THE CONSEQUENCES OF INTENSE CO-CREATION
FOR ENTREPRENEURIAL FIRMS

Eileen Fischer  
Schulich School of Business  
York University  
Email: efischer@schulich.yorku.ca

A. Rebecca Reuber  
Rotman School of Management  
University of Toronto  
Email: reuber@rotman.utoronto.ca

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Abstract
Founders of all new firms must find a means of creating value. Increasing numbers of them are doing so by enrolling unpaid outside actors in value co-creation. This paper inductively develops new theory about the consequences for firms of relying on such value co-creation from inception. Through an in-depth, qualitative study of Twitter, we theorize that intense co-creation results in scope expansion, in terms of a proliferation of value propositions and a growing technological infrastructure. Co-creation intensity, together with scope expansion, in turn precipitates multivalent stakeholder ambivalence. These theoretical insights extend prior research on value creation by new ventures, and on value co-creation more generally.

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Twitter began as a rudimentary social tool based on the concept of status messages but together with those who use it every day, the service has taught us what it wants to be. From features invented by users to applications built on the platform, we’re still discovering potential.

– Twitter co-founder Biz Stone (Twitter blog, 29/07/09; three years after start-up)

The creation of economic value is an essential part of entrepreneurship (Knight, 1921; Penrose, 1959). Entrepreneurship theory highlights that entrepreneurs make early, critical choices about value creation, such as the nature of the firm’s innovation, the markets served and how market value is signalled (Fauchart & Gruber, 2011; Navis & Glynn, 2011; Santos & Eisenhardt, 2009; Schumpeter, 1943; Shane & Venkataraman, 2000). Prior research also shows that early value creation choices are consequential for important market outcomes such as subsequent innovation and diversification (Gruber, MacMillan & Thompson, 2013; Pahnke, McDonald, Wang & Hallen, 2015) and the evaluation of the firm by external stakeholders (Martens, Jennings & Jennings, 2007; Pontikes, 2012).

One value creation choice that is increasingly available to founders is enrolling outsiders to co-create the firm’s value. Co-creation can be defined as having actors who are external to, and not paid by, the firm systematically perform activities that create value for the firm. The word “systematically” is important here, because it indicates that co-creation is ongoing and embedded in the firm’s core activities.¹ For example, software developers co-create Apple’s

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¹ We distinguish this meaning of co-creation from two others meanings that have been associated with it. First, crowdsourcing suggestions for solutions to particular problems, as the Library of Congress did to identify people in old photographs and British Petroleum did to find ways to clean up after a massive oil spill (e.g. Afuah & Tucci, 2012; Piezunka & Dahlander, 2015), is not considered co-creation in the way the term is used here because such crowdsourcing is not ongoing and embedded in the firm’s core activities. Second, marketing scholars emphasize that customers and users co-create value with a producer when using a product or service (e.g. Prahalad & Ramaswamy, 2004; Vargo & Lusch, 2004). “Value” here is value-in-use, or utility, and is co-created jointly by the user and the producer during consumption. This meaning of co-creation holds that it is inherent in all cases of product or service consumption, and that the value is co-created is specific to the consumer. This differs from the definition of co-creation used here, where co-creators participate in a firm’s core activities and yield something of potential value to stakeholders other than themselves.
value when they provide mobile applications for Apple smartphones, and members of the general public co-create Yelp’s value when they post online restaurant reviews.

Co-creation is not a new phenomenon. Newspapers have long engaged in co-creation by having a “letters to the editors” section inviting readers to submit commentary and manufacturers have long engaged in co-creation by setting up beta test sites in the facilities of key customers. However, the widespread use of digital technologies has enabled co-creation to occur on a scale previously unheard of. Digital technologies are easy to access, modify and integrate with other digital technologies (see Kallinikos, Aaltonen & Marton, 2013), and so they facilitate the participation of dispersed and diverse market actors in co-creation activities.

Research on the co-creation of value has tended to focus on particular types of co-creators: key or “lead” users of a producer’s market offerings who come up with product enhancements or ideas for new product uses or features (Bogers, Afuah & Bastian, 2010; Franke, von Hippel & Schreier, 2006; Jeppesen & Frederiksen, 2006; Nambisan & Baron, 2010; Oliveira & von Hippel, 2011; von Hippel, 1986); ordinary users who post information, reviews, commentary or other “user generated content” that can be essential for online opinion forums and reputational mechanisms underlying businesses such as eBay and TripAdvisor (Dellarocas, 2006; Orlikowski & Scott, 2014); and autonomous producers who provide complementary goods and services to focal firms such as platform leaders (Boudreau, 2012; Cusumano & Gawer, 2002; Gawer, 2010; Wareham, Fox & Giner, 2014). However, such research has two significant limitations for understanding how co-creation might impact contemporary entrepreneurial firms, especially those based on digital technologies. First, it has focused primarily on already established companies, such as Microsoft (Gawer, 2010; Nambisan & Baron, 2010), Propellerhead Software (Jeppesen & Frederiksen, 2006), GPS device-maker Garmin (Schau,
Muñiz & Arnould, 2009), and existing banks (Oliveira & von Hippel, 2011). Accordingly, prior research has shed limited light on how the enabling of co-creation may affect entrepreneurial firms, which tend to benefit from having an identity that closely aligns with the founders, firm and market and from using high-control boundary processes to achieve market dominance (Navis & Glynn, 2011; Santos & Eisenhardt, 2009). Ceding some control over value creation to outside market actors might diminish entrepreneurs’ ability to accomplish this alignment, even while having other positive effects, such as fuelling innovation. This suggests there is a need to develop theoretical insights specific to entrepreneurial firms that foster value co-creation from inception.

Second, since prior research has typically focused on specific types of co-creators – lead users, ordinary users or autonomous producers – it has given limited attention to the possibility that a firm might enlist multiple types of co-creators at once. This seems particularly likely for entrepreneurial start-ups coming of age in a time when the line between producers and users is blurring with the growing pervasiveness of digital technologies (e.g. Ansari & Munir, 2010). And as the range of types of co-creators expands, entrepreneurs’ control over the value co-created might diminish. Hence theory development in regards to entrepreneurial firms engaged in co-creation must be sensitive to the impact of having multiple types of co-creators.

In order to gain a greater understanding of value co-creation as an entrepreneurial choice, we chose to study a firm that, from its earliest days, enrolled multiple types of co-creators in value co-creation. The study was guided by the research question: What are the consequences to a new firm of choosing to engage with multiple types of value co-creators from inception? The question is not only theoretically important in extending our knowledge of how entrepreneurs can create value, it is also of practical importance because novel types of businesses are
increasingly based on digital technologies which facilitate the enrolment of diverse types of co-creators from the firm’s earliest days (e.g. Dodgson, Gann, Wladawky-Berger, Sultan & George, 2015).

We address the research question through an inductive, longitudinal study of the creation of Twitter, from the firm’s founding in 2006 to its IPO in 2013. We chose to study Twitter because it is an extreme case in terms of the range of types of co-creators involved at start-up, and we know that extreme cases afford insights that studies of other organizations cannot (Siggelkow, 2007). Twitter has strong theoretical fit with the research question: from the outset, the founders of Twitter intentionally encouraged diverse co-creators, as is illustrated in the opening quotation of this paper. Additionally, the company has had several CEOs, which allows greater latitude in separating the company’s trajectory from the personality of a dominant founder than might be the case when studying other prominent digital start-ups. There is also strong pragmatic fit because we were able to collect rich archival data from Twitter’s earliest days that capture the perspectives and behaviors with respect to co-creation from diverse internal and external stakeholders, as well as expert commentators.

Our analysis of these diverse data sources indicates that the consequences of co-creation are more multi-faceted than has been previously reported. We find that intense co-creation at Twitter encouraged expansion of the firm’s scope, in terms of the value propositions offered to the market and the technological infrastructure that needed to be established and maintained; we further found this scope expansion reinforced intense co-creation. We also found that co-creation was associated with multivalent stakeholder assessments. While co-creation was beneficial because it resulted in entanglement of stakeholders with the firm; simultaneously, it produced
friction in stakeholders’ engagement with the firm. Moreover, these consequences of co-creation were persistent over the seven-year period studied.

This research makes three important contributions to our theoretical understanding of value creation in entrepreneurial firms. First, emergent from our analysis is the theoretical construct of co-creation intensity, which refers to the extent to which co-creation is unconstrained. This construct, while inductively derived, integrates and extends differing streams of research on co-creation by conceptualizing it as an activity that embraces diverse forms of co-creation, not merely different types of co-creators. Rather than focusing on the roles of different co-creators, the co-creation intensity construct highlights decision makers’ choices with respect to the heterogeneity in the types of co-creation facilitated and the empowerment of co-creation.

Second, we develop a model that explains the relationship between intense co-creation and the expansion of an entrepreneurial firm’s scope, in terms of a multiplicity of value propositions and a growing technological infrastructure. While previous research has recognized innovation benefits of co-creation provided by third party partners (e.g. Boudreau, 2012) and technologies that facilitate co-creation (e.g. Franke & von Hippel, 2003), our framework explains why the scope of an intensely co-created firm may expand over time, in response to opportunities to expand the value propositions offered to the market and pressures to improve the capacity, reliability and functional capabilities of the firm’s technological infrastructure. This perspective has important implications for thinking about the resources and capabilities of co-created entrepreneurial firms.

