initial cooperation from incumbents such as AOL Time Warner, DirecTV, CBS, NBC and Disney. These companies were all early investors in TiVo. According to an executive, these investments were prompted by a desire by these incumbents to “keep tabs” on the TiVo’s new technology’s potential as well as the threat it posed to them. A network executive offered another motive: “NBC wanted to have a very loud voice in this” (Tedesco, 1999).

Another example of such cooperation was the joint initiative between TiVo and Nielsen to gather data on how viewers would use the DVR technology. TiVo’s technology enabled the measurement of viewing behavior not just during live broadcasts but also when viewers recorded shows and watched them later. This offered fine-grained information for advertisers and content providers, and led to a new way of measuring viewership, thereby making Nielsen’s ratings more valuable to its clients.

However, any such cooperation with TiVo also was accompanied by fear and mistrust on the part of wary incumbents. Even early investors were unsettled by the DVR’s ability to record content in digital format, as this would render valuable content produced by these companies worthless in the market. To safeguard their content and revenue streams, content providers (including TiVo’s investors such as AOL Time Warner, Discovery and Disney) formed a consortium called the *Advanced Television Copyright Coalition* and demanded that DVR companies such as TiVo license the content that viewers recorded for watching later.

Likewise, Nielsen, which had agreed to collaborate with TiVo, realized that fine-grained measurement made possible by TiVo’s technology would continue to raise questions about the accuracy and value of its established methodology for measuring viewer preferences and behaviors. Therefore, to

avoid being blindsided, Nielsen forged competing collaborative initiatives such as the one with Gemstar-TV Guide International to measure interactive program guide usage by DVR users (Donahue, 2004).

Such tensions were evident even in the TiVo-DirecTV partnership. DirecTV, the satellite television provider and TiVo's early mass distribution partner, simultaneously engaged in competing initiatives with companies such as Microsoft and AOL, which also were developing interactive television technologies. TiVo, for its part, was also pursuing potential collaborations with other content distributors by conducting limited trials of its DVR service with Comcast and AT&T Broadband, both competitors of DirecTV.

These dynamics illustrate the simultaneous presence of cooperation and competition in the dyadic relationships between TiVo and other members of the TV industry ecosystem. Gnyawali and Park (2011) studied similar dyadic co-opetition between Samsung and Sony, two industry "giants". In contrast, TiVo was a new startup that had to deal with large firms with entrenched positions in the industry. Capturing these co-opetitive tensions, one TiVo executive observed: "Early on, the networks and advertisers couldn't decide whether to sue us or buy the company" (quoted in Wathieu and Zoglio, 2005).

Multilateral co-opetition. While it was difficult enough to contend with intertemporal and dyadic co-opetition, it was all the more difficult to manage them multilaterally (i.e., across multiple dyads and multiple ecosystem sides). To successfully navigate multilateral co-opetition, a firm must manage relationships across a set of stakeholders, with changes in one relationship affecting others (Adner, Oxley and Silverman, 2013; Brandenburger and Nalebuff, 1996). Such multilateral co-opetition was inevitable, given the pre-requisites for TiVo to create a critical mass across the various sides. As an equities research analyst explained:

The long-term success of TiVo depends on its ability to quickly build a large subscriber base, integrate its functionality into a broad range of consumer electronics products, and develop new services and programming to enhance the TiVo service. In order to achieve these goals, the company has aggressively pursued strategic partnerships with cable and satellite network operators, television programmers, consumer electronics manufacturers, marketing support partners and suppliers of key components of the TiVo technology. (Miller, 2000: 12)

TiVo began building a value network around its DVR to make it a viable platform and to offer a

compelling value proposition to potential subscribers of its DVR service. However, in doing so, TiVo upset the precarious balance that existed in the relationships and revenue/profit sharing agreements of incumbents within the TV industry ecosystem. Placating one side inevitably upset another as exemplified by TiVo's attempts to build a critical mass of subscribers to its DVR service. Beginning July 2000, TiVo launched an aggressive \$150 million marketing campaign that emphasized the disruptive nature of its DVR service and the convenience it offered to television viewers. For instance, one TiVo commercial showed a television network executive being thrown out of a window with a voice in the background saying, "Who needs them?" and a message in bold letters stating: "Program your own network. TiVo, TV your way." When asked about this commercial, a founder observed that

These ads were not aimed at industry but at consumers with a message to take control of the TV instead of letting the TV control you. For most people, the TV was not broken and they did not perceive a problem. So, we had a huge problem to educate the consumers.

However, as an industry analyst noted: "This [TiVo's campaign] angered the networks with whom TiVo was trying to partner, but did not help consumers understand what the TiVo service did" (quoted in Gartner, 2005). Indeed, several networks including CBS (an early investor in TiVo) refused to air the company's commercials that portrayed them in a bad light. When asked about this approach, the CFO (formerly Director of Strategy) observed: "We had to create buzz and grab the attention of consumers. But, this also meant that we were predicting the downfall of incumbents and making enemies. It took us a while to repair these relationships later on."

Multilateral tensions were evident in TiVo's complex relationship with satellite provider, DirecTV. To jumpstart their installed base, TiVo partnered with DirecTV in 1999 to mass distribute TiVo service-enabled DVRs to DirecTV's subscribers. As a direct consequence of this relationship, TiVo's subscriber base increased from 151,000 in early 2001 to 1.33 million in 2004. However, the service fees from subscribers obtained through DirecTV reportedly amounted to less than 10% of TiVo's annual revenues. Building the company's subscriber base hurt its profit base. This tension spilled over to other sides when DirecTV was acquired by content provider, News Corp. Soon after the acquisition, DirecTV announced

its intention to switch to an in-house DVR technology developed by a News Corp subsidiary in preference to TiVo's DVRs.

Another example of multilateral co-opetition is illustrated by TiVo's announcement of a partnership with Netflix in 2004. This partnership involved the joint development of a service for TiVo's subscribers to download movies to their DVRs over the Internet and watch them at their leisure. Forging a relationship with Netflix, a content distributor, spilt over as a tension to another ecosystem side, the content providers. Specifically, movie studios became concerned about the lack of adequate safeguards against piracy of their valuable content and the potential for a significant loss of revenues. In response, they refused to license their content to this partnership, thereby stalling TiVo's and Netflix's initiative till 2008.

Theme 2: Continual adjustment as an emergent strategy

How does a disruptor deal with the tensions due to intertemporal, dyadic and multilateral co-opetition? We address this question in this second theme that emerged from the analysis of the data. As our discussion of various co-opetitive tensions shows, TiVo realized the disruptive potential of its DVR right from the very beginning and made efforts to simultaneously engage with multiple sides of the TV industry ecosystem. While these initiatives served to somewhat mitigate some of the tensions with incumbents, other tensions erupted in the ecosystem. Securing and sustaining incumbent cooperation remained a formidable challenge.

In a few cases, tensions were hard to reconcile, such as the one between TiVo and Nielsen. Given its co-opetitive relationship with Nielsen in developing new ways of measuring viewer preferences and behaviors, and its own vision of monetizing such measurements through new services offered to advertisers, TiVo realized that this tension could not be resolved satisfactorily. When asked whether TiVo's initiatives with advertisers would make Nielsen's service less valuable, a TiVo executive responded: "I think that's happening whether TiVo offers an advertising product or not. Advertisers are

already putting pressure on Nielsen and the networks with respect to program ratings and whether it's a viable currency" (quoted in Kerschbaumer, 2005).

In yet other cases of dyadic co-opetition, TiVo continued to engage with potential partners till a mutually acceptable balance could be achieved. For instance, Comcast began an initiative in 2000 to conduct limited trials of TiVo's DVR with its subscribers. However, modifying TiVo's technology to work with legacy cable systems and proprietary set-top boxes proved challenging and TiVo's inability (or unwillingness) to make these changes resulted in Comcast deciding to introduce its own generic DVR in 2003 and becoming a competitor. Despite this setback, TiVo's executives persisted in wooing Comcast and eventually signed an agreement in 2005 to offer TiVo's service on Comcast's DVRs and also to collaborate on joint development of an interactive platform. Even after this agreement was signed, it took the companies nearly two more years to resolve technological incompatibilities and introduce the TiVo service on a limited basis to Comcast subscribers in New England. Such persistence, however, paid off for TiVo in the form of several agreements with cable and broadband providers (such as Cablevision and Cox) to offer TiVo service, and the repeated extension of the distribution agreement with DirecTV even after DirecTV began to offer its own DVR technology.

