

Symmetric Assumptions in the Theory of Disruptive Innovation: Theoretical and Managerial Implications

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The literature on disruptive innovation has convincingly explained why many established firms encounter problems under conditions of discontinuous change. Incumbents fail to invest in new technologies that are not demanded by their existing customers. This argument is grounded in resource dependency theory and the associated assumption that existing customers control a firm's internal resource allocation processes. While the problem of disruptive innovation has been convincingly explained, there is still a need for managerial solutions. We argue that a key reason why such solutions are lacking can be found in the asymmetric assumptions made in the original theory of disruptive innovation. Specifically, we identify two related forms of asymmetry. First, the focal (incumbent) firm is treated as a collection of heterogeneous actors with different preferences, incentives and competencies, whereas firms in the surrounding environment are treated as if they contained no such heterogeneity. Second, the theory of disruptive innovation describes incumbents as controlled by their environment, but has failed to recognize that the environment can also be influenced. In this paper we argue that a more symmetric theory of disruptive innovation – i.e. one that treats all similar entities in the same way – opens up for a range of interesting managerial solutions.

Introduction

Over time, the Theory of Disruptive Innovation (henceforth TDI) has become increasingly popular among both scholars and practitioners concerned with incumbent failure and technological change (Christensen & Rosenbloom, 1995; Bower & Christensen, 1995; Christensen, 1997). This article aims to improve existing theory on disruptive innovation by exploring its meta-theoretical underpinnings.

Within the literature on disruptive innovation, important contributions have been made concerning the initial emergence of disruptive technologies (Adner, 2002; Govindarajan & Kopalle, 2006; Sandström, 2011) and how the concept relates to business models (Christensen, 2006; cf. Markides, 2006). However, the theory also has its critics, many of whom call for more work on demand-side

factors (Danneels, 2004) including managerially relevant work that explicitly considers the interplay between disruptive innovations and established business models (Christensen, 2006). Others have similarly stressed the importance of leadership and proactively working to transform markets (e.g., Tellis, 2006; Dew et al., 2008).

While many scholars have thus pointed to the limits of the TDI from a managerial and business model perspective, the core theoretical assumptions of the theory have received little attention, despite existing shortcomings. One way of improving existing theory is to perform more empirical studies of disruptive innovations by incumbents, preferably also of successful cases. An alternative way forward would be through investigations of the meta-theoretical assumptions underpinning the theory. With the exception of Christensen's

explicit resource dependency perspective, the theoretical foundations of the TDI have not been covered in further detail. Addressing this gap in research, this conceptual article aims to improve existing TDI by exploring its meta-theoretical assumptions. In particular, we address the issue of theoretical symmetry, an aspect of management theory building recently highlighted by Foss and Hallberg (2014). Based on our review of the literature on the TDI, we identify two asymmetries that we argue are critical for further development of the theory. First, TDI assumes heterogeneity within firms, describing them as internally complex and riddled with conflicts about resource allocation, but it does not assume a similar degree of heterogeneity in the surrounding environment. Second, the theory posits that firms are controlled by their markets, but pays little attention to how firms can influence key actors in their environments.

The article is organized as follows. First, we review existing research on TDI and identify some areas where repeated calls for further improvement have been made. Thereafter we introduce the notion of theoretical symmetry, and then proceed to address these improvement areas by exploring the meta-theoretical assumptions of the theory. We conclude with a discussion highlighting critical trade-offs for the development of the TDI, and also suggest avenues for future research related to managerial solutions.

Previous Research on Disruptive Innovation

It is well documented that established firms often encounter problems when faced with discontinuous technological change (Bessant et al., 2005). For a long time, explanations of incumbent failure focused primarily on the competencies of incumbents and the degree to which these were destroyed by technological discontinuities (e.g., Tushman & Anderson, 1986; Henderson & Clark, 1990).

In his doctoral dissertation about the rigid disk drive industry, Clayton Christensen (1992) observed an anomaly. Established disk drive manufacturers successfully introduced competence-destroying technologies but in each shift to a smaller generation of disk drives, incumbents were nevertheless frequently displaced by entrant firms. These empirical observations called for a revision of the underlying theoretical perspective on firms facing technological change. Instead of maintaining a strict competence-based perspective, as most other scholars had done previously (e.g., Tushman & Anderson, 1986),

Christensen invoked resource dependency theory (Pfeffer & Salancik, 1978). Resource dependency theory is an open systems perspective on organizations that sees the surrounding environment as effectively controlling firms as it provides the resources an organization needs to survive.