Finally, we offer a theoretical explanation for why the consequences of intense co-creation are intrinsically and simultaneously positive and negative for entrepreneurial firms by providing a model of the relationships between co-creation intensity, scope expansion and
stakeholder assessments of a firm. The theory posits that the consequences of intense co-creation will be persistently mixed because some stakeholders will be highly committed to the firms and others will be disenchanted by friction in engaging with it. This suggests the intriguing possibility that effective co-creation may increase the odds of survival for weakly performing entrepreneurial firms by establishing a base of committed co-creators with the clout and the innovativeness to keep the firm alive despite lacklustre financial performance.

**CO-CREATION IN ENTREPRENEURIAL FIRMS**

It is widely acknowledged that the growth of entrepreneurial firms involves the enlistment of market actors from outside the firm. Past research provides persuasive evidence that social ties and social interaction with other market actors can provide critical resources for a new firm (e.g. Eisenhardt & Schoonhoven, 1996; Shane & Cable, 2002; Stuart, Hoang & Hybels, 1999). For example, bricolage-based views of entrepreneurial activity highlight the use of pre-existing networks to access needed resources (Baker, Miner & Eesley, 2003; Baker & Nelson, 2005) and effectuation-based views of entrepreneurial activity highlight the acquisition of committed stakeholders that can provide needed resources (Read, Dew, Sarasvathy, Song & Wiltbank, 2009; Sarasvathy, 2001). Collectively, this body of research underscores the social nature of entrepreneurship.

Yet, despite the recognition that entrepreneurship is a socialized process, past research tends to focus on the founders as the creators of value. Scholarly attention has been paid to the role of external actors in supporting and facilitating founders’ construction of new value, but under-developed is the prospect that other actors might co-create value. Thus, past research on new firms emphasizes the need to attract resource providers and guard against value appropriation by powerful resource providers such as corporate partners and venture capitalists.
(e.g. Katila, Rosenberger & Eisenhardt, 2008; Pahnke, McDonald, Wang & Hallen, 2015), but largely overlooks the possibility and consequences of involving outsiders in value co-creation.

This involvement has been studied in the context of established firms. Different streams of prior literature tend to highlight a particular type of market actor involved in co-creation, such as ordinary customers and users, lead users or third-party providers of complementary products. Since our research led us to understand that forms of co-creation may vary, and that this variation is not necessarily aligned with particular types of co-creators, we organize our review of the prior literature by discussing two distinct ways in which value is co-created.

First, prior literature shows that value is co-created through sharing, which we define as providing content publicly. The literature highlights the public sharing of diverse online content such as social media posts, user reviews, and online product support in customer forums (e.g. Nambisan & Baron, 2010; Schau, Muñiz & Arnould, 2009; Smith, Fischer & Yongjian, 2012). Shared content can increase a firm’s market value by creating brand value and stronger customer relationships, and attracting a larger user base. For example, the video-sharing company Youtube would have substantially less value if people did not post videos and the peer-to-peer accommodation company Airbnb would have substantially less value if hosts did not post accommodation listings or share best practices on Airbnb’s online Community Center.

The research on value co-creation through sharing has focused on its benefits for established firms, but there is reason to believe that it may be challenging for new firms at the same time that it affords some benefits. Founders need to find out which product markets are best to target (see Dencker, Gruber & Shah, 2009; Gruber, MacMillan & Thompson, 2008). This

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2 To avoid using the phrase “customer and user” throughout the manuscript, we will use the term “user” because it is the narrower term referring to the end user of a producer’s products or services. “Customer” is a broader term and also covers exchange partners throughout the value chain.
implies that value propositions may change in the early years of a firm, and raises questions about the consequences of this for early value co-creators through sharing. Further, founders need to have policies and procedures in order to manage publicly shared content. The rules governing content generation tend to evolve, because social norms and expectations change with changes in technology and people’s use of it (van Dijck, 2012). Although the online content examined in scholarly studies is overwhelmingly positive (for example, Chevalier & Mayzlin, 2006), in practice, it has been estimated that “content moderators” comprise as much as half the people working for social media sites to deal with offensive content such as online bullying and offensive photographs (Chen, 2014). To the extent that this estimate is true, co-creation through sharing could be a costly endeavour for a new, entrepreneurial firm with immature and still-forming practices.

Second, prior research shows that value is co-created through innovating, which we define as improving a firm’s market offerings or providing complementary market offerings. This includes research on both innovations by lead users (e.g. Bogers, Afuah & Bastian, 2010; Franke, von Hippel & Schreier, 2006; von Hippel, 1986) and innovations by autonomous producers providing complementary goods and services on the leader’s digital platform (Cusumano & Gawer, 2002; Gawer, 2010). Research in both areas has drawn attention to the factors motivating innovators to participate in co-creation (Boudreau, 2012; Franke, Keinz & Klausberger, 2013; Jeppesen & Frederiksen, 2006; Nambisan & Baron, 2010).

Much of the research on co-creation through innovating has also highlighted its benefits for established firms, and again, there is reason to believe that it may be challenging as well as beneficial for new, entrepreneurial firms. The platforms literature, in particular, has emphasized the platform leader’s need to incent and manage independent co-creators to augment the platform
in a way that provides value to all platform participants. An unconstrained ecosystem of independent co-creators can result in tensions among them, quality deficiency problems, and an uncertain trajectory for the firm and so platform leaders rely on governance mechanisms to attempt to manage and guide the co-creator activities (Tilson, Lyytinen & Sørensen, 2010; Wareham, Fox & Giner, 2014). This is likely to be particularly difficult to do in a firm’s early days when its practices are immature and its trajectory is uncertain even in the absence of co-creation. Indeed, Hagiu (2014) contends that successful multi-sided platforms are the exception rather than the norm.

Thus, while these streams of past research on co-creation do not specifically investigate co-creation in the context of new, entrepreneurial firms, close reading of this work suggests that there may be challenges in this context, as well as potential benefits. In collecting and analyzing data about Twitter’s incorporation of co-creation from start-up, we were mindful of this prior research, but not constrained by it. Our purpose was to extend our current understanding of co-creation as an entrepreneurial choice by generating new theory about the consequences, both positive and negative, of enrolling unpaid outsiders in value co-creation from inception. Before presenting the findings of our study, we next describe the research methods used.

**RESEARCH CONTEXT AND METHOD**

**Research Context: Twitter**

We analyzed co-creation at Twitter from its founding in 2006 to its initial public offering (IPO) in November 2013. We end the analysis at this point in order to avoid conflating our findings with any impacts of Twitter being a publicly traded company. Twitter was founded in San Francisco. The platform was launched as a product of Odeo, itself a start-up company at the time, and Twitter was spun off as a separate company in April 2007. Since inception, the Twitter
platform has allowed users to post brief messages called tweets which were (until well past Twitter’s IPO) limited to 140 characters. Early on, users “followed” someone to view their tweets; later they were also able to use a search engine to find tweets of interest.

Twitter’s history is a mixed one, with both celebrated highs and notable disappointments. Growth in its user base was critically important to Twitter because it competed in a digital market characterized by herding behavior. Herding behavior occurs through network effects – a product becomes more valuable to users as its user base expands (Katz & Shapiro, 1994) – and because new users make adoption decisions by following the crowd (e.g. Banerjee, 1992).

Twitter’s user base grew extremely rapidly: there were 6 million registered users by the end of 2008 (Gigaom, 03/12/08), 105 million registered users in 2010 (Gigaom, 14/04/10), and 500 million in 2012 (Lunden, 2012). However, the proportion of registered users that are actively engaged with the system is estimated to be much lower (Arrington, 2008; Carlson, 2011), with some analysts reporting that less than one-third users are active (Lunden, 2012).

Throughout this period, Twitter was enormously attractive to investors (Gigaom, 07/11/13). This interest was, however, influenced more by anticipated revenue potential than by actual revenues achieved. Although the company derived some limited income from selling access to its data prior to 2010, it was only in that year that management made a concerted effort to monetize the platform by selling advertising in the form of “promoted tweets” (Twitter blog, 13/04/10) and “promoted trends” (Twitter blog, 4/10/10). The revenues it achieved were relatively modest compared with its market valuation: revenues from all sources grew from

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3 Because our data is archival, and we did not want our data sources to be intermingled and confused with the scholarly references cited, we adopted a convention for identifying our data sources within the text alone. The Twitter blog is labeled as such (“Twitter blog”) and blog entries are referenced by the date in dd/mm/yy format. Any media source cited or referred is identified by the source and date in dd/mm/yy format. Interview data is referenced in the text by “Interview” followed by the name of the speaker and the date in dd/mm/yy format.
$28.3 million in 2010 to $422.2 million in 2013. While its market valuation rose rapidly, scepticism remained, particularly regarding Twitter’s “puny” revenue: the fact that the company was able to generate only “a buck thirty-nine for each of its active users” (Forbes, 31/01/12). Further, investments in the start-ups that comprise app developers in the Twitter ecosystem started to decline in 2010 (Gigaom, 07/09/10).