While such strategic adjustments mitigated dyadic tensions, TiVo's initiatives to engage with members of one ecosystem side also spilt over to another side, highlighting multilateral tensions. In these cases, TiVo switched dynamically to engage with the side experiencing negative spillovers so as to balance these tensions. For instance, consider the events that unfolded because of the multilateral tension between TiVo's subscribers on the one hand and content providers and advertisers on the other. As noted earlier, time-shifting of programs and fast-forwarding of commercials compromised advertisers' and content providers' efforts to reach television viewers as prime time viewing of programs could no longer be guaranteed. To address this tension, TiVo offered content providers and advertisers new options such

as Network Showcases and TiVo Advertainment.⁵ TiVo even resorted to contests and prizes to entice its subscribers to watch commercials. These moves caught the attention of Walter Mossberg, *The Wall Street Journal*'s influential reviewer and critic of consumer technology products, who complained that TiVo makes “annoying efforts to get you to watch certain shows. TiVo presents you with network showcases which are really just come-ons. TiVo also tries to suggest shows to you, and will record them to your hard disk unless you opt out. That ‘feature’ makes Personal TV less personal” (Mossberg, 2001). A TiVo executive, who oversaw DVR design, explained the difficult balancing act involved in staying true to its commitment to subscribers while at the same time catering to the needs of other ecosystem sides such as advertisers:

We draw a line and come back to core principles about how we like to be perceived by the customer. Is it worth the additional ad revenue to alienate our customer base? Word of mouth has always been a huge part of TiVo, we don't have a huge advertising budget. So you have to weigh any short term business boost you might get for doing something that poisons your brand that'll stop people from talking about it anymore... We really focus on what is the right balance on what the consumer needs and what the business needs. It's not black and white, so at the end of the day it's finding that “sweet spot.

In response to complaints about giving in to the industry, TiVo introduced a series of new tools to balance its subscribers' interests with those of content providers and advertisers. The guiding principle behind these tools was to give subscribers the choice of whether or not to engage with potentially obtrusive content such as commercials. One such tool was “tagging.” With tagging, advertisers could display a tag or logo with a short message even when TiVo subscribers fast-forwarded a commercial, and the subscriber could choose to watch the full commercial by clicking on the tag. TiVo also offered its subscribers the ability to search for commercials on products or services of specific interest to them. A former executive explained in an interview how such tools converted the typically passive experience of viewing commercials on TV to an interactive experience that offered subscribers information relevant to their specific needs, and therefore received an “extraordinary response” from subscribers.

⁵ Network Showcases are infomercials and previews of movies, programs or products/services that may be longer than a typical commercial spot and offered exclusively to TiVo subscribers. TiVo Advertainment is an advertising program “that allows advertisers to repurpose and edit existing commercials or create entirely new advertainment executions without the usual time constraints for TV spots” (Elkin, 2002).

Events associated with the company's TiVoToGo service in 2004 offer yet another illustration of such dynamic adjustment to balance multilateral tensions. The TiVoToGo service allowed TiVo subscribers to transfer recorded content from their DVRs to their PCs, and later to mobile devices such as Windows Mobile devices and iPods. This service, though offering value to subscribers, alarmed content providers who feared that digital recording and transfer without strong security safeguards would encourage piracy. This prompted the National Football League and the Motion Picture Association of America (MPAA) to petition FCC for disallowing TiVo's new service.⁶ The FCC determined that TiVo's security safeguards satisfied its specifications and approved the TiVoToGo service (FCC 04-193, 2004). Notwithstanding FCC's favorable decision, TiVo voluntarily addressed content providers' concerns by strengthening the new service's security features and limiting the number of devices to which subscribers could transfer content (Bangeman, 2004).

As these illustrative examples highlight, TiVo made continual adjustments to its strategy even as its attempts to engage with various ecosystem members and sides gave rise to co-opetitive tensions and spillovers. Such adjustments were facilitated by a change in management during 2002-03 and the attendant change to a more business oriented, collaborative mindset that emphasized the need to become an integral part of the industry ecosystem. As the CFO explained:

Despite collaborating from the beginning, we still had an "engineering" mindset and an "us versus them" mentality. It was not easy to keep talking to DirecTV and Comcast but they became curious when they realized that the company was changing. We showed them that we could be flexible and deal with the complexity of their products (e.g., Comcast's cable systems). Slowly, they realized it was a better deal for them to work with us. All this took time. We began negotiating in 2003 and first deal was in in 2005 and the second in 2006.

These continual adjustments influenced TiVo's technology platform as well as its relational positioning vis-à-vis industry incumbents – the third theme that emerged from our analysis.

Theme 3: Evolution of TiVo's technology platform and relational positioning within the ecosystem

⁶ Earlier, Sonicblue, the owner of TiVo's key competitor Replay TV, had been sued by major movie studios alleging copyright violations because Replay's DVR allowed users to transmit recorded programs to one another over the Internet. Sonicblue filed for bankruptcy in March 2003 and sold Replay TV to D&M Holdings, Inc., a Japanese consumer electronics holding company.

As TiVo engaged with multiple sides and dealt with emergent co-opetitive tensions, its DVR platform and service evolved. For instance, TiVo responded to competition from generic DVRs offered by cable and satellite TV providers by releasing new generations of its DVR with enhanced functionality and features. Examples include DVRs with the ability to access personal content from PCs through the Internet. In addition, as noted earlier, TiVo integrated innovative advertising tools such as tagging, which advertisers could use to offer targeted and interactive commercials to interested subscribers. Besides, partnerships with content distributors and content providers such as Amazon, NY Times, CNET and the NBA increased the content options for subscribers.

With all these enhancements, TiVo's services were evident everywhere, with one analyst noting: "They are like Kleenex. Their brand name defines the entire product category" (quoted in Van, 2005). Later, based on CEO Tom Rogers's talk at Bear Stearns' annual media conference, another analyst noted: "The bottom line: TiVo is in transition from a company that sells subsidized DVR boxes to a company that sells viewer metrics, DVR software as a service over cable boxes, and expensive, unsubsidized hi-definition DVR boxes" (quoted in Frommer, 2008). TiVo's head of design re-iterated this point:

We are content agnostic, so wherever you want to get the content from – whether tape, cable, over-the-air network broadcasts, Netflix, Amazon, Hulu, YouTube – we support all of them on our platform. What we want to create is the best user experience across all those platforms.

TiVo was becoming the "Google of video content" (Grover, 2009).

To further explore this evolution of TiVo's DVR platform, we gathered and analyzed data on TiVo's portfolio of patents. Our analysis showed that TiVo aggressively built its intellectual property. For instance, TiVo's portfolio of patents increased from just 33 in 2000 to 238 in 2011. In addition to patenting internally developed technology, TiVo also acquired or cross-licensed key patents pertaining to DVR technology from firms such as IBM and Digital. Moreover, TiVo continued to extend its existing IP to offer new DVR functionality and new tools and services. Whereas a third of TiVo's patents filed between 1998 and 2011 disclosed new inventions, another third were continuation patents (i.e., additional claims of extensions and improvements of an invention already disclosed in a prior patent) or

continuation-in-part patents (i.e., disclosing a new invention or application partially derived on an invention already disclosed in a prior patent). TiVo's CEO explained the company's patenting strategy:

“Our basic technology can be duplicated. Cable and satellite providers could abscond with our technology so we had to instigate litigation to protect our IP....But we also had to weave our way into the fabric of the media industry. So, we then had to evangelize by highlighting our enhanced user experience and presenting a vision of how our technology can take them to TV's future.”

The CFO agreed: “Patents were a ‘shot across the bows’ to people who dealt with us commercially.” Other TiVo executives too noted the importance of patents in increasing TiVo's bargaining power during negotiations: “Our strategy is “Speak softly but carry a big stick”” and “We prefer to partner with others, but we reserve this (patent protection) for a rainy day if someone comes after us.” However, they also acknowledged the limitations of relying on patents alone. The CEO noted:

“You can't hold a gun to people's head. (With this approach), you can't have the strategic partners that you need. So, you need patents but you also need a superior product going forward. You can extract value from IP but it can't be your backbone like your operating business...Patent earnings can be a band-aid but cannot sustain long-term viability.”