This theoretical perspective seemed to explain the pattern of entrant-incumbent dynamics observed in the rigid disk drive industry. Christensen therefore adopted it and argued that established firms struggle under conditions of discontinuous change as their most profitable customers control the firms' internal resource allocation process. Specifically, as their existing market segments did not demand disk drives with an initially lower storage capacity, incumbents struggled to find a financial logic in developing such products. As a consequence, the next generation of disk drives were developed by entrant firms addressing new market segments and operating in new value networks, defined as 'the context within which the firm identifies and responds to customer's needs, procures inputs and reacts to competitors' (Christensen & Rosenbloom, 1995, p. 234). As the performance of these smaller disk drives improved over time, the previous generation was superseded. At this point, incumbents were also displaced as they had been captivated by their existing, profitable market segment.

Interpreting such empirical observations through the lens of resource dependence theory, a distinction was made between disruptive and sustaining innovations. A disruptive innovation underperforms along the dimensions that customers have historically valued and at the same time brings some new performance attributes to the market. A sustaining innovation, on the other hand, can be regarded as an improvement along the dimensions that customers have historically valued. The fact that the disruptive innovation does not address the needs of an incumbent's largest and most profitable customers makes it irrational for incumbents to invest in it. Hence, the incentive asymmetry between entrants and incumbents is a core element of the TDI.

As indicated in the introduction, the original TDI has been improved over the past decades. Other scholars have tried to better understand the innovator's dilemma by drawing on diffusion theories and looking further into the role of the market (Slater & Mohr, 2006). Adner (2002) also invoked a diffusion perspective to argue that the structure of demand must be analysed further in order to address the effects of disruptive innovations. In particular, he pointed to the role of different performance

thresholds that need to be met in order to reach different market segments. Similarly, Schmidt and Druehl (2008) offered a detailed terminology and a description of the challenges related to low-end and high-end disruptive innovations, focusing on the diffusion pattern of the new product. These and other contributions (e.g., Danneels, 2004, 2006; Christensen, 2006) have stressed the need for more work on demand-side factors, managerial solutions and business model innovation.

Related to the above, two issues stand out as particularly important, namely the need to view disruptive innovation as a business model problem and the need to develop managerial solutions that more explicitly consider demand-side factors. These are addressed in further detail in the coming sections.

Disruptive Innovation as a Business Model Problem

In recent years, research on disruptive innovation has paid more attention to the role of business models (Habtay, 2012), i.e., the ways in which firms create, deliver and appropriate value. Beyond this high-level definition, descriptions of business models are often quite detailed, taking the form of taxonomies that include more or less nuanced conceptions of customer segments, value propositions, key partners, revenue models, distribution channels, etc. (Chesbrough & Rosenbloom, 2002; Morris, Schindehutte & Allen, 2005). While specifics are still debated, most would agree with Zott and Amit's (2010, p. 216) general assertion that a business model is 'a system of interdependent activities that transcends the focal firm and spans its boundaries'.

The increased focus on business models could be related to the large number of product and service innovations displaying disruptive characteristics, but where these disruptive features stem from different ways of performing business activities rather than from technological characteristics. Christensen has long argued that not only technologies but also business models can have disruptive properties (Christensen & Raynor, 2003; cf., however, Markides, 2006), and he has even claimed that disruptive innovation is a 'business model problem, not a technology problem' (Christensen, 2006, p. 48).

Current research has shown that there are some similarities between business model innovations and product innovations, but also several differences (Bucherer, Eisert & Gassmann, 2012; Berglund & Sandström, 2013). As mentioned, most definitions of business models have a more nuanced understand-

ing of customers and also contain several additional elements that often concern how the focal firm interacts with different actors in the environment. Hence, to enable the TDI to properly address disruptive innovation as a business model challenge, the theory appears to need a more comprehensive and nuanced conceptualization of the focal firm's environment.

A Need for Managerial Solutions

Closely related to the discussion of disruptive innovation as a business model challenge is the need to develop better managerial solutions. Following Christensen, most scholarly efforts in this area have been internally focused, with the most common recommendation being for the incumbent to separate any disruptive initiative from the rest of the organization (Christensen, 1997). By doing so, its development is protected from the forces of resource dependency that are otherwise likely to starve it (Van Loy, Martens & Debackere, 2005; Mahmoud-Jouini & Charue-Duboc, 2008; O'Reilly & Tushman, 2008). Nevertheless, as pointed out by Bhidé (2000), the combination of significantly different resources and activities require substantial integration efforts and the direct and indirect costs of these may be so high that overall performance actually makes their integration questionable. Also, Gottfredson and Aspinall (2005) highlight the risks for firms of having an exaggerated complexity in terms of offerings and activities and point out the importance of not adding new products and services to companies without understanding their impact in terms of complexity costs.