Beyond the numbers, Twitter’s reputation with the media and other external observers has also been mixed. While many observers initially regarded Twitter with scepticism (for example, Wall Street Journal, 16/02/07), within a year of founding it had garnered enough attention from the business press to be profiled in the Wall Street Journal (Wall Street Journal, 20/03/07). In 2009, Twitter was a TIME Magazine cover story and that magazine included Biz Stone and Evan Williams, two of the company’s co-founders, in their list of the most influential people of the year (Gigaom, 05/05/09). Twitter was endorsed by celebrities like Oprah Winfrey (Gigaom, 16/04/09), and publicly heralded for playing an unprecedented role during key world events like the Haitian earthquake and the Arab Spring (Gigaom, 19/01/11). Competitors, such as Facebook, were viewed as imitating some of its features (Wired, 01/11/09). At the same time, people became disenchanted with malicious content (Gigaom, 14/08/09), difficulties in using the platform effectively (Gigaom, 07/04/10), and changes in policy like the addition of the Quick Bar, which was quickly renamed the “dickbar” by annoyed users (Gigaom, 09/03/11).

Compounding and contributing to these issues, Twitter’s leadership has been turbulent: a book on Twitter’s history is sub-titled “a true story of money, power, friendship and betrayal” (Bilton, 2013). Twitter’s co-founders included Jack Dorsey (who originally conceived of the idea and sent the first tweet on July 16, 2006), Evan Williams, Biz Stone, and Noah Glass. Dorsey was the first CEO of Twitter; Williams took over that role in 2008, while Dorsey became chair of
the board. In 2010, Dick Costolo, who had been the company’s COO, replaced Evans as CEO; Evans became a member of the board of directors (Bilton, 2013). Costolo remained in the CEO position to oversee the company’s IPO in 2013. (He stepped down in 2015 and was replaced by Dorsey.) In analyzing the data, we looked for shifts in co-creation that corresponded to shifts in leadership but did not discern any. Co-creation was so imbricated in the company from the start that it remained a central phenomenon through leadership changes.

**Data Sources**

Real-time archival data forms the core of the empirical materials collected, and is summarized in Table 1. We have three distinct sources of such data. First, to gain insight into the company’s perspectives and practices, we collected all posts in the Twitter blog from the launch of the blog in July 2006 through to the end of 2013. For the first four years, blog posts were mostly authored by Twitter’s founders; from 2011, posts were often said to be authored “By Twitter” or by named employees. There are a total of 1,460 unique posts comprising 889 pages of text. We also read the company’s Prospectus, filed prior to the 2013 IPO.

** Insert Table 1 about here **

Second, in order to understand further the perspectives of Twitter executives, we collected online publicly available videos of interviews with founders and CEOs. This interview data was important to augment the blog posts for two reasons. First, it enabled commentary to be directly tied to individual Twitter executives when blog posts started to be authored by the anonymous “Twitter.” Second, it provided more detailed data on executive beliefs, intentions and objectives because the executives were responding to often challenging questions about the company. We found 43 interviews posted between 2006 and 2013, totalling more than 14 hours.
Third, to understand the perspectives of external observers, we collected media coverage over the period of time from 2006 to the end of 2013. In selecting media coverage, we made a conscious choice to include three types of publications spanning differing perspectives on Twitter. We included four business publications prominent in the financial sector to gain a financial perspective on Twitter (*The Economist, Forbes, Fortune* and *The Wall Street Journal*) and two magazines that provided popularized content on digital companies to gain a popular media perspective on Twitter (*Fast Company* and *Wired*). We used the bibliographic search engine Proquest to identify any articles in which the word “Twitter” appeared in the title or the opening paragraph. This data collection process yielded 203 articles constituting 312 pages of text. Additionally, we included two media sources that paid close attention to Twitter so we could gain in-depth and frequent commentary on both the business and the technical side of the company: *Gigaom*, a prominent San Francisco based blog on technology, and *Techmeme*, a curated technology news aggregator also based in San Francisco. We used a web scraping program to gather all articles in which the word “Twitter” appeared, and included in our data set only those with Twitter in the title. This process yielded 1,201 pages of text from 1,471 *Gigaom* articles, and 1,501 pages of text from 1,722 *Techmeme* articles.

**Data Analysis**

Our overall analytic approach was iterative, with the goal of building and refining theory from a single case study that is an extreme instance of co-creation (see Siggelkow, 2007). We followed procedures similar to those used in prior inductive research involving a single case study (e.g. Tracey & Phillips, 2016). Our approach involved five steps that can be analytically separated: (1) forming a time line for Twitter from inception through to IPO; (2) creating first-order categories relating to the co-creation of Twitter’s business model and the consequences
thereof; (3) abstracting second-order themes from these first-order codes; (4) abstracting aggregate theoretical dimensions from the second-order themes and (5) identifying patterns of relationships among these abstract theoretical dimensions. While we describe them here in sequence, there was overlap in carrying them out, because insights at one step often resulted in a need to revise work products constructed at a pervious step.

In the first step, we focused on producing an extremely detailed descriptive history of Twitter, focusing on the nature of its offering, its achievements, its important stakeholders, and significant events. We compared across our distinct data sources to make determinations of what actors, achievements and events were important to internal and external stakeholders, as well as to people that spanned this boundary (e.g. influential investors). This resulted in the creation of a narrative that highlighted milestones in terms of funding, user base, revenues achieved, initiatives, significant hires, partnerships and acquisitions, as well as key events and reactions to them. A time line of key milestones and events in shown in Table 2.

** Insert Table 2 about here **

The second step of analysis focused on creating first-order categories. Our initial interest in this project—which we began in 2011 when media coverage of Twitter had been intense for some time—was sparked by our awareness of the size and the seeming importance to Twitter of its “ecosystem,” the term used to refer to the community of developers who create applications to run on the platform. We were driven by curiosity about how a start-up would manage to create and appropriate value via such an ecosystem. Our initial coding efforts therefore focused on identifying the value propositions that were promoted by Twitter and/or detected by stakeholders; the revenue models attempted and/or eschewed; the actors involved in producing value; and both favorable and unfavorable reactions to Twitter’s actions and offerings. Because
of our sensitivity to the liabilities of newness (Stinchcombe, 1965) we looked, when coding, for any events or reactions that indicated Twitter was being either destabilized or stabilized.

We coded each data source independently initially, and then compared across data sources. The comparison was important to identify, and seek understandings for, any idiosyncrasies specific to particular data sources. For example, one data source (Gigaom) gave much greater coverage than others to the benefits and the challenges Twitter faced because of its extreme stance toward “free speech” (that is, minimal censorship of tweets); other data sources mentioned this less frequently. As another (unsurprising) example, the Twitter blog and recorded interviews with Twitter executives tended to celebrate the company’s achievements and downplay destabilizing events or negative reactions relative to other data sources. Our process of comparison across data sources helped to ensure that editorial biases specific to any data source did not exert undue influence in our analysis. This coding effort resulted in first-order categories, which fed into the third analytic step.

This third step entailed integrating the first-order categories into a set of second-order themes, a process similar to axial coding (Strauss & Corbin, 1990). The grouping of categories into themes entailed both inductive and deductive thinking. It was informed not only by deep immersion in the data, but also by extensive reading of conceptual and empirical literature on the topics of co-creation and new firm creation. The process was iterative and involved moving back and forth repeatedly between the data, the literature and the emerging patterns associated with each particular construct. Table 3 provides examples of data representing the first-order categories and shows how these categories are grouped into second-order themes.

** Insert Table 3 about here **

In the fourth step, we grouped the second-order themes identified in the prior step into
aggregate theoretical dimensions that were more abstract and parsimonious. Instrumental to this process was a search for repeated patterns over time; this is a form of replication that helps with identification of specific theoretical mechanisms that recur over time (Tsoukas, 1989; Van de Ven, 1992). This analysis resulted in three aggregate theoretical dimensions: co-creation intensity, scope expansion and multivalent stakeholder assessments. Figure 1 presents the final set of second-order constructs, the first-order categories that informed them, and the aggregate theoretical dimensions that link them.

** Insert Figure 1 about here **

In the fifth and final analytic step, we investigated links among the abstract theoretical dimensions. A critical aspect of this was recognizing the centrality of the co-creation intensity construct. This analysis of relationships among co-creation and its consequences resulted in the theoretical model that represents the conceptual contribution of this paper. It is visually depicted in Figure 2.

** Insert Figure 2 about here **

We used two techniques to ensure trustworthiness of the interpretation resulting from these steps. First, we shared our interpretation with one technology journalist who had covered Twitter and other tech start-ups closely for several years. This individual read a draft of our findings, and his input resulted in some minor refinements to the model. Second, we asked a fellow qualitative researcher to audit our data structure and coding scheme to attempt to reduce the possibility of bias in the analysis. This helped to clarify our thinking and resulted in some further revisions.

FINDINGS: CO-CREATION INTENSITY
We begin by discussing two aspects of co-creation that were enacted by Twitter and that together constituted a high level of co-creation intensity. The first factor is the extent of co-creation heterogeneity. The second is the extent to which co-creators were empowered.