TiVo's increasing technological prowess and its well-differentiated DVR platform resulted in partnerships with dominant content distributors such as Comcast and Cox, offering a degree of legitimacy to TiVo within the TV industry ecosystem. The increase in the company's subscriber base to over 4 million by 2006-07 also made it possible to recruit larger and more representative samples of viewers to track and offer real-time, precise data on viewer behaviors and preferences. In 2006, TiVo started a new division to offer research and analysis to its advertising partners and also introduced services to track and report second-by-second viewing behavior to content providers. Indeed, by 2007, TiVo, in partnership with Starcom, was tracking a panel of 20,000 subscribers to monitor their preferences and behaviors. In contrast, Nielsen's ratings and audience measurements at that time were reportedly derived from a representative sample of just 5,000 television households.

A consequence of all these developments was a shift in its content and service offerings. With these new tools and services, the promised benefits of the DVR to various ecosystem sides began to be realized. Slowly, ecosystem incumbents too began to view TiVo not as an “ad-killer” and destroyer of “television

as we know it” (Dignam, 2000) but as an ad-enhancer and enabler of interactive television. TiVo’s executives used these developments to reframe the company’s relational positioning within the TV industry ecosystem as a ‘connector’ of various sides facilitating collective value creation, instead of a ‘disruptor’ perceived as destroying or appropriating existing value. Speaking directly to the notion of TiVo’s changing role and perception within the industry, TiVo’s CEO Tom Rogers, commented:

Just a few years ago, we were viewed with great paranoia as the disruptor...Our goal now is to work with the media industry to come up with ways to resist the downward pressure of less advertising viewing and create a way for advertising on TV to become more effective, more engaging and closer to the sale. (quoted in Stone, 2008)

He also observed during an interview with us: “We are not just a tech company anymore but a hybrid – we develop both technological capital and media capital.”

Indeed, TiVo was already gaining wider acceptance within the ecosystem, viewed as a sustaining force rather than the initially perceived disruptive influence. For instance, the National Academy of Television Arts and Sciences recognized TiVo with Emmy awards in 2006 and 2007 respectively for its role in pioneering interactive television and an interactive advertising platform. This major change in relational positioning of the company was also manifest in an increasing willingness of key incumbents to partner with the company or to use its services. Partly, such willingness (especially of cable and satellite TV providers) was driven by fear of infringing TiVo’s growing portfolio of patents. As an equities research analyst noted:

Pay TV operators who have not yet properly licensed the right to provide DVR services in the vein set forth by TiVo's patents might well be at risk of patent infringement claims. Therefore, in due time, we think that nearly all Pay TV operators will review their risks and opt to legitimize their DVR offerings. (quoted in Simons, 2008)

TiVo’s platform gained further momentum as both established and new firms adopted its services. For instance, in 2007, NBC Universal began using second-by-second viewership data and ratings information offered by TiVo. Likewise, in 2008, Netflix partnered with TiVo to stream its movies on a variety of devices to TiVo’s subscribers. A TiVo executive commented on the bandwagon effect that key partnerships (e.g., Netflix) generated for the company: “As consumers by the droves began to watch

content on many devices like the iPad, television sets and iPhones, companies like Netflix began to feel, ‘Wow, this is scary; we have got to respond. We have got to work with these guys (TiVo).’ Netflix is now one of our biggest allies, and this has helped to change the perceptions of other incumbents.”

Summary: TiVo’s Emergent Strategy

Clearly, TiVo’s position within the ecosystem had changed since its inception when it introduced a revolutionary product, one that in 2005 won PC Magazine’s third best product of all times, just behind Apple II. A TiVo executive noted that TiVo was continuing to forge ahead from being a company that sold DVRs (which was becoming a commodity) to one that added value through its software, which he likened to “the operating system of a computer.” He noted that, looking forward, TiVo planned to solidify its position within the TV industry ecosystem, which was itself changing to accommodate the concept of “anytime, anywhere television experience” through a multitude of devices and services.

But, this new positioning had not come easily. TiVo’s DVR technology when it was first released, was perceived as being disruptive to the different sides within the TV industry ecosystem. The DVR, as per TiVo’s vision, had the potential to transform television viewing from a one-way, passive experience based on a set schedule to an interactive experience at the viewer’s convenience. Equally important, the DVR would enable advertisers to target specific demographics, making commercials more relevant and informative to television viewers. However, all these benefits depended on TiVo finding acceptance by TV industry incumbents and attaining a critical mass of subscribers for its DVR service. In doing so, TiVo had to gain the support of the very ecosystem incumbents it stood to disrupt. This tension was what we termed as intertemporal co-opetition – whereas the benefits were uncertain and would be obtained only in the future, the threat of disruption was perceived by industry incumbents in the present.

As we discussed earlier, TiVo attempted to mitigate intertemporal co-opetition to the extent possible by presenting a more familiar face to incumbents (hiring executives from the media industry), making conciliatory gestures (e.g., implementing commercials fast forwarding instead of a commercial skip button implemented by a competitor) and engaging with forward-thinking executives within

incumbent firms. Whether motivated by a desire to keep tabs on the threat or to influence the evolution of the technology in ways beneficial to the industry, a set of key industry incumbents chose to collaborate with TiVo initially. Equally important, such gestures were instrumental in TiVo being seen, as a founder noted, “as the good guys, among the disruptors.”

However, any such partnerships initiated by TiVo were beset by dyadic co-opetition because collaborators were still wary of the disruptive threat posed by TiVo’s DVR.. In addition, given the inherently conflict-ridden relationships between the various ecosystem sides, TiVo attempts to engage with multiple incumbents also engendered multilateral co-opetition within and across ecosystem sides. Indeed, for TiVo, any attempt to mitigate one co-opetitive tension frequently resulted in the emergence of other co-opetitive tensions.

It attempted to deal with dyadic co-opetition by persistently engaging with co-opetitors, all the while making its product and services (and thus its brand) more valuable and visible to television viewers and, thereby, making it in their interest to continue collaboration. Indeed, the CFO acknowledged the importance of brand in being able to secure cooperation from incumbents, TiVo also engaged with different sides by introducing new tools that enabled interactiveness and workarounds to the disruptive aspects of the DVR in fast forwarding commercials and time-shifting programming.

When engagement with one side caused negative spillovers to other sides, TiVo switched dynamically to engage with these sides in an attempt to mitigate the tensions due to such spillovers. Indeed, TiVo attempted to strike a balance between the needs and demands of various ecosystem sides by dynamically adjusting its strategy and also its technology to make it more valuable to various sides. However, as our analysis revealed, some tensions were irreconcilable. In such cases, TiVo collaborated to the extent possible and let the residual tensions remain. At an extreme, TiVo even took aggressive actions to protect its intellectual property and limit competition and imitation (e.g., suing DISH for patent infringement). Such aggression had a cost, with TiVo being labelled “as a black hat” by the industry, and the company had to soften its image over time by emphasizing the benefits of its technology.

Over time, such dynamic adjustments paid off for TiVo. With new management installed in 2005 promoting an even more collaborative and accommodating approach, TiVo became more receptive to incumbents' needs in introducing new features, tools and services. With each addition, TiVo's technology platform evolved to offer more and more benefits to key ecosystem sides such as television viewers, advertisers and content providers. With its subscriber base growing to reach critical mass, TiVo now could deliver on its initial vision to offer more targeted and interactive reach to a broad demographic of television viewers. As benefits began to flow to various sides, the tension due to intertemporal co-competition abated, and the relational positioning of TiVo within the industry too changed. The company began to be perceived more and more as a connector facilitating collective value creation instead of a disruptor destroying existing value. Indeed, TiVo's DVR technology had now become a sustaining (rather than the initial perception of a disruptive) innovation enabling the industry ecosystem to evolve to the promised future of interactive television.

DISCUSSION AND CONTRIBUTIONS

We began the paper by asking how a disruptor can address the challenges it encounters in introducing its disruptive innovation into an existing ecosystem. The findings from our analysis of data on TiVo's experiences within the US TV industry ecosystem offered several insights, which we articulated as themes in the previous section. In this section, we use these insights to develop a process model of the disruptor's dilemma and its possible resolution and delineate our contributions to different literature streams.