When it comes to the more specific challenge of crafting a commercially attractive disruptive offering, there are suggestions related to generic R&D strategies (Yu & Hang, 2011), as well as diffusion forecasting techniques (Linton, 2002). Moreover, some scholars have argued that 'customer competence'¹ is vital when introducing disruptive innovations (Danneels, 2002, 2004; Henderson, 2006). Along the same lines, others have pointed at the importance of managing the environment more proactively (e.g., Chandy & Tellis, 2000). It has been suggested that the key challenge related to the innovator's dilemma is not about resource allocation, but rather to build and transform markets, i.e. to act as an entrepreneur (Dew et al., 2008). Similar claims have been made by Kassiech et al. (2002), who pointed at the importance of expeditionary marketing, whereas others have highlighted that tracking changing customer needs over time is a differentiating capability (Govindarajan &

Kopalle, 2006). It has also been argued that firms with a history of exploring new markets and value propositions would be better at introducing disruptive innovations (King & Tucci, 2002).

All these attempts to develop managerial solutions have one thing in common; they stress the importance of proactively managing and sometimes actively influencing the environment. However, this stands in stark contrast with Christensen's original work, with its exclusive focus on firm-internal resources, values and processes (Christensen, 1997; Christensen & Raynor, 2003). This tension between what contemporary researchers are converging on as being central, and what the original theory is able to theoretically accommodate, is harming ongoing efforts to develop useful managerial solutions to the innovator's dilemma and some of the underlying assumptions may need to be revised.

The following section contains an analysis of the TDI through the lens of assumption symmetry, followed by some suggestions for the development of TDI in a way that allows for more fruitful generation of managerial implications.

Assumptions in the Theory of Disruptive Innovation

Revisiting the original TDI, it can be seen that the theory in question rests on a set of meta-theoretical assumptions that need to be better understood and further explicated. Before we turn to these, we need to briefly discuss the role of assumptions in theory development.

Determining what constitutes good assumptions in theory construction is not a simple issue. Some would accept patently unrealistic assumptions, as long as they enable accurate predictions (Friedman, 1953). Others prefer more realistic assumptions because they lead to better explanations (Simon, 1963). However, to the extent that management research aims to inform business practice, it seems reasonable to prefer good explanations of underlying processes and causal mechanisms to accurate predictions (see, e.g., Poole et al., 2000; Van de Ven & Engleman, 2004; Berglund, 2010). In elaborating this preference, Tsang (2006) urged management researchers to prioritize realism in assumptions regarding the behavioural core of their theories, typically the nature and behaviour of individuals and firms. The argument is that such core assumptions determine the essential explanatory processes on which management theories turn, whereas more peripheral assumptions need not be as realistic (Tsang, 2006). More generally, making

assumptions that abstract from reality is a theoretical virtue in that it allows researchers to concentrate on certain aspects of the world while ignoring others (cf. Lakatos, 1978). However, abstraction can also be harmful, not least if it leads researchers to neglect critical (i.e., 'core') aspects of reality.

Theories based on asymmetric assumptions are especially interesting (cf. Fraassen, 1989; Foss & Hallberg, 2014). An asymmetric theory is one that changes its (core) assumptions from one domain of application to another. A classic example from political science posits that individuals *qua* politicians, public sector bureaucrats, etc., act in the public interest, whereas individuals *qua* voters, lobbyists, etc., act in their own interest (Buchanan, 2003). Similarly, in strategic management, the resource-based view often assumes that product markets are efficient, whereas factor markets are inefficient in the sense of being uncertain, heterogeneous, etc. (Foss & Hallberg, 2014).

It is at times argued that more symmetric management theories are good *per se* (e.g., Foss & Hallberg 2014), and by consciously striving for symmetry researchers may counter some natural tendencies of both theory-driven (deductive) and empirical (inductive) research processes to produce asymmetric theories. Management research inspired by micro-economic theory is often theory-driven, i.e., it starts with a given, often quite skeletal, theory based on unrealistic assumptions. These assumptions are then relaxed and tested – often in terms of predictive ability – in a piecemeal fashion (Foss & Hallberg 2014). Empirically driven research instead starts with structured observations of interesting phenomena or processes. These observations are then synthesized and developed into new theory through a process of empirical reduction and comparison with relevant existing theories (Glaser & Strauss, 2009).