**Co-creation Heterogeneity**

Our analysis indicated that Twitter stakeholders were engaging in several forms of value co-creation. Consistent with prior literature, we found evidence of value co-creation through sharing and through innovating. Emergent in our analysis were two additional forms of value co-creation: through embedding and through aggregating. Stakeholders of multiple types participated in each type of value co-creation, as the discussion below indicates.

*Value co-creation through sharing.* From inception, Twitter’s founders envisioned that users would co-create value for themselves and their friends by using the platform for “status updating,” that is, telling others what you are doing at the moment. This is reflected in the answer co-founder Evan Williams gave to a 2006 interview question about what Twitter was “good for.” He explained that Twitter is for “present tense blogging. It’s about what you’re doing about right now. And about what your friends are doing right now” (Interview, Williams, 01/12/06).

Sharing-based value co-creation was not restricted to communications between individuals who knew one another, however. One frequent form of value co-creation through sharing was the use of Twitter by celebrities and politicians who shared information about themselves with those who were interested: high profile examples of early adopters were Britney Spears, who had more than 870,000 followers by early 2009 (Techmeme, 13/04/09) and Barack Obama whose account was, in 2010, ranked as fourth most followed with about 4 million followers (Gigaom, 05/07/11). A second frequently occurring type of value via sharing was public sector organizations
collaborating with citizens. This was illustrated during the 2010 Haitian earthquake, when information shared on Twitter helped officials both to coordinate relief efforts and to raise funds (Wall Street Journal, 14/01/10). A third way in which value was co-created through sharing occurred when entertainment brands and users used Twitter as a “second screen” for sharing information about, and reactions to, programs being broadcast on traditional media. For instance, in an interview with The Wall Street Journal’s Kara Swisher, Dick Costolo explained that:

Mainstream TV viewing, more and more, they have a device in their hand when they’re watching TV. Like on “Glee.” The characters tweet while the show is on. When “Glee” starts, tweets per second for “Glee” shoot up, and stay up 100 times that level until the show ends, and then they drop (Interview, Costolo, 07/01/11).

Costolo’s example of Glee illustrates the sharing between actors affiliated with the program and viewers of the program in creating something valuable to users of Twitter who could use the medium to gain deeper engagement with the show.

As the foregoing examples reveal, value co-created through sharing was diverse in terms of both the kinds of stakeholders who were engaged, and the type(s) of value derived. And while Twitter founders had anticipated some of the ways of value would be co-created through sharing, others were unforeseen. This is consistent with prior research suggesting that engaged users will create value for themselves in ways not envisioned by managers (e.g. Smith, Fischer & Yongjian 2012).

Value co-creation through innovating. A different form of value co-creation was value co-creation through innovating, whether by improving Twitter’s market offering or providing complementary offerings. Some improvements were user-generated innovations, such as the Twitter “hashtag” symbol (#), a convention introduced by user Chris Messina in 2007. He proposed using hashtags as a way of grouping tweets according to topic, which afforded users
the opportunity not just to see status updates but also to search for tweets on topics of interest to
them. Twitter management embraced the hashtag convention which became widely used to
facilitate search and to generate memes (Gigaom, 20/04/10).

Application developers in Twitter’s ecosystem were even more ubiquitously
involved in co-creation through innovating by providing complementary offerings.
Some applications were relatively incremental innovations, or “add-ons.” For example,
Twubble and Twits Like Me were apps that facilitated connecting with a broader
network (Gigaom, 09/04/08). Other applications opened up whole new possibilities in
terms of how the platform might be used. For example, developer David Winer created
an application that circulated headlines and links to articles from New York Times
(Twitter Blog, 16/03/07), which was an innovation that allowed Twitter to be used as
news aggregator. Another application, Stocktwits, was created to “build on the
immediacy and community functions of Twitter for a stock picking community”
(Gigaom, 17/12/08); it extended Twitter’s use by potential investors who could monitor
relevant posts about specific companies, analysts or industries. In addition to app
developers who offered innovations to users, corporations also co-created value via
innovating for their own commercial purposes. For example, Salesforce developed an
enterprise product built on Twitter to extend the value they provided their own
customers (Twitter blog, 23/03/09).

It is clear that Twitter’s leaders foresaw and welcomed the co-creation of value
through innovation from outsiders from the company’s earliest days. The company
opened a formal application program interface (API) in September 2006, thus
facilitating the “interesting projects” that developers were undertaking “without any help” from the company itself (Twitter blog, 20/10/06).

**Value co-creation through embedding.** A type of co-creation that has not been explicitly recognized in prior research, but that is widespread in our data, is value co-creation through embedding, which we define as forming links between organizations’ offerings. As Kallinikos, Aaltonen & Marton (2013) note, digital artefacts are inherently borderless and so can be readily shared. Thus embedding is a form of value co-creation that is particularly possible when the firm enabling co-creation produces digital artefacts, as Twitter does.

A number of forms of value co-creation through embedding were evident in the data. One common form was enabling linkages that connect contact lists across platforms. For example, in 2008, Google included Twitter in their Friend Connect program, which meant that “folks can stay connected with their Twitter network on web sites that have activated the service” (Twitter blog, 16/12/08). This form of embedding co-created value by allowing users to transport their social network across platforms. A second common form was enabling linkages that connect content across platforms. For example, shortly after Instagram was founded, Twitter and Instagram co-operated so that users could seamlessly embed links to Instagram pictures in their tweets (Gigaom, 30/12/11). This embedding added value because it enabled users of both platforms to share their photos more readily to a potentially wider audience.

Other examples of embedding were described by Dick Costolo when he was serving as CEO and was interviewed by The Wall Street Journal in 2011. He stated:

We’re working with the Mozilla folks. They’ve created an add-on for Firefox that’s available now, and you can actually go to Firefox.Twitter.com and download this Firefox bundle and use this version of the browser. Such that by typing in an @handle or a hashtag in the URL you’ll be taken directly to Twitter … If you type in a hashtag, you’ll
be taken to the Twitter search results for that hashtag…. And when Glee is on on Fox now, for a good portion of the show #Glee is in the lower right hand corner (Interview, Costolo, 05/08/11).

As this quotation illustrates, co-creating value through embedding includes simply placing a Twitter hashtag on a screen when a television program is airing (as in the case of Glee), to creating whole new versions of an existing product (Mozilla’s Firefox browser), to integrating additional features (searching Twitter for a particular topic). The diversity of possible ways of co-creating value via embedding is immense owing to the ready portability of Twitter’s digital artefacts. Twitter executives sanctioned wide and diverse embedding, as is reflected in this statement in the company’s Prospectus:

> Millions of platform partners, which include publishers, media outlets and developers, have integrated with Twitter, adding value to our user experience by contributing content to our platform, broadly distributing content from our platform across their properties and using Twitter content and tools to enhance their websites and applications (Twitter Prospectus, 2013: 2).

**Value co-creation through aggregating.** Our analysis indicates that Twitter executives fostered an additional form of value-creation, also not reported in prior scholarly work: value co-creation via aggregating. We define this as the amassing and analyzing of co-created content. The aggregated content could consist of past tweets or it could be the “firehose,” which refers to the streaming set of tweets being created in real time.

Twitter made both past and present content available to an array of outside actors at various points in time. Twitter executives initially allowed only four partners access to its streaming firehose. In an interview, co-founder Evan Williams explained that they restricted access to a small set of firms with which it had close ties “because it is a ton of data, and there is a cost to that. And so even people that we like what they
are doing, and would be fine to offer [the firehose] to right now, we just don’t have the capacity” (Techmeme, 15/07/08).

In 2010, as Twitter acquired financial and technical resources that would enable it to send its data to more firms, the company began to allow a much wider array of organizations to aggregate and analyze its data. In an interview with television journalist Katie Couric, co-founder Biz Stone talked about the rational behind company’s decision to let other organizations amass and analyze its data.

Recently we decided to provide all of the data that is coming into Twitter to companies like Microsoft and Google and Yahoo, very big players in this space. … What’s our goal? Our goal is to serve our end user the best we can. If we provide this data to these great companies who will provide much better search and much better ways of finding interesting content on Twitter … then more people will get more value out of the data. (Interview, Stone, 20/04/10).

This quote from Stone suggests that end users of Twitter would benefit from being better able to find interesting content once it was aggregated by third parties with stronger search engines. The value of being able to access and analyze tweets in aggregate was also evident to users in both the public and private sectors. Public health researchers, for example, found aggregate Twitter data useful as a source of public health information. In an interview with the digital editor of The Economist, CEO Dick Costolo reported that researchers at Johns Hopkins University “determined that you could track the spread of influenza just by examining two billion tweets, and lay it out on a map in way that accurately reflected the way it spread,” (Interview, Costolo, 12/06/12). In the commercial sector, companies like Bluefin Labs developed natural language processing algorithms to make sense of Twitter data in ways that were of benefit to broadcasters and brands:
For instance, this summer, Diet Pepsi studied audience reactions to an advertisement starring Modern Family's Sofia Vergara. During the airings of the ad, social-media comments about Diet Pepsi increased about 19%. Bluefin collected data from 1.8 million people who commented on TV shows on which the ad played. Then they discerned "affinities" by finding out how many commenters were saying something about each show and Diet Pepsi. Understanding these affinities gives Diet Pepsi something valuable for the future: Directing more ad dollars to the commenters' favored shows may prove far more efficient. (Fast Company, 11/12/12)

In summary, the discussion in this section illustrates that Twitter was based on heterogeneous co-creation from inception, involving diverse types of co-creators and diverse types of co-created value. The company courted an array of co-creators, actively encouraging them to discover disparate ways to generate content, to identify and facilitate new uses of Twitter, to make existing uses easier, and to embed and aggregate content in ways that provide varied types of value. Twitter’s co-creation heterogeneity can be regarded as an enacted strategy. As the quotation that opens this paper indicates, this strategy was embraced by the firm’s founders who acknowledged that “together with those who use it every day, the service has taught us what it wants to be” (Twitter blog, 29/07/09).