Process Model

A disruptor faces an evolving set of dilemmas arising from the need to demonstrate value for various members of an ecosystem. While it is difficult to capture all the nuances and complexities in a figure, we nevertheless make an attempt to do so in Figure 1. As we depict in the figure, disruptive innovations are 'double-edged' swords. That is, while some innovations may be breakthroughs with the

potential to spawn new markets, breaking through may also imply breaking apart and disrupting existing industry ecosystem arrangements and fueling strong reactions from incumbents.

This breakthrough dilemma generates several cooperative tensions, viz. dyadic, multilateral, and intertemporal. Observations from the TiVo case highlights how these tensions play out over time and the actions of the disruptor that reduce or enhance the tensions. For instance, consistent with literature on paradoxes (Cameron and Quinn, 1988; Poole and Van de Ven, 2005; Smith and Lewis, 2011) and TiVo's actions, one way is to articulate a holistic frame on how an innovation can eventually complement ecosystem incumbents, thereby transcending dualisms between competition and collaboration. However, such framing is not straightforward, as the TiVo case suggests. In systemic industries, the pain of disruption by ecosystem members is felt in the present, whereas benefits of change only accrue in the future, and that too to the extent that a critical mass can be galvanized around the disruptive innovation.

We have characterized the latter as intertemporal cooperation. To address this tension, the disruptor tries to accommodate some sides of its platform so as to generate critical mass. However, attempts to deal with dyadic cooperation by appeasing one side can generate problems with another. For instance, in its efforts to woo customers with provocative advertisements, TiVo angered distributors. Such spillovers are likely to occur in systemic industries where firms have to deal with multilateral cooperation.

The analysis of the data from the TiVo case highlights how a disruptor performs a juggling act by deploying 'soft power' (Santos and Eisenhardt, 2009; Nye, 2004) which requires using social and political skills (Fligstein, 1997) to secure cooperation from disrupted incumbents. For instance, TiVo recruited a number of high-level executives from the TV industry to build bridges with the very firms it was disrupting. Speaking to the notion of relational advantage (Chen and Miller, 2014), these executives identified and interacted with people in the disrupted organizations who were more willing to work with TiVo to orchestrate the inevitable transition. They also secured goodwill through "equity investment" from incumbents – an alliance mechanism by which entrepreneurs allow partner firms to purchase financial stakes in their ventures (Santos and Eisenhardt, 2009).

Changes in the executive team may be warranted as founding members may face greater difficulties in leading needed transformations in a startup. These dynamics have been observed in other contexts such as in the case of Google, where founders leave executive positions and “hand over the reins” to professional managers to lead the startup to the next level. These transformations in the technology platforms will also be manifest in embellishing the disruptor’s intellectual property base, which the firm can then use to defend its position and secure incumbents’ cooperation. The deployment of such hard power (Nye, 2004) was evident in TiVo’s patent infringement lawsuits. As TiVo’s IP position was upheld in court, it gained bargaining power to establish its position as the operating system of the TV industry.

Besides the deployment of such soft and hard power, the disruptor modifies its technology platform to accommodate the various sides. For instance, in order to collaborate with Comcast, TiVo had to make its software code compatible with cable manufacturers’ offerings. To mitigate tensions with advertisers, TiVo created ad showcases. All these efforts highlight the co-emergence of social and technical structures during the transformation of an industry (Garud and Kumaraswamy, 1995).

However, not everything is in the disruptor’s control as the example between DirectTV and TiVo shows. Specifically, TiVo’s collaborative effort to partner with DirectTV to grow its customer base went awry when DirecTV was acquired by NewsCorp and then began using its own generic DVR technology. In other words, cooperative behaviors in a dyadic relationship can turn competitive when events such as mergers and acquisitions unfold in the industry ecosystem.

Overall, a disruptor has to deal with all three tensions in an interrelated fashion as it draws on soft and hard power, while adapting to unfolding events in the ecosystem. Transformations of the disruptor’s technological platform represent changes in its overall co-opetitive capabilities. For instance, as TiVo’s technology platform transformed to accommodate the various sides, the company morphed from a hardware to a software company. Moreover, with such developments, the nature of value creation and appropriation can change from a zero sum to a positive sum game (Brandenburger and Nalebuff, 1996).

Correspondingly, there is a shift from an ‘egocentric’ view where the introduction of an innovation breaks things apart to an ‘allocentric’ view that emphasizes bringing things together (Lado, Boyd and Hanlon, 1997). For instance, the ongoing adjustment of TiVo’s platform to woo different sides offered the company an opportunity to frame its platform as being sustaining rather than as being disruptive.

Our findings resonate with the recent experiences of companies such as Uber (MacMillan and Fleisher, 2015) and Pandora (Sisaro, 2015). Uber Technologies, a smartphone-based car service has followed a pugnacious expansion strategy as it “barreled” into new markets around the world, sometimes skirting local laws and daring regulators to stop the service. But as fierce challenges from regulators and taxi operators pile up from Portland to Paris to Phuket, executives are trying a new “gentler” “white glove” strategy; compromise and diplomacy. Yet making concessions to appease incumbents would erode its margins or alienate customers – a tension we also observed in our case.

Pandora that delivers audio to mobile devices and dominates Internet radio had antagonized the music industry by pushing for lower royalty rates, and unsustainable payments. Once it became the target of publicized criticism, Pandora sought to repair its relationships in the music world, It created a new division to engage with labels and artist managers, allowed access to its vast databanks, and begun experimenting with artist promotions through the Artist Marketing Platform. Clearly, it is not unusual for disruptors to adopt a more engaging positive sum approach when they face industry backlash and attempt to win back their support.

Navigating the tensions that are generated is not an easy task; it requires the deployment of social, political, technological skills on the part of disruptor. Not only does a disruptor have to establish relational links with existing incumbents, but it also has to pivot its operations (Garud, Lant and Schildt, 2014) to adjust to changing circumstances. Success is never guaranteed, and many firms fail trying (Park and Russo, 1996). TiVo’s ongoing survival despite all the challenges it confronted provides an in-depth view of the process involved in the introduction of a novel innovation from the disruptor’s perspective.

Contribution to Literature on Disruptive Innovation

Ever since Christensen (1997) highlighted the processes through which disruptive innovations eventually destroy an incumbent's core value proposition, the topic continues to attract both scholarly interest (e.g., Danneels, 2004; Govindarajan, Kopalle and Danneels, 2011) as well as popular attention (Lepore, 2014). The internal resource-allocation processes within established firms result in a systematic underinvestment in disruptive technologies. This poses a dilemma for incumbents (i.e., the innovator's dilemma) as to how they might themselves invest in and pursue a disruptive innovation instead of allowing others to disrupt their markets. However, new entrants introducing disruptive innovations into an existing ecosystem also confront a dilemma – how to gain the support of the very incumbents that stand to be disrupted. Complicating matters, many aspiring disruptors also experience “liability of newness” (Stinchcombe, 1965) including lack of legitimacy (Lounsbury and Glynn, 2001), customer indifference (Rosenberg, 1982), incumbent skepticism (Marx, Gans and Hsu, 2014) and lack of co-specialized assets (Teece, 1986), all of which undermine their efforts to successfully introduce and establish their innovations.

By taking a disruptor's perspective, we add to an understanding of the challenges confronted by disruptors and extend the literature on disruptive innovation. *First*, while it has been acknowledged that disruption is not a one shot event or “a carefully planned forward march” but rather a process (Christensen, 2006; Christensen and Raynor 2003), our analysis highlights the co-opetitive tensions that disruptors confront during the process. *Second*, our analysis shows how a disruptor might address these tensions, further extending classical perspectives that view innovations as being either disruptive or sustaining (Christensen, 1997). In contrast to such essentialist views, our analysis demonstrates the strategic actions possible for a disruptor to frame its innovation in alternative ways (cf., Gurses and Ozcan, 2014) and the use of soft and hard power to secure cooperation from incumbents (cf., Santos and Eisenhardt, 2009). Specifically, such reframing involves a change in emphasis from the “disruptive” aspect of the innovation that upstages established incumbents, to the beneficial aspect of the innovation that can enhance the value generated for and by various incumbents within the ecosystem. *Third*, while

disruptive innovations have often been characterized as having an impact on specific incumbent firms (typically direct competitors), our analysis demonstrates how such innovations may affect the entire ecosystem by reconfiguring the interdependencies among various ecosystem members. This dynamic is not limited to TiVo. Polaroid's landmark innovation, the SX-70 camera affected the entire photography ecosystem, including Polaroid's relationships with key stakeholders, such as its film and battery suppliers, Kodak and ESB, respectively (Garud and Munir, 2008). These observations highlight the need for adopting a systemic view of how disruptive innovations can affect various relationships within an ecosystem instead of focusing just on a specific set of incumbents.