Clearly, both approaches run the risk of developing asymmetric theories – deductive theories through the piecemeal fashion in which assumptions are relaxed, and inductive theories through the empirical focus on particular phenomena to the exclusion of others. By being conscious of assumption symmetry during theory development, these risks can be mitigated.

Having introduced the role of assumptions in management theory, and in particular the aspect of assumption symmetry, we can now turn to the situation in the TDI. As will be elaborated below, we see that the TDI is asymmetrical in two ways. First, it treats the focal firm as an internally complex and heterogeneous entity, but does not assume equal heterogeneity in the surrounding environment.

Second, it assumes that incumbents are influenced by firms in their environment but it regards incumbents as incapable of influencing the firms that comprise their environments. By analysing these asymmetries in greater depth, we hope to reveal ways forward for productive future development of the TDI.

Asymmetry One: Complex Incumbents and Simple Environments

In the TDI, incumbent firms are seen as complex organizations with substantial internal heterogeneity. Importantly for the theory, this includes actors and sub-units with diverse preferences, incentives and competencies competing to secure resources for different innovation projects. Drawing upon resource dependency theory, TDI then suggests that the firm-internal actors who satisfy demands of the current market will attract resources at the expense of more disruptive initiatives. However, the complexity described in incumbents is not assumed to exist in the firms that populate its surrounding environment. Instead, the environment is primarily depicted as internally homogeneous customer *segments*, e.g. low-end and high-end. Less attention is paid to differences either between or within organizations in these segments. This means that important differences in competencies, preferences and incentives that may exist among different actors and sub-units within individual customer organizations are not recognized by the theory.² The external environment is essentially reduced to a set of broad forces that determine who within the focal firm wins in the competition for resources.

In fact, much of the TDI does not speak of customers at all but of market segments, i.e. collections of customers with similar preferences. In his original work, Christensen (1997) made a distinction between low-end, mainstream and high-end segments, whereas his later work also addressed the role of entirely new markets (Christensen & Raynor, 2003). Other important contributions to this literature have covered the issue of high-end segments (Govindarajan & Kopalle, 2006; Sandström, 2011) and performance thresholds in different parts of the market (Adner, 2002).

The fact that several recent developments of the theory have often invoked diffusion theories to craft a more nuanced understanding of customers clearly indicates the field's focus on markets, or market segments, as the unit of analysis. This means that the TDI contains something of a paradox: it rests on a very simple conceptualization of the environment, despite the environment being central to understanding the innovator's dilemma. This

coarse description of the environment as a set of different but internally homogeneous market segments made it possible to explain why established firms failed in, for example, the disk drive industry and the steel industry. We argue, however, that it is overly simplistic when it comes to addressing more complex matters such as business models and the development of managerial solutions.

Interestingly, Christensen's conceptualization of the environment as a homogeneous force controlling the incumbent's resource allocation process stands in stark contrast with how resource dependency scholars actually view the environment. Pfeffer and Salancik (1978, p. 32) quite explicitly state that the environment contains a range of actors with different incentives (see also Wry, Cobb & Aldrich, 2013):

A variety of interest groups, individuals, and organizations have contact with a given focal organization; each of these evaluates the organization and reacts to its output and actions. Each has a particular set of criteria of preferences that it uses in this evaluation process, and consequently, organizational effectiveness is a multifaceted concept, where the effectiveness of the organization depends on which group, with which criteria and preferences is doing the assessment. (p. 32)

To understand this paradox, it is important to remember that a simplified conceptualization of customers, as constituting homogeneous market segments, was quite sufficient to make sense of the historical events Christensen originally studied. Disk drives could be evaluated and compared along objective performance dimensions such as storage capacity, size, price, etc., and preferences differed between market segments.

In many settings, it may be very misleading to conceptualize the market on such an aggregated level. For instance, the firms that make up an incumbent's existing customer base may be internally heterogeneous and comprise different sub-units with varied preferences. One example of this pattern would be the ongoing shift from analogue CCTV to digital, IP-based video surveillance. In this setting, an important challenge has been related to the fact that digital cameras are frequently installed and used by the IT department rather than the security department, thus creating a conflict between those two units within the client firm (Berglund & Sandström, 2014). If a new technology is demanded by one element of a buyer organization but not another one, would it be referred to as disruptive or sustaining? How should an incumbent firm facing this situation

act in order to succeed? These issues are overlooked by current TDI as the theory maintains a simplified view of the environment where those nuances are not attended to.