Co-creator Empowerment

Any firm that involves co-creators in value creation faces the challenge of making their participation easy and attractive, while at the same time discouraging them from making contributions that are not in the firm’s best interest (Tilson, Lyytinen & Sørensen, 2010; Wareham, Fox & Giner, 2014). Twitter, as a start-up, was extreme in its empowerment of co-creators. Policies were highly conducive to enabling co-creators, and did relatively little to restrict their co-creation efforts.

Compared with other web-based companies, Twitter had a liberal policy on user registration: the company did not ask users to reveal their true identity when creating a user ID.
While companies like Facebook, Google and Youtube required users to register with real (or real sounding) names, Twitter did not block or ban users from creating accounts with pseudonyms (Gigaom, 16/09/11). Twitter’s leaders were explicit about this policy and denigrated other digital platforms for their stricter controls. For example, then-CEO Dick Costolo told reporters “Other services say you have to use your real name because they think they can monetize that better and get more information about you.” (Gigaom, 08/09/11).

Coupled with this unrestrictive user identity policy, Twitter consistently promoted the value of freedom of expression, and refrained to the extent possible from censoring tweets or posts. For example, in a blog post entitled “The Tweets Must Flow” co-founder Biz Stone stated:

We don’t always agree with the things people choose to tweet, but we keep the information flowing irrespective of any view we may have about the content…. At Twitter, we have identified our own responsibilities and limits. There are Tweets that we do remove, such as illegal Tweets and spam. However, we make efforts to keep these exceptions narrow so they may serve to prove a broader and more important rule—we strive not to remove Tweets on the basis of their content. Our position on freedom of expression carries with it a mandate to protect our users’ right to speak freely and preserve their ability to contest having their private information revealed. (Twitter blog, 25/05/11).

Company executives often proudly described the platform as “the free-speech wing of the free-speech party” (e.g. Interview, Costolo,18/10/11). Consistent with this positioning, Twitter frequently fought government actions to disclose user account data, such as that associated with Wikileaks (Gigaom, 18/11/11) and Occupy Wall Street protests (Gigaom, 08/05/12).

Inevitably, Twitter faced pressures to place some restrictions on its commitment to enabling free speech among users. For example, in response to complaints from users, steps were taken to curb phony accounts in the names of celebrities (Gigaom, 12/06/09), and to restrict some extreme forms of abusive behavior and spam (Twitter blog, 10/09/09). And as the company
expanded its user base in new markets, it encountered more stringent laws than in its country of origin. This led to some content restrictions, which are described in the Twitter blog:

As we continue to grow internationally, we will enter countries that have different ideas about the contours of freedom of expression. …Until now, the only way we could take account of those countries’ limits was to remove content globally. Starting today, we give ourselves the ability to reactively withhold content from users in a specific country — while keeping it available in the rest of the world. We have also built in a way to communicate transparently to users when content is withheld, and why.... As part of this transparency, we’ve expanded our partnership with Chilling Effects to share this new page, http://chillingeffects.org/twitter, which makes it easier to find notices related to Twitter. (Twitter blog, 26/01/12)

Notwithstanding the incremental increases in restriction on what users could post and see, Twitter users remained relatively empowered. Compared with other platforms that permit users to generate content, Twitter undertook minimal censorship. As a detailed analysis of practices regarding policing user-generated content reported in the year of Twitter’s IPO: “The company that has moved the furthest toward the American free-speech ideal is Twitter, which has explicitly concluded that it wants to be a platform for democracy rather than civility. Unlike Google and Facebook, it doesn’t ban hate speech at all; instead, it prohibits only “direct, specific threats of violence against others” (Techmeme, 29/04/13). Thus, despite some limits having been placed on co-creators’ freedoms over time, it is warranted to characterize Twitter as having maintained policies that were highly conducive to empowering user co-creators.

To a considerable extent, Twitter also empowered the app developers. An interview between two prominent business journalists (Walt Mossberg and Kara Swisher) and two Twitter co-founders (Stone and Williams) highlights how much discretion Twitter’s ecosystem had, for example, in designing Twitter’s user interface:

Mr. Mossberg: Is it an odd thing that you’re running this service but even your Web page is … sort of feature-free? There are a lot of people who have essentially built your user interface[UI].
Mr. Williams: We’re going to try to make our UI as good as possible, but it’s fabulous for us and for users that there are dozens of companies and individual hobbyists competing to create the best Twitter experience possible. Openness is certainly one of the themes of the company and of the product, and the API demonstrates that in a very profound way. …

Ms. Swisher: What is the theory behind creating this ecosystem that you have … no real control over? You have no stake in?

Mr. Williams: I don’t think you can win by trying to corral everything in. We have all these people adding value. … We can’t do all of that. We can’t do it well.

(Interview, Williams, 09/06/09)

As the interviewers’ line of questioning implies, Twitter was unusual in the extent to which it deliberately eschewed control over co-creators in the ecosystem of app developers. And as William’s reply indicates, “openness” was embraced as a one of the company’s “themes.”

It must be noted, however, that Twitter’s empowerment of its co-creators did have limits. In particular, executives decided to invoke greater control over app developers as the company implemented measures to generate revenue that put it into competition with some ecosystem members. In May 2010, when it introduced Promoted Tweets and Trends for the first time, Twitter made changes to its API agreement that imposed limitations on app developers who were building their own ad-related businesses on Twitter. The company blog explained that even though it was placing some prohibitions on certain types of apps, it was leaving developers considerable flexibility to innovate:

There has never been more opportunity for innovation on the Twitter platform than there is now. In order to continue to provide clarity, our guiding principles include: We don’t seek to control what users tweet. And users own their own tweets. We believe there are opportunities to sell ads, build vertical applications, provide breakthrough analytics, and more. Companies are selling real-time display ads or other kinds of mobile ads around the timelines on many Twitter clients, and we derive no explicit value from those ads. That’s fine. We imagine there will be all sorts of other third-party monetization engines that crop up in the vicinity of the timeline. (Twitter blog, 29/05/10).

Despite these assurances, Twitter’s updates to its API in both 2010 and 2012 did represent a decrease in the level of empowerment of app developers. From a conceptual perspective,
Twitter’s co-creator empowerment was diminished to some extent by its moves to reign in what app developers could do. And while its empowerment was high especially given the extremely limited restrictions on users, in principle an even higher level of empowerment is theoretically possible should a case exist where no co-creator restrictions were implemented.

**Summary: Co-creation Intensity**

In highlighting Twitter’s high level of co-creation heterogeneity coupled with a high level of co-creator empowerment, our data analysis inductively identified a theoretical construct that has not been recognized in the literature: co-creation intensity, which we define as “the extent to which co-creation is unconstrained.” Co-creation can vary in intensity: delimited, constrained co-creation occurs in firms with a low level of co-creation intensity and expansive, unrestricted co-creation occurs in firms with a high level of co-creation intensity. Our data indicates that Twitter’s extreme co-creation heterogeneity coupled with its relatively extreme co-creator empowerment produced a very high level of co-creation intensity for the young firm. Alone, either factor could have contributed to a somewhat more moderate level of intensity such as can be observed in companies that facilitate fewer types of co-creation, or empower co-creators to a lesser extent. And while co-creation may be less consequential for new firms that enable only low levels of co-creation intensity, our analysis suggests that extreme levels of co-creation can be associated with a range of consequences as we discuss in the following sections.

**FINDINGS: SCOPE EXPANSION**

Our analysis indicates that Twitter’s co-creation intensity was linked to an expansion of the organization’s scope, a term we use to refer to both the number of value propositions offered
and to the technological infrastructure supporting them. Sorenson et al. (2006) note that a narrow market niche is most typical for young firms. In this case of a start-up with intense co-creation, however, we found considerable potential for niche expansion early on. Co-creators were generating value in so many ways and with such vigour that the company could persistently identify, circulate, and support additional value propositions that could be offered to stakeholders. And since Twitter chose to circulate multiple value propositions, the company needed to develop an infrastructure to support them.

To be clear, the following analysis does not indicate that co-creation intensity “caused” scope expansion. Rather, we argue that the company’s adoption of intense co-creation meant that there were many additional types of value that executives became aware of and could choose to support and circulate. Concomitant with their decision to support and circulate multiple and varied value propositions, it became necessary to grow Twitter’s infrastructure.

**Proliferation of Value Propositions**

Every firm must choose which value propositions it conveys to its exchange partners and support with its operations (e.g. Zott, Amit & Massa, 2011). Our data analysis reveals that the high co-creation intensity at Twitter yielded many potential value propositions that could be promoted. Our analysis also indicates that Twitter top management chose to circulate multiple value propositions to its stakeholders, which we refer to as “proliferation of value propositions.”