Contribution to Literature on Co-opetitive Dynamics

Insights from our analysis confirm and extend prior observations on co-opetition. Co-opetition between two firms is walking “a fine line between cooperating with partners in good faith and maintaining a posture of vigorous competition with rivals” (Gnyawali, He and Madhavan, 2006: 509; Bengtsson and Kock, 2000). Besides such dyadic tension, we highlight how disruptors must navigate dependencies and consequent spillovers across multiple ecosystem sides (i.e., multilateral co-opetition) to realize the value proposition inherent in the innovation. This leads to a continual shift in the balance between cooperation and competition (Gnyawali and Park, 2011). However, as this study shows, shifts in this balance may not just be an objective function of an innovation's technological features or broader environmental conditions, but also because of a change in perceptions. Indeed, as we observed earlier, a reframing of the disruptor's relational positioning within the ecosystem – especially once benefits start accruing to various sides – may result in it being perceived more as a connector or partner than a disruptor. Change in perceptions thus offers an additional explanation for the shifting balance between cooperation and competition.

In addition, we highlight yet another kind of co-opetition – intertemporal co-opetition, i.e., how a disruptor has to gain cooperation from incumbents it disrupts with promises of benefits that might accrue only in an uncertain future. This is a classic “chicken-and-egg” problem, or the challenge of attracting

sufficient number of adopters under uncertainty to build critical mass on different sides of a platform (Caillaud and Jullien, 2003; Evans, Hagi, and Schmalensee, 2006; Rochet and Tirole, 2003). The disruptor may attempt to set future expectations through projective stories to attract support of ecosystem members (Garud, Schildt and Lant, 2014). However, such expectations may also serve as a source of future disappointments (Ansari and Garud, 2009), especially when a disruptor's attempts to accommodate one side create problems for another. For instance, when ad-free television viewing attracted subscribers but disrupted advertisers, TiVo's efforts to make ads more appealing to placate advertisers ended up disappointing subscribers. Failure to manage such disappointments may result in a loss of legitimacy among certain ecosystem members and initiate a snowball effect with more serious and systemic consequences. Such considerations further complicate the dilemma confronted by the disruptor, and highlight the importance of the continual juggling act a disruptor must perform to cope with these diverse tensions.

Contribution to Literature on Industry Ecosystems and Strategy as Process

Studies on industry ecosystems have shown how interdependent firms must work together to co-create value, and how the success of one firm depends on the success of others (Adner *et al.*, 2013). However, there is a presumption that pre-meditated roles and links among ecosystem members already exist and remain stable over time. By contrast, this study highlights the evolution of existing rules, roles and relationships within the ecosystem, even as the disruptor continually adjusts its strategy to deal with emerging co-opetitive tensions. Such continual adjustment by the disruptor through dynamic switching is what Poole and Van de Ven (1989) called "temporal separation," i.e., the separation of the tensions and then dealing with them across time. To do so, a disruptor has to deploy both "social" and "political" skills (DiMaggio, 1988; Fligstein, 1997) to successfully adjust its strategies and relationships with various sides within the ecosystem. Eventually, as in TiVo's case, an effective use of both these skills can potentially lead the way for a more collaborative strategy of engagement instead of a disruptive strategy of confrontation.

As the disruptor tries to accommodate different sides of the ecosystem, not only does its innovation itself evolve, but also the existing rules, roles and network of relationships among different ecosystem members (including the disruptor). This co-evolutionary process continues till such time an overall collective frame emerges within the ecosystem, one that can hold together the different actors around the innovation and keep the overall ecosystem in a delicate balance. This represents a shift in the disruptor's relational positioning within the ecosystem from a standalone approach that entails exploiting other parties (*tertius iungens*) to an integrated approach that links disconnected parties through combinative activity (*tertius gaudens*) (Obstfeld, 2005).

These insights also add to the literature on strategy as process (Bower and Gilbert, 2005; Mintzberg, 1978; Mintzberg and Waters, 1985), which has seen resurgence of late (e.g., Mirabeau and Maguire, 2014). Our study shows that disruptive strategy is an uneven process that does not follow a natural trajectory or logic set in advance. Instead, it requires “muddling through” (Lindbloom, 1959) and “logical incrementalism” (Quinn, 1980) as a disruptor transforms its technology platform and relational positioning within an ecosystem that is co-emerging. Eventually, as the ecosystem itself changes to accommodate the disruptive innovation, the disruptor can shift its relational positioning from that of a value destroyer to a value creator, and thereby convert ‘head-winds’ to ‘tail-winds’. Overall, our analysis shows how disruptors can dynamically adapt their strategic choices vis-à-vis incumbents to gain a foothold within the ecosystem, without stirring up excessive hostility and retaliation (Carmeli and Markman, 2011; Kotha, Zheng and George, 2011; Markman and Waldron 2014) but instead establishing symbiotic relationships with ecosystem members.

LIMITATIONS, BOUNDARY CONDITIONS AND FUTURE RESEARCH

Dynamics accompanying the introduction of disruptive innovations into an existing ecosystem typically unfolds over several years, as is evident in TiVo's experiences with its DVR and the TV industry ecosystem. To gain an understanding of these dynamics, we require longitudinal data that is gathered in real time. Emulating others, we addressed this limitation by gathering data from multiple

sources and by using well-established analytical techniques such as triangulation. Our interview of senior TiVo executives, and the validation of our case narrative increased confidence in both our data and our interpretations. From the data that is available, we can only infer the challenges that must arise within startup firms in dealing with external tensions and the prioritization of goals to address them in real time. This limitation affords an opportunity for future research, to the extent that such data can be collected in real time as disruptive dynamics unfold. This can shed light on the relativity of disruptive innovations and how they may differentially impact incumbents (Danneels, 2004). Some innovations may begin as disruptive but end up as sustaining while some apparently sustaining innovations may become disruptive (Garud and Munir, 2008). It is worth examining these dynamics across a broad range of contexts.

A second area for future research suggested by our study pertains to co-opetitive tensions. While researchers have studied co-opetitive dynamics within dyadic relationships, the tensions and dynamics associated with multilateral and intertemporal co-opetition remain underexplored. Several questions arise in this regard. How do industry incumbents band together to deal with a disruptor despite their differences? How does a disruptor generate a vision of the future that is compelling enough to persuade incumbents to support its innovation despite the clear and present threat of disruption? Also, how might a disruptor's efforts to muddle through in attempting to address various co-opetitive tensions affect its legitimacy and its relational positioning within the ecosystem?

Yet other research opportunities emerge when we consider boundary conditions applicable to our study. The TV industry ecosystem is one with multiple sides. However, different ecosystems may have different characteristics, some with multiple sides and others without, some closed and others open, and some stable and others with the capacity to evolve (Koenig, 2012; Moore, 2006; Wareham et al., 2014). To the extent that the ecosystem is closed and does not have multiple sides, multilateral co-opetition may be less of an issue. To the extent that an ecosystem is open and unbounded, disruption in one industry ecosystem may reverberate across others associated with it. For instance, Skype's innovation may disrupt ecosystems not just in the communications industry but also in the travel industry. Similarly, driverless

cars may impact not just the automobile industry but also the insurance, energy, car service and repair industries. These issues are worth examining in greater depth.

In conclusion, our study builds upon existing literatures to offer new insights. In doing so, it also opens up new avenues for research. Specifically, by theorizing about the disruptor's dilemma, it sensitizes scholars to dynamics associated with disruptive innovations over time and the diverse co-opetitive tensions that a disruptor must manage. This is a challenging task, especially in systemic industries. Additional and complementary research can help refine the themes we develop in this paper.