One might also consider a scenario when preferences differ across important downstream stakeholders such as customers and distributors. For example, consider the recent shift from feature phones to smartphones and how Nokia was toppled as the industry leader by the entrant firm Apple and the fast follower Samsung. In this case, mobile phones became platforms which in turn created a market for software-based applications. Once smartphones were launched, it was quite clear that this product category was demanded by consumers. Were these phones equally appreciated by operators who used to make money from a collection of different software-related services in the feature phone era? While more evidence is needed regarding this particular example, it suffices here to conclude that it is important to investigate these questions, but they are overlooked by TDI as it maintains a simplified view of a firm's surrounding environment.

Customer adoption of a disruptive innovation would then not be a matter of either/or, but rather the result of incumbents' efforts to understand the complexities of heterogeneous customer organizations. The same goes for other actors in the incumbent's value network, making the introduction of a disruptive innovation a matter of multilateral negotiations with multiple stakeholders that have potentially diverging preferences.

Asymmetry Two: Incumbents Are Influenced by, but Cannot Influence, Their Environment

Christensen's original research illustrated how the resource allocation process of established firms is controlled by their most profitable customers. Incumbents thus failed to make sufficient investments in disruptive technologies because they were 'held captive' by their existing market. The underlying assumption here is that incumbents are controlled by their customers, whereas the customers cannot be influenced by the incumbent.

As a result – and consistent with the TDI's application of resource dependency theory – the only way in which firms can relate to their existing customers is by passive adaptation, i.e., developing offers that fit one of the existing customer segments' predefined demand functions (Christensen & Rosenbloom, 1995). This focus on adaptation as the only way incumbents can relate to customers may explain why existing prescriptions for over-

coming the innovator's dilemma have primarily focused on firm-internal factors. Managerial solutions have thus far addressed, for example, how new and old business models should relate to each other, how incumbent firms can work with internal resources, processes and values, such as by establishing organizational designs that shield disruptive initiatives from the adaptive forces of resource dependency (e.g., Christensen & Raynor, 2003; Markides & Charitou, 2004; O'Reilly & Tushman, 2008). Indeed, this basic premise makes the issue of developing suggestions for how incumbents may proactively manage their customers, and more generally their surrounding value network, a *non sequitur*.

However, just as the resource dependence theorists acknowledge environmental heterogeneity, they also acknowledge that relations between organizations are often characterized by interdependence rather than one actor exclusively controlling another. Interdependence can be defined as follows: 'Any event that depends on more than a single causal agent is an outcome based on interdependent agents. [...] Interdependence exists whenever one actor does not entirely control all of the conditions necessary for the achievement of an action or for obtaining the outcome desired from the action' (Pfeffer & Salancik, 1978, p. 40).

As stated previously, some scholars have indeed pointed to the importance of proactively influencing the environment (e.g., Kassicieh et al., 2002; Tellis, 2006; Dew et al., 2008). However, these suggestions have only emphasized the general importance of doing so; they have not produced concrete managerial recommendations. An important reason why these ideas have not had more influence on the TDI may be their incompatibility with the original TDI's assumption of unidirectional control of firms by their customers.

To understand why the TDI has developed this unidirectional view of control, it is again instructive to examine Christensen's early research. His historical studies of the disk drive industry did not require assumptions of proactive change to explain the observed pattern of entrant-incumbent dynamics. Manufacturers of computers would arguably have a set of predefined criteria in terms of storage capacity, price and size, and incumbents had little choice but to comply with those criteria. The same is true for the other examples that were used: the steel industry, discount retailing and the mechanical excavator industry (Christensen, 1997). Keeping in mind that inductive development of management theories is often strongly influenced by

the specific empirical setting, it is not surprising that the resulting TDI embraced a view of customers as homogeneous and simple, and an understanding of environmental dependence and influence as unidirectional. In fact, one could argue that the resulting simplicity of the proposed theory was valuable, as it rendered the investigated problem understandable, thereby most likely also facilitating the theory's diffusion in both academia and practice.

Another reason may be found in the purpose of the original TDI, which was developed to explain a specific problem, i.e. 'the innovator's dilemma'. This explicit focus on parsimoniously describing why firms are blindsided by disruptive innovations may have inadvertently introduced assumptions that make it very difficult to develop managerial solutions. Specifically, if the focal firm is regarded as a responsive servant to the market, and if its customer relations are transactional and arm's-length, there is no theoretical scope for managerial solutions that include proactively working with customers to develop disruptive innovations.