One venue in which Twitter circulated its value propositions was its blog, which frequently explained the ways in which Twitter could be useful. In some instances, blog posts were used to educate readers about the value propositions the founders saw as being innate to the platform. For example, an early post explained: “Twitter was in part created because we thought the increasing amount of folks using the status message field in their IM client to indirectly
communicate with friends indicated a potential need or market for a service built around that sort of use case” (Twitter blog, 18/09/06).

More often, consistent with the founders’ embrace of co-creation, the blog let readers know of uses that had been identified or made possible by innovative co-creators. For example, highlighting the value that businesses were finding in the platform, the company noted:

From small companies to big, there’s an increasing amount of business use happening with Twitter. Lots of these companies are using Twitter to search for mentions of their brands or products and then finding ways to better serve customers. …Twitter is a simple and open communication service made more interesting by the many different uses people invent. Applications, projects, and integrations such as Salesforce CRM add to an ecosystem which continues to grow around Twitter delivering variety, relevance, and most importantly, value to users (Twitter blog, 23/03/09).

This quote highlights, and celebrates, the many different uses being identified and the varied ways in which the platform provided value to stakeholders. Twitter continued to convey to stakeholders that it supported multiple and diverse value propositions throughout the period between start-up and IPO. Indeed, in its Prospectus, the firm devoted three pages to listing fifteen different value propositions, as summarized in Figure 3.

As Figure 3 indicates, Twitter chose to articulate and elaborate upon multiple different value propositions for each of four categories of stakeholders. We refer to this as “proliferation” because value propositions accumulated over time. This is in contrast to companies that experiment with one value proposition and pivot away from it after assessing exchange partners’ reactions. It also contrasts with the practice of “continuous morphing” identified by Rindova and Kotha (2001). Continuous morphing involves deliberate changes that produce clear-cut directional trajectories in organizational form, function and basis of competitive advantage. Morphing thus entails transformation; in contrast, the proliferation of value propositions...
exhibited by Twitter is characterized by accumulation rather than the replacement of one value proposition by another. The following quote reflects the proliferation of the Twitter value propositions seven years after start-up, as viewed by an outside observer:

Twitter is many things: a social network, a short-form messaging service, a news wire, a tool for self-expression — even, some believe a force for global political change. But the company itself seems far more keen to position itself among its users — and even better, potential users — as a TV companion, an indispensable tool to keep up with, discuss and even influence the outcomes of shows and live events like sporting contests and political debates (Forbes, 7/10/13).

This quotation does not indicate that Twitter has ceased to offer the value propositions of being a short form messaging service, a news wire, a tool for self-expression or a force for global change. Rather it indicates that as time passes, an additional form of market value – Twitter as a TV companion – is added to the mix. Throughout the time period studied, Twitter continued to add new value propositions without distancing itself from past value propositions.

Growing Technological Infrastructure

As the intense co-creation at Twitter produced more, and more diverse, types of value propositions that were embraced and promoted by the company, the demands on Twitter’s infrastructure escalated. A strong core infrastructure was necessary to support diverse forms of co-creation, and the requirements heightened as the numbers of empowered co-creators increased. A 2008 blog post by co-founder Biz Stone explicitly links system reliability with co-creation intensity: “We have a stated goal to make Twitter a reliable global communication. While we continue to grow around the world, reliability is our most important measurement of success. In order to become a utility that people will use every day for more reasons than we could ever imagine, we need to earn trust” (Twitter blog, 01/02/08). Later that year, Stone announced a new round of funding intended to finance the growth of the core infrastructure: “our biggest opportunities will be worth pursuing only when we achieve our vision of Twitter as a
global communication utility. To reach our goal, Twitter must be reliable and robust. Private funding gives us the runway we need to stay focused on the infrastructure that will help our business take flight” (Twitter blog, 24/06/08).

Twitter’s escalating infrastructure demands, and its difficulty in meeting them, became acutely evident in 2008 given the frequent outages that year, including downtime at the U.S. Presidential State of the Union address and Steve Jobs’ keynote presentation at Macworld (Techmeme, 31/01/08). This led industry observers to comment that “downtime is the Achilles heel of Twitter” (Gigaom, 03/06/08). Although the prevalence and prominence of outages in 2008 undoubtedly prioritized efforts towards increased reliability that year, a 2010 blog post by then CEO Dick Costolo illustrates the persistent need to grow the technological infrastructure: “When we discuss the future of Twitter, we focus on the mechanisms through which we can build a platform of enduring value. The three mechanisms most important to building such a platform are architecting for extensibility, providing a robust API to the platform’s functionality, and ensuring the long-term health and value of the user experience” (Twitter blog, 24/5/10). As the blog post suggests, there is an intrinsic interconnection between delivering on value propositions and strengthening the technological infrastructure.

The growth of the technological infrastructure is also reflected in the company’s evident need to acquire ever more technological capabilities. In Twitter’s first seven years of operation (2006-2013), the company made 28 acquisitions, which provided a wide scope of technological capabilities that supported the diverse forms of value co-created by the heterogeneous stakeholder involved, such as mobile business development (Twitter blog, 13/01/09), geo-tagging (Twitter blog, 23/12/09), data analytics (Twitter blog, 10/06/10), and mobile security (Gigaom, 29/11/11). Frequently, the company made acquisitions in anticipation of co-creator
requirements that were as yet unclear. For example, when Twitter acquired search app Summize in 2008, a blog post explicitly linked the acquisition to co-creation possibilities: “the addition of search to our existing API creates an opportunity for more diversity within projects developed on the Twitter platform. We will continue to support existing applications built on the Twitter API and look forward to innovative new approaches” (Twitter blog, 15/07/08). And specialized capabilities were often acquired to support particular value propositions that were being promoted. For example, the acquisition of social TV analytics company Bluefin Labs was described as supporting a specific second screen value proposition as follows: “This acquisition reflects our commitment to the social TV market and builds on our exclusive partnership with Nielsen announced in December to develop the Nielsen Twitter TV Rating” (Twitter blog, 05/02/13). This quotation illustrates how the proliferation of value propositions promoted externally to stakeholders was intimately intertwined with the growth of infrastructure demands: as the range of value propositions that Twitter promoted and attempted to support grew, so did the company’s technology requirements.

**Summary: Scope Expansion**

Our analysis suggests that scope expansion was not only supported by intense co-creation, but also contributed to it. In other words, these two factors are mutually reinforcing: just as intense co-creation supported the potential for scope expansion, so did scope expansion support the potential for co-creation intensity. When co-creators saw that Twitter was promoting and supporting value propositions related to innovations or uses they had contributed to, it encouraged them to contribute more. And when the new infrastructure capacities were added (as, for example, through search engine improvement via the Summize acquisition), co-creators were given more capabilities to use in creating value.
FINDINGS: MULTIVALENT STAKEHOLDER ASSESSMENTS

Our analysis indicates that Twitter’s co-creation intensity triggered two inter-related outcomes that together contribute to multivalent stakeholder assessments. The first outcome is engagement friction experienced by those using Twitter occasionally or frequently. The second is entanglement, which refers to stakeholders finding Twitter something they are drawn into.

Engagement Friction

Engagement friction refers to aversive experiences with the platform, and many stakeholders complained of them. Perhaps the most basic source of friction is the sheer volume of tweets to which potential users find themselves exposed. As Dick Costolo acknowledged:

One of the challenges that the company has always faced … is that we have to narrow the distance between awareness of Twitter and engagement on Twitter. … There’s enough content flowing into the system constantly that … Twitter has to separate the signal from the noise… [And]… we’ve got figure out the way to capture all the volume at the same time you separate the signal from the noise (Interview, Costolo, 18/10/11).

This suggests that paradoxically, the quantity of content produced by value co-creation through sharing can diminish value for some stakeholders.

In addition to the overwhelming volume of tweets, the content of a portion of them was often off-putting. In some cases, there was simple annoyance with “the vast amount of pointless messages from some people, like “a friend…who shows up at a party and just won’t stop talking” (Gigaom, 16/03/07). In other cases, the off-putting content was “spam;” irrelevant or inappropriate messages sent indiscriminately to users. Spammers were attracted to Twitter from its earliest days because the company did so little to restrict the content conveyed and made accessing the platform so easy. As one observer reported:

A spam-less Twitter feed might just be too good to be true. Spam is becoming an increasing problem on Twitter and something has to be done to separate the wheat from
the chaff. Spammers are using Twitter as a tool by replying to your @username, which then causes the Tweets to show up in your timeline. There isn’t really a way to filter Twitter spam directly from a Twitter client. (Techmeme, 26/04/09).

While Twitter made efforts to reduce spam both by filing lawsuits against high profile spammers and attempting technical solutions to identify specific types of spam, such as tweets that linked to malware (Twitter blog, 05/04/12), Twitter’s high level of co-creation empowerment meant that many types of spamming persisted. And spamming resulted in even those who enjoyed following others or sending tweets themselves becoming frustrated by unsolicited and unwelcome tweets in their Twitter streams.