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Table 1: Data Sources

Data Source	Details
Interviews	<ul style="list-style-type: none"> • Interviews of seven senior current and former TiVo executives, including one founder, CEO, CFO, Head of Design and former President. Interviews conducted telephonically or during visits to TiVo headquarters during January-March 2015. • 24 audio/video files or transcripts of interviews (ranging from 3 minutes to 36 minutes between the period 2002-2012) of TiVo executives (e.g., founders, Michael Ramsay and Jim Burton, CFO and Senior Vice President, Corporate Development & Strategy, Naveen Chopra and current CEO, Tom Rogers) and industry analysts conducted by journalists in news programs (e.g., Bloomberg TV, CNBC, Fox News, NPR, CNET Reporter’s roundtable, etc.) • Interviews of TiVo executives published in news articles by the business press and trade press. • Interviews published in books (e.g., Jessica Livingston, <i>Founders at Work: Stories of Startups’ Early Days</i>, Springer-Verlag, 2007) • Transcripts and commentaries of interviews from online blogs (e.g., WSJ’s All Things Digital, Engadget, PVRblog, inovate.blogspot.com, thomashawk.com) • Quotes from TiVo executives, industry executives and industry analysts included in Harvard Business School and Northwestern Kellogg School cases on TiVo, academic articles, and articles published in the business/trade press.
Published articles and comments/commentaries on TiVo and industry from databases such as Lexis-Nexis and ABI/INFORM Global, and Google searches	<ul style="list-style-type: none"> • Articles published between 1995 and 2012 in: <ul style="list-style-type: none"> • Business press (e.g., Wall Street Journal, New York Times, Fortune, Business Week, Economist, CNN Money, etc.) • Trade press (e.g., Advertising Age, Broadcasting and Cable, Multichannel News, Telephony, Marketing News, etc.) • Online blogs (e.g., PVRblog, TiVo Community Forum, DVRplayground, Zatz not Funny!)
Business cases and academic articles published on TiVo and the entertainment/television industries	<ul style="list-style-type: none"> • 7 Harvard Business School and Northwestern Kellogg School cases on TiVo (authors of cases include David Yoffie, who serves as a Director in TiVo’s Board) • Academic articles downloaded through keyword searches of SSRN, JSTOR and Google Scholar.
TiVo website, and other sources (e.g., SEC Edgar, Internet Archive)	<ul style="list-style-type: none"> • SEC filings (IPO prospectus, Annual reports, 10-Q reports and 10-K reports between 1999 and 2012) • News releases (since founding to 2012) • List of US patents covering technologies used in TiVo’s DVR products/service
Company and industry directories, Trade/industry association websites	<ul style="list-style-type: none"> • Company histories on key industry players from directories such as Gales Directory, Hoover’s. • Industry reports/outlook and publications from Standard & Poor’s, Moody’s. • News releases and reports published by industry associations (e.g., National Cable and Telecommunications Association, Motion Picture Association of America)
Analysts reports downloaded from Mergent Online and ThomsonONE databases	<ul style="list-style-type: none"> • 54 equities analysts reports (e.g., JP Morgan, Credit Suisse First Boston, Janney Montgomery Scott, Piper Jaffray, etc.) and industry analysts reports (e.g., Gartner Group, IDC) on TiVo and DVR/television/entertainment industries between 1998 and 2012
Federal Communications Commission website; Google searches	<ul style="list-style-type: none"> • FCC news releases • Transcripts of speeches made by FCC commissioners at trade and industry associations/conferences • FCC industry reports • Filings, comments related to FCC rulemaking and reports (downloaded by keyword search of FCC’s Electronic Comment Filing System and Electronic Document Management System) • Court appeals, briefs filed by industry actors and interest groups subsequent to FCC rulemaking
US Patent and Trademarks Office database and The Lens (http://www.lens.org/about/)	<ul style="list-style-type: none"> • US patents awarded to TiVo between 1998 and 2012

Table 2. Abbreviated Chronology of Events: TiVo and the U.S. Television Industry

Year	Events
1998	<ul style="list-style-type: none">• Teleworld, Inc., incorporated in 1997 by Jim Barton and Mike Ramsay, renamed as TiVo.
1999	<ul style="list-style-type: none">• TiVo strikes mass-distribution deal with DirecTV• First TiVo DVRs introduced, in collaboration with Philips• Replay TV, a competing DVR/service launched.• TiVo secures funding from a cross-section of TV industry ecosystem incumbents such as Showtime, NBC, DirecTV, Disney, Comcast Interactive, Cox, Liberty Media, TV Guide and AOL.• TiVo launches Showcase commercials that its subscribers can opt to watch from its menu.• TiVo completes IPO raising \$88 million.• Echostar and Microsoft offer box with digital satellite TV tuner, DVR capabilities and WebTV
2000	<ul style="list-style-type: none">• AOL takes 15% stake in TiVo and makes TiVo exclusive DVR provider for AOL TV boxes.• TiVo launches edgy marketing campaign (disparaging networks) to attract subscribers.• TiVo, ASI Entertainment and Nielsen set up National In-Home TV Lab to study use of new technologies such as DVRs by TV viewers.• DirecTV set-top box with integrated TiVo service introduced in the market.• Thomson (RCA) to offer TiVo enabled stand-alone DVRs through Radio Shack.• Replay TV exits selling set-top boxes to consumers and decides to license its technology.
2001	<ul style="list-style-type: none">• Microsoft's Ultimate TV, a competitor to TiVo, launched in collaboration with DirecTV• TiVo creates Advertising Advisory Board, with partners such as Starcom and Omnicom.• ReplayTV acquired by SONICBlue; to return to the market by Fall 2001 with set-top box• EchoStar (DISH Network) releases DISH501, a DVR integrated satellite TV set top box.• TiVo secures patents on key DVR technologies.• TiVo offers prizes and contests to entice subscribers to watch commercials offered by partners.
2002	<ul style="list-style-type: none">• TiVo launches second generation Series 2 DVR.• AOL cancels plans to offer set-top box for AOL TV and returns TiVo stake, but will offer messaging and other services on TiVo DVR.
2003	<ul style="list-style-type: none">• Time Warner Cable, Cox and Comcast to launch cable TV receivers with DVRs.• TiVo launches its first premier service application, the Home Media Option.• SONICBlue files for bankruptcy and sells Replay to D&M Holdings.• Toshiba, Pioneer license TiVo technology for integration into consumer electronics devices.
2004	<ul style="list-style-type: none">• TiVo sues Echostar (parent of DISH Network) for violating its patent.• FCC approves TiVo's TiVoGuard service (to transfer recorded content from DVRs to PCs) against objections by the Motion Picture Association of America.• News Corp. gains control of DirecTV and to use in-house DVR technology instead of TiVo's.
2005	<ul style="list-style-type: none">• Comcast to distribute TiVo-integrated DVRs to its cable subscribers, and jointly develop interactive advertising platform with TiVo.• TiVo offers TiVoToGo, a mobile service to transfer DVR content to mobile Windows devices.• Competitors such as DISH, ReplayTV, Motorola and Scientific Atlanta introduce satellite and cable set-top boxes with multiple tuners and DVRs compatible with HDTV.• Cablevision begins to offer TiVo's DVR technology to its subscribers on trial basis.• TiVo offers tagging option to advertisers, who can display an icon even when subscribers are fast-forwarding through an advertisement.• TiVo and Nielsen to analyze viewing preferences/behaviors of a panel of TiVo subscribers.• TiVo announces service to download content from DVR to iPods with IP protection.
2006	<ul style="list-style-type: none">• DirecTV extends partnership to 2010, though it will stop distributing TiVo service in Feb 2007.