One may argue that such a conceptualization of the environment is logical, as a firm cannot maintain executive control beyond its boundaries (cf. Powell, 1990). But as mentioned, resource dependency scholars explicitly point out two ways in which a firm can relate to its environment: by adapting to it, which is the view currently underpinning the TDI, or by transforming the environment, an option which has so far been largely overlooked (Pfeffer & Salancik, 1978; Wry, Cobb & Aldrich, 2013).

A Symmetric Theory on Disruptive Innovation

Summarizing the above, we can conclude that a more symmetric TDI should assume (a) the same degree of heterogeneity in all firms, and (b) acknowledge that influence can go both ways. Instead of regarding the environment as a powerful force that controls the firm's resource allocation process, it can be thought of as containing a wide range of different firms (and sub-units within firms) that control different resources, are equipped with different competencies and have different preferences and incentives. Furthermore, a symmetric TDI should regard the concerned firms as not only controlled by the environment, but also able to influence and transform their environments in different ways. These efforts to make the TDI more symmetric, should make it easier to address those issues that previous theory struggled to deal with, e.g. treating disruptive

innovation as a business model challenge and developing more proactive solutions to the innovator's dilemma. We turn to these implications next.

Implications of a More Symmetric Theory of Disruptive Innovation

As stated previously, Christensen (2006) argued that disruptive innovation is a business model problem. Still, existing theory on the subject essentially deals with only a limited part of the business model, primarily customers, and does so in a quite coarse grained way by focusing on whether existing market segments demand a given product or not. If disruptive innovation is regarded as a business model problem, it is clear that earlier work on the subject would need to be revised, as existing theory on disruptive innovation addresses only a limited part of the business model, namely whether or not customers demand the new offering. This explicit focus on customers is clearly illustrated by the following quote from Christensen and Bower (1996):

Our findings support many of the conclusions of the resource dependence theorists, who contend that a firm's scope for strategic change is strongly bounded by the interests of external entities (customers, in this study) who provide the resources the firm needs to survive. (p. 212)

In order for a firm to generate a new customer offering, specific activities are needed for developing and delivering these, and the activities in turn depend on the availability of resources, which fundamentally can be derived from either customers or investors. This illustrates the interconnectedness between various components of business models, but also indicates that the view taken by Christensen and Bower (1996) in the quote above delimits the external environment to customers, and although not explicitly stated, actually only deals with existing customers with homogeneous demands regarding certain performance requirements.

Shifting to a more symmetric perspective – in which all firms are viewed as internally complex and agentive organizations – it becomes much easier to point out just how the innovator's dilemma can be regarded as a business model problem. A multitude of actors, not just aggregate level market forces, influence the focal firm. Because each actor has different preferences, incentives and competencies, they will perceive different barriers to adoption of a new innovation. Similarly, they will be susceptible to different forms of influ-

ence and motivation. Therefore, the incumbent may need to engage a range of actors in order to identify which ones to work with and how to develop the business model as part of exploring a new innovation (Berglund & Sandström, 2013).

Assuming that incumbents can influence these actors also implies a less deterministic theory of disruptive innovation; one that rejects the notion that firms are simply 'held captive' by their customers, and instead assumes interdependent agency (Pfeffer & Salancik, 1978). Despite being internally heterogeneous and riddled with conflicts, an incumbent can still make a concerted effort to target certain firms or sub-units within firms, with specific value propositions, through certain channels, with particular revenue models etc.

Consequently, managerial tools and solutions allowing for purposeful handling of these questions would stand out as interesting and valuable contributions to the fields of both disruptive innovation and business model innovation. To a certain extent, such contributions are readily at hand in other management fields, e.g. marketing, and would thus not have to be developed completely from scratch.

In light of the more comprehensive and detailed conceptualization of the environment described so far, we argue that a disruptive innovation is a business model problem in the following way. To the extent that a disruptive innovation leads to systemic changes in the incumbent's established actor network constellation, this will distort the established business model. Moreover, we argue that it is possible but quite difficult to proactively manage such changes, mainly because the incumbent is forced to act under conditions of restricted freedom, as business models span the boundaries of the firm. Having underlined these difficulties, we claim that the proposed changes towards symmetry are valuable in that they imply a less deterministic understanding than is offered by the current TDI, which essentially regards the surrounding environment as largely beyond the incumbent's control. Taking such a step towards a more symmetric theory would potentially open up opportunities for future development of the TDI, and then in particular for the development of new managerial solutions.