User harassment was a particularly virulent form of off-putting content on the Twitter platform that contributed to engagement friction and that was fuelled by co-creation intensity. User harassment differs from spamming in that it is targeted at a specific individual or category of individuals, and entails hostile posts that range from embarrassing, to mocking, to cruel, to insulting, to threatening. To illustrate, in one of the earliest first high profile cases of harassment on Twitter, blogger Ariel Waldman, a high volume Twitter user, raised concerns about being hounded by a long-time stalker starting in June 2007. Waldman complained repeatedly to Twitter about the abuse, and some tweets were deleted from the public time line. But Twitter – consistent with its co-creation empowerment ethos – refused to ban the user from Twitter. According to Waldman, she received direct communication from Jack Dorsey stating: “We’ve reviewed the matter and decided it’s not in our best interest to get involved.” (Wired, 22/05/08). Twitter’s choice to enable free speech has frequently meant that individual users or categories of users (e.g. feminists) are subject to ongoing attacks.

Friction also resulted from dysfunctional societal level dynamics to which Twitter was seen as contributing. These dynamics were associated with circulation of excessive volumes of
[E]very time there is an unfortunate tragedy — be it a raging fire or a terrorist attack — we get a torrent of stories heralding the legitimacy of Twitter as a news source. Their core arguments are always the same — that social media tools allow for information to be dispatched far faster than the lumbering old media …[A]s we struggle to make sense of all the readily available information, it’s important also to understand how the role of media outlets has changed. … Despite the tremendous volume of information — and its immediacy — coming from Mumbai via Twitter, getting context about the situation has been a struggle. … Maybe I was overcome with emotion, but the sheer volume of tweets and lack of clarity only fed my frustration with Twitter” (Gigaom, 28/11/08).

While Twitter is not held directly responsible for the manner in which citizens use the technology, and while the platform’s role in societal dynamics is not unambiguously and uniformly negative, instances such as these illustrated the friction that users experienced.

Nor was engagement friction limited to individual users. Some advertisers also apparently found aversive the “free speech” ethos of the site. Twitter’s non-censorship policy meant that when users tweeted in hostile and derogatory terms their dissatisfaction with advertisers whose products or ads they disliked, these posts could be visible in the timelines of those following the brand. The reluctance this generated on the part of some advertisers led Twitter to post a YouTube video that attempted to reassure marketers that although they might be pilloried by a few users, the percentage of “haters” on Twitter was “tiny” (Gigaom, 16/02/11).

MacDonald’s experience when it experimented with a sponsored hashtag to promote “McDStories,” further illustrates the kind of friction advertisers encountered. In response to the company’s initiative, users submitted copious “tales of gross food and alleged animal cruelty” (Gigaom 18/02/13), which was surely not the message McDonald’s intended to convey.

**Entanglement**

At the same time that many stakeholders experienced friction in their use of Twitter, others were becoming increasing entangled with the platform, meaning that they were in some ways reliant
upon it, just as Twitter was reliant on them for co-creating value. As Hodder (2014) has noted, the entanglement of human and objects or “things” means that people depend on these things to achieve goals or accomplishments they are pursuing, and in the course of doing so become dependent on them. This observation characterizes well the experience of many frequent users, who found that Twitter served personal and professional purposes that had not previously been recognized or satisfied. “Web workers” (professionals who work from home via the internet) were among those who were quick to adopt Twitter and find it ever more useful, as the following quotation indicates:

I said it once, and I’ll say it again: I love Twitter.... Twitter is my watercooler as I work solo from home (or a local cafe) in Alaska. It is my finger on the pulse of social media and things happening in the Lower 48. It is my way of touching base with friends, acquaintances and people who I’d like to get to know better.; Looking at my Twitter account over the last few weeks, I also saw distinct ways I used Twitter in my work proving once and for all that Twitter is not just chatter but a useful business tool (Gigaom, 29/09/08).

Even those who initially resisted the platform could become entangled with it. For example, eminent film critic Roger Ebert, who used Twitter to review movies up to the time of his death in 2013, wrote:

I vowed I would never become a Twit. Now I have Tweeted nearly 10,000 Tweets. I said Twitter represented the end of civilization. It now represents a part of the civilization I live in. ... I said I feared I would become addicted. I was correct.” (quoted in Gigaom, 04/04/13).

As Ebert’s use of the term “addiction” implies, entanglement entails a sense of being unable to function effectively without the company. Beyond personal attraction to the platform, some perceived they needed to persist with using Twitter owing to the fact that it was the only reliable way of communicating with others in their network:

Despite the attempts of many, from Pownce to Plurk, to build a better Twitter, by and large the Twitter user-base seems to be staying put. I’ve heard from more than one of my contacts that they’d be happy to leave Twitter’s problems behind, except for one little
thing: all of their friends are still on Twitter. By building up a huge mass of users, Twitter benefits from our existing social connections and their inertia. … This has fuelled the growth of the Twitter ecosystem, increasing Twitter’s lock-in, if you depend on any application built on top of Twitter, you’re stuck on Twitter. … Twitter’s biggest asset is Twitterers (Gigaom, 03/06/08).

This quote indicates that entanglement with Twitter can be a function of network effects (Katz & Shapiro, 1994) – having friends and associates who also use Twitter – and of needing to use applications that rely on Twitter in order to perform as intended. Even though alternative platforms might be available, there is “stickiness” once a user becomes both socially and materially entangled with a co-created object like Twitter. As one blogger put it “I now need Twitter more than Twitter needs me” (Techmeme, 08/07/08).

Beyond personal and professional entanglement with Twitter, commentators also observed a certain socio-cultural entanglement or embeddedness. That is, social institutions like mainstream media, governments, or public health and safety organizations began to take Twitter for granted as a source of information and as a communication tool. As one journalist wrote:

The more I see where social media and online communications is going, the more I realize how Twitter has transformed the landscape in both big and subtle ways…. Even mainstream media is referring to the Twitterstream, using Twitter to gauge public sentiment, and referring to people’s Twitter pages (Gigaom, 28/11/08).

At times of crisis, the reliance of the public and of institutions on Twitter became particularly apparent. This was vividly illustrated, for example, when Hurricane Sandy hit New York as the following post indicates:

As you know, the devastation of Hurricane Sandy has hit millions. Many turned to Twitter to discuss what they were going through. … Twitter was a fine replacement for cell phones and landlines that weren’t working. People sent more than 20 million Tweets about the storm between Oct 27 & Nov 1…. [P]eople weren’t only tweeting, they… were using the search and discover functionality, along with trending topics, to make sure that they had all of the information they needed to navigate their way through everything that was going on. Mother Nature causes quite a scare when these things happen, and having a readily available set of information can calm those nerves. … That means that the
“system” is working, and that Twitter could one day become a national broadcast system in the case of emergency (Techmeme, 2/11/12).

Summary: Multivalenced Stakeholder Reactions

Taken together, engagement friction and entanglement precipitate multivalent stakeholder assessments of Twitter. Some simply find the platform frustrating. Others find it intensely annoying and even offensive. This negative valence of many stakeholders’ reactions to Twitter is reflected in the fact that the platform continuously encountered “churn” or turnover in its user base. Throughout the seven-year period we examined, observers repeatedly commented that while new users increased, the percentage of those that stay engaged is low. For example, a 2009 article states: “Twitter may be bringing in millions of new users every month — but it is struggling to keep them. Nielsen Online said Tuesday that Twitter’s audience retention rate, or the percentage of a given month’s users who come back the following month, is now a rather measly 40 percent.” (Gigaom, 28/04/09). Two years later, the point is reinforced: “While Twitter has been able to sign up north of 200 million users, it has been a bit tricky getting all of them to stick around and continue to use the service” (Techmeme, 25/07/11). This refrain is repeated again in 2013: “Our sources tell us that churn and retention are the number one headache at Twitter and the company is trying to make sure it finds a way to get those new users hanging around the service.” (Gigaom, 28/08/13). User churn reflects the tendency of those with negatively valenced assessments of Twitter to disengage from it.

At the same time, based on their positive assessments, other stakeholders demonstrated considerable engagement with Twitter. The creativity fuelled by the legion of empowered co-creators, coupled with the expansive scope that Twitter chose to support, contributed to making it appealing, and often invaluable, to diverse stakeholders. Such positive evaluations of Twitter are
reflected in the steady growth of companies that chose to partner in some manner with Twitter. By the time of its IPO, Twitter, in its Prospectus, reported that it had over six million platform partners that were “contributing content to our platform, broadly distributing content from our platform across their properties and using Twitter content and tools to enhance their websites and applications” (2013: 98). The Prospectus emphasized that “Many of the world’s most trusted media outlets, including the BBC, CNN and Times of India, regularly use Twitter as a platform for content distribution” (2013:2). And it noted that: “Although we do not generate revenue directly from users or platform partners, we benefit from network effects where more activity on Twitter results in the creation and distribution of more content, which attracts more users, platform partners and advertisers, resulting in a virtuous cycle of value creation” (2013: 61).

Positive evaluations of Twitter are also reflected by the amount of capital invested in the firm. Between 2006 and 2012, Twitter raised three rounds of financing totalling approximately $57 million. Within three years of start-up, Twitter had a market valuation of roughly $1 billion U.S. (Wall Street Journal, 25/09/09). This rose to $3.7 billion in 2010 and to $11 billion in early 2013 (Forbes, 03/01/13), and at the time of the IPO in 2013 the company was valued at approximately $31 billion (Gigaom, 07/11/13). Investors clearly had favourable evaluations of the platform into which they invested so much.