- TiVo secures \$74 million in damages in its patent infringement lawsuit against EchoStar.
 - TiVo offers TiVoCast service enabling viewers to watch video from a number of content providers over broadband networks.
 - TiVo creates new division to offer ratings and market research and analysis, using its ability to track viewer propensity to watch commercials.
 - Cox Communications to distribute TiVo service to its cable subscribers.
 - TiVo introduces next generation Series3 HD DVR.
 - TiVo introduces ProductWatch, a service enabling its subscribers to search and subscribe to Showcase format commercials on products/services of specific interest to them.
- 2007
- TiVo and Roxio partner to bring TiVoToGo service to the Mac platform.
 - TiVo introduces StopWatch ratings service for nationally run programs and commercials from cable and broadcast networks
 - TiVo to offer Amazon Unbox service to its broadband-ready subscribers.
 - FCC's 'integration ban' comes into force
 - Comcast DVRs with TiVo service launched regionally on a limited basis.
 - TiVo and Nero partner to offer a package that can turn a Windows PC into a DVR.
- 2008
- TiVo to offer movie rentals from Walt Disney Studios to its subscribers.
 - TiVo launches PowerWatch ratings service in partnership with Starcom.
 - DirecTV extends agreement till 2015, and offers new HD DirecTV DVR with TiVo service.
 - TiVo launches new HD XL premium DVR.
 - TiVo and Netflix announce agreement to stream Netflix movies instantly to TiVo subscribers.
- 2009
- TiVo reports first full year of profitability (FY ending January 31, 2009).
 - RCN and TiVo to offer co-branded TiVo DVRs to its residential and small business customers
 - TiVo to offer hundreds of new free web video channels and podcasts through its DVRs
 - TiVo sues AT&T and Verizon for patent infringement.
 - US District Court awards TiVo additional \$200 million in damages for EchoStar's continued infringement of TiVo's patents.
 - Blockbuster to offer OnDemand service on TiVo DVRs, and promote/sell TiVo in stores.
 - Google to license TiVo's television viewing data to measure audiences for advertisements offered through Google TV Ads platform.
- 2010
- TiVo introduces fourth generation Premier DVR that can to access TV and Internet content.
 - Suddenlink to offer cobranded TiVo DVR and non-DVR set-top boxes to its subscribers.
 - Samsung to license TiVo technology and jointly develop a TiVo-ready set-top box.
- 2011
- Charter Communications to offer set-top boxes with TiVo DVR technology to its subscribers.
 - TiVo launches free online website for advertisers and brand managers to compare how well their advertisements are doing against those of their competitors.
 - Motorola Mobility countersues TiVo claiming that TiVo violated its patents and that its set-top boxes supplied to Verizon do not infringe TiVo technology patents.
 - EchoStar settles lawsuit with TiVo and agrees to a \$500 million payment over 6 years and licensing of disputed technologies from TiVo.
 - TiVo unveils new quad-tuner Premier DVR box and a non-DVR Preview cable set-top box.
 - Grande & Charter to offer TiVo Premier DVR box to their broadband subscribers
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Table 3a: Co-opetitive Tensions in Disrupting Ecosystem with Multiple Sides⁷

Data	Sub-Themes
<p>Vision of future benefits to advertisers: “TiVo believes that our TiVo Service will offer advertisers a new platform with more efficient and effective ways to reach their targeted audience. Key benefits offered to advertisers include the following: <i>Targeting Consumers.</i> <i>In the future, the TiVo Service will allow advertisers to offer advertising that is related to the viewing preferences stored on the personal video recorder....</i> <i>Platform for New Advertising Opportunities.</i> The TiVo Service provides advertisers with a new platform to offer advertisements to viewers...<i>TiVo also intends to offer advertisers a new service that will allow viewers to get more information about and possibly purchase a featured product or service using the TiVo remote.</i> In this way, TiVo expects to create an interactive on-air shopping experience for the viewer.” (TiVo 10-K report 2000, p8)</p> <p>Disruption felt by ecosystem incumbents in the present: <i>“And then we had to think about (the fact that)...broadcasters – television networks – rely a lot on commercials to make their money...(In) fact many of them rely exclusively on commercials to make their money, and here we are ... fast forwarding through commercials and messing around with prime time and surf.”</i> (Mike Ramsay interview, iinnovate.blogspot.com, 2006).</p>	<p>Intertemporal co-opetition</p>
<p>Co-opetition with: DirecTV (content distributor/partner): <i>“TiVo’s largest customer, DirecTV, likely in coming months will strike a deal to put a competing DVR on DirecTV.</i> (Ad Age, June 28, 2004).</p> <p>Nielsen (ratings firm/partner): <i>“Nielsen Media Research and TiVo inc., are planning to work together on measuring viewing in the homes of latter’s customers.... Separately, Nielsen is looking to measure interactive program guide usage through a partnership with Gemstar-TV Guide International Inc.</i> (MultiChannel News, February 9 2004)</p> <p>Comcast and other cable operators (distribution partners): <i>“Comcast has funded development of TiVo software that runs on boxes with different technologies...Investors have been growing nervous about TiVo’s ability to compete as cable and satellite companies dominate the DVR market...” ...Along with its Comcast and Cox deals, TiVo hopes to make inroads with its own HD DVRs that use CableCards from system operators and eliminate the need for a cable box.”</i> (USA TODAY, August 30, 2007).</p>	<p>Dyadic co-opetition</p>
<p>Attracting customers alienates content providers: <i>“Ostensible rivals CBS Corp., Discovery Communications Inc., Walt Disney Corp., News Corp. and Time Warner Inc., CNN’s parent, announced Thursday they are forming the Advanced Television Copyright Coalition to prevent rivals from swallowing their bread-and-butter: TV ad dollars.... Ironically, several of the same broadcasters forming the alliance -- including CBS, Disney and Discovery -- announced an investment of \$32 million in TiVo in late July. In June, General Electric’s NBC took an unspecified stake in TiVo.”</i> (CNN Money, August 12, 1999)</p> <p><i>“Viewers may find the campaign’s sly humor refreshing, but some thin-skinned media types aren’t amused. In a move that appears to confirm the wry premise of the commercials, Viacom Inc.’s CBS television network, a TiVo investor, has decided not to run one tongue-in-cheek spot.”</i> (Wall Street Journal, July 5, 2000).</p> <p>Offering value to content providers and advertisers reduces value to consumers: <i>“A greater problem with TiVo is that it is too closely tied to TV networks and advertisers, sometimes to the detriment of consumers...Because of this, TiVo has no commercial-skipping button like Replay’s, and TiVo’s press literature even attacks Replay’s feature.”</i> (Walter Mossberg, Wall Street Journal, April 8, 1999).</p> <p><i>“(TiVo makes)... annoying efforts to get you to watch certain shows. TiVo presents you with network showcases which are really just come-ons. TiVo also tries to suggest shows to you, and will record them to your hard disk unless you opt out. That “feature” makes Personal TV less personal.”</i> (Walter Mossberg, Wall Street Journal, February 22, 2001)</p> <p>Partnering with one content provider alienates other content providers: <i>Online DVD rental service Netflix Inc. (NFLX) and digital video recorder maker TiVo Inc. (TIVO) on Thursday said they would jointly develop a product to download movies over the Internet, a deal uniting two of the fastest growing brands in home entertainment ...But the plan faces the daunting challenges of winning cooperation from Hollywood, which has hesitated to release its movies on the Web without rock-solid security, fearing it could lose control of its products like music industry labels did.”</i> (Fox News, October 1, 2004).</p>	<p>Multilateral co-opetition</p>

⁷ This is a subset of our analysis, included here for illustrative purposes. Parts have been italicized to help readability. Citations in these tables have not been added to the reference list given space considerations, but are available from authors.