Opportunities for New Managerial Solutions

The discussion above focused on business model innovation. But as indicated previously, a symmetrical TDI has more general implications. Previous literature on managerial solutions has focused on firm-internal matters and

often argued that disruptive initiatives need to be protected from the forces of resource dependency and nurtured in an autonomous organization, for example a spinoff, an independent unit or the exploring parts of an ambidextrous organization (Christensen, 1997; Christensen & Raynor, 2003; O'Reilly & Tushman 2008; de Visser et al., 2010). While this recommendation may be regarded as an organizational prerequisite for successfully developing new disruptive offerings and dealing with the dilemma of resource dependency, the actual process of commercialization needs to be better understood. Having conceptualized the market as a network of heterogeneous actors rather than a collection of segments, we are now in a position to develop more proactive managerial solutions. In fact, a more symmetric TDI opens up for the inclusion of a whole range of well-known managerial concepts and tools that concern how firms can work proactively with users, customers and value networks. Here we will briefly discuss two examples of how incumbents can develop disruptive innovations by working with heterogeneous actors in their environment.

The first example taps into the prescriptive frameworks for customer-centred business model innovation (Sarasvathy, 2001; Blank, 2013). Starting from the insight that disruptive innovations face tremendous uncertainties, these frameworks emphasize the importance of iteratively explicating, testing and revising one's business model assumptions. In the context of business-to-business sales, such assumptions require great knowledge about the purchasing organization and typically include: who are the users, what are their main problems, does the disruptive innovation solve them, who has the relevant budget, who is the technical buyer, who is the internal opposition to a sale, how can this opposition be neutralized, etc. (Blank & Dorf, 2012). Without going into more detail, it is clear that any process of business model innovation that rests on detailed probing and influencing of preferences and incentives of a specific sub-group is made impossible by a meta-theoretical perspective that sees customer organizations, and more generally actors in the external environment, as part of homogeneous segments with predefined price and performance needs.

The above-mentioned example comes from the entrepreneurship literature, but there are lessons to be learned also from strategy research on the management of innovation networks that span firm boundaries (cf. Dhanaraj & Parkhe, 2006; Nambisan & Sawhney, 2011). This literature is premised on the assumption that the focal firm (i.e., the firm that acts as

network hub and orchestrates collaborative innovation initiatives) has limited authority over its network partners and that the network is characterized by interdependencies that make management complex and dynamic. Innovation management under such conditions is not a simple matter of creating, evaluating and deploying a portfolio of innovation projects. Rather, the main challenges concern issues like: identifying the incentives governing key actors in the environment; developing shared knowledge among participants; establishing suitable appropriability regimes in a way that balances predictability and flexibility (typically based on trust rather than formal contracts); managing network membership stability in a way that ensures sufficient creativity while at the same time avoiding rigidity (Mohr & Spekman 1994; Carlile, 2002). Again, it is clear that firms seeking to develop disruptive innovations by orchestrating a complex network of connected actors must conceptualize its environment in a way that is both rather nuanced and assumes interdependence.

In more general terms, the proposed broadening of the perspective on firms' external environment, and an increased emphasis on interdependence of resources and activities provide improved possibilities to embrace, and manage, complexity. This does not, of course, imply that firms should uncritically strive for increased heterogeneity and complexity through disruptive innovations. Reminding ourselves that innovation can indeed be a driver of costly complexity (Gottfredson & Aspinall, 2005), we can on the positive side see that acknowledging a more complex perspective on firms' external environments and actors' inter-relationships can lead to new opportunities for disruptive innovations being proactively identified and evaluated.

Discussion

While we have pointed in this article to the potential benefits of a more symmetrical TDI, such a development may also come at a cost. One apparent drawback would be that the theory becomes more complex. In general, theories of social behaviour need to trade off generality in scope, simplicity in formulation and accuracy in representation (Weick, 1979). For example, economic theories, based on rational choice, are very strong on simplicity and generality, but not very accurate. Behavioural economic theories, based on bounded rationality, are still quite general, but trade off some simplicity for increased accuracy.

Previous work on disruptive innovation has resulted in a quite simple framework that

provides a persuasive argument for how and why incumbents fail under conditions of discontinuous change. However, this simplicity has been achieved partly at the expense of generality and accuracy. Our proposed changes towards symmetry can be thought of as a different trade-off between the above-mentioned criteria, making the theory less simple but arguably more general and more accurate.