Table 3b: Continual Adjustments by TiVo as Emergent Strategy

Data/Excerpts/Quotations/Vignettes	Sub-Themes
<p>Engagement with content providers and advertisers to get buy-in</p> <p>Receives equity investments from several leading media companies, cable companies, network broadcasters, including CBS, Comcast Corporation, Discovery Communications Inc., The Walt Disney Company. <i>"This round of investment marks a major step forward in the adoption and validation of TiVo's service"</i> (Mike Ramsay, TiVo co-founder, quoted in PR Newswire, July 27, 1999).</p> <p><i>"Realizing the risk of taking on the all-powerful television industry, Ramsay hired Stacy Jolna, an Emmy-winning programming exec, as chief programming officer to reassure networks and advertisers and bring them into the fold....and to increase other streams of revenue by developing partnerships with networks and advertisers...The idea is that someday advertisers will be able to aim ads at small groups with specific interests, on the basis of TiVo subscribers' viewing habits. Still, trying to please networks, advertisers, and viewers is a tough balancing act."</i> (Fortune, March 19 2001)</p> <p>Accommodating tensions</p> <p><i>"TiVo unveiled plans for a product that allows subscribers to search for specifically targeted commercials placed on their DVRs. What will this mean for advertisers? It means a real targeted market and a user that has said, "I'm actually interested in this product." That is highly valuable for the advertiser. TiVo is held up as the poster child of ad-skipping. Does this solve those concerns? People do watch ads that are delivered to them. They want to be in control, watch it on their own time and have it be relevant. So these opportunities put a big challenge on the advertiser to find out what entices a user to actually interact with the brand, rather than the traditional 30-second framework, where they try to grab the viewer's attention. I think advertising is not going away, but it's evolving.</i></p> <p><i>If advertisers embrace this method, does that make Nielsen less valuable? Advertisers are already putting pressure on Nielsen and the networks with respect to program ratings and whether it's a viable currency"</i> ((Davina Kent, TiVo VP, national advertising sales, quoted in interview with Kerschbaumer, Broadcasting & Cable, December 2, 2005).</p> <p>Creating value for multiple conflicted sides</p> <p><i>"Hollywood studios and the National Football League are seeking to block the maker of the popular TiVo television recorder from expanding its service so that users could watch copies of shows and movies on devices outside their homes...the new technology could compromise the copyrights of shows that broadcasters send over the airwaves in digital form. TiVo wants to make copies more portable, in stages...Such devices, including laptops or desktop computers, would be registered with the company and would share encoding and decoding technology that prevents viewing by nonregistered devices... "TiVo has an interest in keeping everything secure. "We are trying to bring innovation to consumers." (said its Washington attorney, James M. Burger) ...But the system alarms the content industry, which promised to roll out more digital programming over free television networks only after insisting that the FCC adopt rules requiring makers of recording devices to certify that they have technologies to prevent mass Internet distribution.</i></p> <p><i>Federal regulators have brushed aside arguments by Hollywood and the NFL that the portable technology TiVo Inc. plans to introduce could spark widespread copyright piracy. In a 5-0 vote, the commission said TiVo Guard and the other copyright control technologies approved adhere to the "broadcast flag" copyright protection regulations the FCC approved last year. (Hollywood Reporter, August 10, 2004)</i></p> <p><i>"TiVo is ratcheting up DRM restrictions on its subscribers. One patch will cause TiVos to automatically delete pay-per-view content after a preset period of time. A new agreement with the NFL means that TiVo owners will not be able to view games outside of designated broadcast areas. NFL and TiVo will work together to protect live NFL games against real-time retransmission outside of the subscriber's local television market while providing consumers with the ability to remotely access their own recorded broadcast programming after its initial airing. It seems that TiVo is feeling the squeeze from broadcasters lately, and the move towards imposing more stringent DRM may ultimately turn some of their customers off....In his interview with Wired, TiVo General Counsel Matthew Zinn commented on the tension they are faced with as they try to please both content providers and customers and acknowledged concerns that the DVR pioneers could find themselves on a slippery slope. (ArsTechnica, October 28, 2004)</i></p>	<p>Engaging simultaneously with ecosystem sides most disrupted initially to get buy-in</p> <p>Continuing to live with tensions that are difficult to address/resolve</p> <p>Dynamically switching over time to offer value to one side and address spillovers to other side(s)</p>

Table 3c: Evolution of TiVo’s Technological Platform and Relational Positioning

Data/Excerpts/Quotations/Vignettes	Sub-Themes
<p>Growth in patents as indicator of TiVo’s technological capability: # of patents at end of Dec 2001: 33 patents awarded; 99 patents pending # of patents at end of Jan 2012: 238 patents awarded; 413 patents pending (data abstracted from TiVo 1999 IPO prospectus and TiVo 2000-2012 10-K reports)</p> <p>Engaging with different sides over time leads to DVR platform and service evolution: 1999: TiVo’s first DVR released enabling subscribers to time-shift and fast-forward commercials 2002: Placement of advertising partners’ Showcases on TiVo DVR’s central menu making these more accessible to subscribers 2004: TiVOToGo service announced with TiVoGuard digital rights management (DRM), to enable subscribers to transfer DVR content to PCs. DRM strengthened to appease content providers, despite FCC approval. 2005: Tagging introduced to give advertisers second chance to display interactive “tags” for subscribers to view full commercial/content or request information even when they are pausing or fast-forwarding commercials/content. 2008: TiVo’s new Premier DVR has ability to deliver DVR, cable box, movie box, web box, and music box functionality. (data abstracted from TiVo 1999 prospectus and 2000-2012 10-K reports)</p> <p>New sources of revenues as indicators of TiVo’s growing capabilities: From 1999 IPO prospectus (p. 23): We currently generate revenues from subscriptions to the TiVo Service and other income from the sale of personal video recorders....(From TiVo 1999 IPO prospectus, p. 23) From 2012 10-K report (p. 6): We primarily generate revenues from four sources: Consumer Service...Television Service Providers or MSOs....Media Services....Licensing Revenues...</p>	<p>Evolution of DVR platform/services</p>
<p>Initial image as disruptor ‘Let me see if I understand this. All the other companies are investing in you so they can preside over their own demise?’ (Barry Diller, USA Networks chairman, quoted in Chen, Fortune, March 19, 2001).</p> <p>Attempt to change perception of relational positioning by offering a vision of benefits early on “Marty Yudkovitz is a longtime NBC executive who became president of TiVo in April. <i>He knows his company can't rely solely on stand-alone DVRs...To remain a leading player, it has to grow its satellite TV base and convince the cable industry that "TiVo inside" can help cable gain and retain subscribers...He's focused on premium services that allow TiVo to stand for more than basic DVR functionality, since cable companies can offer that on their own...TiVo, he argues, can be used not just to skip ads but to enhance them with targeting, long-form content, audience measurement and interactive capabilities. His strategy is to enlist the support of marketers, ad agencies and media specialists, and convince them that, if DVRs are inevitable, TiVo is the most ad-friendly solution.</i> (Advertising Age, October 6 2003)</p> <p>Unsuccessful attempts to change relational positioning within industry ecosystem leading to leadership changes “...Last week, TiVo announced that Mr. Ramsay was stepping down as chief executive, But they also said that the board hoped to hire someone with less of Mr. Ramsay’s fierce belief in the power of TiVo’s technology. They said they preferred someone with an ability to repair TiVo’s relations with the big cable companies...”They are looking for a guy who can stand up and go belly to belly with the big service providers,” said Stewart Alsop, a former member of TiVo’s board and a venture capitalist with New Enterprise Associates, which has a financial interest in TiVo. (New York Times, January 17, 2005)</p> <p>Reframing of relational positioning by new CEO Thomas Rogers “Yes, <i>TiVo does allow people to fast forward through ads</i> and yes that's an important feature of TiVo, but the advertising industry has come to understand that that's going to happen no matter what. <i>And the issue now is how do you create a new relationship with the viewer so that advertising messages get there and they are looking at TiVo as that platform increasingly as potentially the way to do that. (...)</i> Now we find ourselves embraced rather than a pariah and consequently my old friends in the advertising industry are still my friends.” (Tom Rogers, TiVo CEO quoted in an interview at thomashawk.com, 2006)</p>	<p>Evolution of relational positioning from that of value destroyer to one of value creator</p>
<p>“For years TiVo was perceived as a pariah because it allows viewers to zip through TV ads. <i>When former NBC executive Tom Rogers took over as TiVo CEO in July 2005, he made it part of his mission to smooth over relations with broadcasters, cable providers, and advertisers...</i>The olive branches Rogers is offering Tivo's former adversaries, it turns out, are also areas of expected revenue growth. <i>Last year, for instance, TiVo rolled out its Stop Watch audience measurement service, inking recent deals with NBC and CBS, to track consumers' minute-by-minute viewing habits. "With two major networks on board, other networks likely will have to subscribe to the data as well, as will the ad agencies and advertisers," noted Bear Stearns analyst, Kunal Madhukar. "And as such, CBS's decision was critical to the service gaining general acceptance in the industry." TiVo also unveiled a similar service that will provide advertisers with information about how viewers respond to (or fast-forward through) commercial spots.</i>” (CNNMoney, March 5, 2008).</p>	<p>Joint evolution of platform and relational positioning</p>

Figure 1: Dynamics that Unfold During the Introduction of a Disruptive Innovation