Christensen's conceptualization of the market as a powerful force that controls the firm's resource allocation process is very easy to comprehend and use. It also makes perfect sense as long as the environment is simple and difficult to influence. If we instead conceptualize the surrounding environment as made up of a wide range of heterogeneous actors that can be influenced, the resulting theory becomes more complex and consequently less easy to use as an analytical framework. However, especially in industries characterized by complex inter-relationships between numerous different stakeholders, such as for instance the healthcare industry (cf. Christensen, Grossman & Hwang, 2009), a conceptualization of the environment that is highly simplified will not be sufficient to identify all the relevant challenges facing an incumbent. Nor will it help very much in the development of responses. Instead, it may be necessary to map out different actors with conflicting preferences, incentives and competencies, for example those who are likely to receive an innovation in a positive way as well as those who may be impacted negatively and therefore may actively or passively work to block its adoption (cf. Adner, 2006).

So, while some of the original theory's simplicity is sacrificed, a shift towards symmetry would arguably result in a TDI that is more general and accurate as it allows us to address important issues that the existing literature has struggled to deal with. Previous work on disruptive innovation could only address a limited part of the business model, namely whether segments of a firm's market demanded a new offering or not. When focusing on individual firms and sub-groups within firms instead of market segments as the unit of analysis, it becomes possible to discuss business models in a much more nuanced way and to point out how incumbent firms can actually change and manage their network to achieve alignment.

Therefore, our present contribution should not be thought of as an attempt to reject the existing TDI. Rather, it can be seen as a suggestion to consider a revised theory that produces a different trade-off between the criteria of simplicity, accuracy and generality.

Conclusion

In this article, we have tried to inform the existing TDI by addressing some of its meta-theoretical underpinnings. While there is now abundant research on the topic, little has been done with regard to the assumptions upon which the theory relies. Extant literature calls for connecting TDI more clearly to business models, and also bemoans the lack of managerial knowledge about how incumbent firms can proactively pursue disruptive innovations.

We argue that one of the main reasons why previous literature has been unable to address these issues can be found in the asymmetric assumptions of the TDI. Specifically, the focal firm has been regarded as a collection of actors with different preferences, incentives and competencies, whereas firms in the surrounding environment have been reduced to homogeneous parts of anonymous segments that control the firm's resource allocation process. Also, focal incumbent firms have been assumed to be controlled by the firms in their environment (i.e., the firms making up the current, profitable customer segment), but it has not conversely been assumed that focal firms are able to influence firms in their environment. A more symmetric TDI would (1) assume the same degree of heterogeneity in the surrounding environment (including customer firms) as in the focal firm and, relatedly, (2) view the relationship between the focal firm and its surrounding value network as interdependent rather than characterized by unidirectional influence stemming from resource dependence. We argue that the asymmetric assumptions in previous theory have indirectly imposed limitations on efforts to develop managerial solutions to the innovator's dilemma, and specifically that they have obscured the obvious connection with business model innovations.

Since disruptive innovations are often incompatible with existing preferences, incentives and competencies of actors in a firm's value network, they may be met with resistance. To overcome such resistance, the incumbent firm often needs to design a new business model, something that requires a nuanced and creative relationship with external stakeholders, especially when the environment is characterized by a high degree of complexity.

Clearly, it is difficult to manage business model innovation because it transcends the focal firm's boundaries, but it is nevertheless possible to do so. A firm can target certain actors and avoid others (both inside and outside existing customer organizations). It can also experiment with different value

propositions, try out alternative distribution channels, and change its revenue models. Such issues have largely been overlooked by existing theory.

By drawing upon the concept of symmetry, we have taken another step towards understanding how incumbents can actually succeed and manage the innovator's dilemma. We therefore suggest that future research extend this meta-theoretical development by empirically examining how incumbent firms go about designing new business models as they seek to overcome the innovator's dilemma. Further research into how TDI can make use of the literature concerning the management of complexity is also warranted.

Notes

1. Defined as an 'understanding of customer's needs and buying process, access to sales and distribution channels, brand and firm reputation within the targeted market, and communication channels with the customers' (Danneels, 2004, p. 254).
2. An actor in this context can be a customer firm, but it can also be a particular unit inside a customer firm or any other relevant unit in the surrounding environment. The defining characteristic of an actor is that they have distinct preferences, incentives and competencies.

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