As Figure 2 indicates, the theoretical insight generated from our analysis as a whole is that when new firms engage in value co-creation from inception, they may trigger mixed consequences if they choose to foster high levels of co-creation intensity. Specifically, high levels of co-creation intensity may make it likelier that the firm will also choose to engage in scope expansion in terms of both value propositions offered to stakeholders and the technological infrastructure that supports those value propositions. Scope expansion in turn
supports co-creation intensity, because stakeholders who are inclined to engage in co-creation are supported and reinforced both by seeing new value propositions added based on their activity and because they have a robust infrastructure on which to engage in co-creation. The reciprocally reinforcing dynamic between co-creation intensity and scope expansion triggers multivalent stakeholder reactions. Although some stakeholders disengage based on negatively valenced assessments, other begin to engage or deepen their engagement based on positively valenced ones. As this summary of our theoretical model implies, our analysis does not suggest that the dynamics of co-creation outlined here would necessarily unfold if a focal firm chose to keep co-creation at low levels of intensity: the choice of co-creation intensity level at inception is thus the critical factor in this theoretical model.

DISCUSSION

We began this research with the observation that in making choices about value creation, entrepreneurs are increasingly leveraging digital technologies to involve external market actors in co-creating the value of their firm from its earliest days. Our objective in this study was to understand the consequences of this choice. Towards this end, we conducted a detailed study of the first seven years of Twitter, a firm that represents an extreme case of co-creation. We believe that our findings, based on analyses of diverse accounts of these early years at Twitter, make three important contributions to our theoretical understanding of value co-creation in entrepreneurial firms. First, we conceptualize co-creation intensity as a theoretical construct independent of particular types of market actors engaging as co-creators. Second, we develop a model that explains why a high level of co-creation can be associated with an expansion of the firm’s scope, in terms of both value propositions and its technological infrastructure. Third, we offer a theoretical explanation for why co-creation may result in negative, as well as positive,
assessments of the firm by stakeholders. In this section, we discuss these contributions and the avenues they suggest for future research on entrepreneurial firms. We also consider the question of the contextual conditions that may impact these consequences of co-creation.

**Co-creation Intensity as a Theoretical Construct**

As indicated above, prior research on co-creation highlights particular types of market actors and their roles in value creation: (lead) users offering innovations and support services (e.g. von Hippel, 1986), ordinary users generating online content (e.g. Schau, Muñiz & Arnould, 2009), and autonomous producers offering complementary goods and services (e.g. Cusumano & Gawer, 2002). In this study we have sought to integrate and extend disparate bodies of literature by conceptualizing distinct forms of value co-creation in which one or more of these categories of market actor may engage.

Crucially, our analysis of the data on Twitter led us to develop the theoretical construct of co-creation intensity. A firm’s co-creation intensity refers to the extent to which the co-creation is unconstrained. This construct reflects our finding that heterogeneity and empowerment are important dimensions of co-creation independent of particular types of outside market actors engaged in it. In analyzing the data through the lens of co-creation intensity, we were able to understand how co-creation is related to important organizational outcomes for new firms to a degree that is not possible when the conceptual lens is focused on particular market actors. The increasing sophistication of digital technologies is likely to make new forms of co-creation possible, and we believe that a form-focused perspective should be added to an actor-focused perspective for a complete theoretical understanding of co-creation phenomena.

Moreover, in developing a conceptualization of co-creation focused on forms of value created versus types of actors involved, we characterized the extant literature as highlighting two
avenues via which value is co-created: through sharing and through innovation. This perspective also enabled us to identify inductively through data analysis two additional ways in which value can be co-created: through embedding and through aggregating. While the market value of these latter two types of co-creation has been recognized by practitioners and in the media, they have not yet been part of scholarly discussions of co-creation. The nature of the value co-created by embeddedness and aggregation implies that early market dominance may be critical for new firms based on co-created value, and so a relevant question for future research is how founders can attain early market dominance. This question has partially been addressed by previous research on network effects and platform dynamics (e.g. Boudreau & Jeppesen, 2015; Gawer, 2014; McIntyre & Srinivasan, 2017). However, this literature has not yet addressed early market dominance in the context of multiple types of co-creators.

**Co-creation Intensity and Scope Expansion**

Previous research has emphasized the factors encouraging co-creation, in terms of inducements, motivations and governance mechanisms (e.g. Jeppesen & Frederiksen, 2006; 2010; Wareham, Fox & Giner, 2014). Our study extends these findings to provide a model of the effects of a persistently high level of co-creation intensity. Our framework explains why co-creation intensity is related to scope expansion of a new firm, through the circulation of an expanding number of value propositions and growth in the technological infrastructure to support them.

Both of these findings are important theoretical additions to our understanding of co-creation in entrepreneurial firms. With respect to value propositions, co-creation has been previously viewed as providing enhanced value, through improved product suggestions or customer service enhancements (e.g. Nambisan & Baron, 2010), innovations (e.g. Boudreau,
2012), or, more generally, because of the increased user base through network effects (e.g. McIntyre & Srinivasan, 2017). Here we show that intense co-creation can increase and broaden the set of value propositions offered by the firm itself. The multiplicity of value propositions that are made evident under conditions of intense co-creation may be beneficial in providing founders with valuable information about user preferences. Sorenson (2000) points out the trade-off between offering variety, which provides information about unmet demand, and focus, which concentrates the firm’s resources and allows higher value to be offered, and suggests that it is less beneficial to cull poorly-performing products when market uncertainty is high because demand is unstable. This theory is consistent with our finding that Twitter founders added value propositions but rarely culled any. Sorenson’s study was of tangible manufactured products, with firms having an average of four products. The cost of variety is likely to be lower for firms such as Twitter where value propositions are attached to a multi-purpose technology rather than to specific market offerings. However, a question for future research is whether co-created variety becomes disadvantageous at high levels, because of the costs of supporting the expectations associated with more, and more diverse, value propositions and users, and the difficulty of culling value propositions favored by users who are committed co-creators, such as banning certain types of content.

Our finding that the high level of co-creation intensity at Twitter was associated with a growth of its technological infrastructure also makes a theoretical contribution to our understanding of co-creation. Previous research has shown the value of providing technology to support co-creation, such as toolkits (e.g. Franke & von Hippel, 2003) and APIs (e.g. Gawer, 2014), but has stopped short of considering the implications of co-creation for a firm’s technological infrastructure. Our data analysis revealed that the Twitter’s high level of co-
creation intensity put pressures on the capacity, the reliability, and the functional capabilities of
the company’s technological infrastructure, and encouraged the acquisition of an increasing
number of specialized technology firms over time. These findings suggest that the technology-
related costs of co-creation may be substantial and should be taken into account in future
research on co-creation outcomes.

Taken together, these findings show that organizational boundaries are likely to be
porous in a firm based on co-created value, with a fuzzy distinction between insiders and
outsiders. Important resources and capabilities of such new firms are not owned or controlled by
the founders. This suggests that future research should extend our understanding of firm-level
resources and capabilities to take into account the value-creating activities conducted by
autonomous market actors. For example, Helfat and Peteraf (2003) argue that organizational
capabilities evolve over time as a firm grows, and future research on entrepreneurial firms can
investigate the trajectories of capability development when co-creators may number in the
thousands or millions globally even in a firm’s early days. The dynamic capabilities perspective
can also be extended to take into account co-creation. This perspective emphasizes the
importance of adapting to changing environmental conditions by sensing new opportunities and
threats and reconfiguring the firm’s resource base to respond to them (Teece, 2007; Teece,
Pisano & Shuen, 1997). Our research suggests that founders of co-created firms also need to pay
attention to detecting opportunities and threats from co-created innovation, as the Twitter
founders did in adopting user-generated improvements and acquiring some of autonomous
software producers on their platform. Moreover, reconfiguration is likely to be more complex as
co-creation intensity increases because it involves the orchestration of heterogeneous and
empowered autonomous market actors.
An additional area where current theory on resources and capabilities may need to be extended to take co-creation into account relates to the contention that processes constituting effective dynamic capabilities differ across markets. Eisenhardt and Martin (2000) reason that in relatively stable markets with clear boundaries and identifiable players, dynamic capabilities embody routines based on existing knowledge, while in high velocity markets with blurred boundaries and shifting players, new knowledge has to be created for new situations and so dynamic capabilities involve emergent adaptation and experimentation. Although these ideas were developed to examine variation in market dynamism in terms of speed, we believe that they may also be applicable to comparing firms with lower and higher degrees of co-creation intensity, since the unpredictability resulting from blurred boundaries and shifting players is concomitant with unconstrained co-creation. This suggests that the start-up processes of firms based heavily on co-creation may differ from those that involve little co-creation. Thus, we believe that investigation of the resources and capabilities of entrepreneurial firms that enable co-creation at varying intensity levels offers a promising area for future research.

**Multivalent Stakeholders Assessments of Co-created Firms**

Previous research on co-creation has emphasized the benefits of co-creation in terms of customer relationships (e.g. Nambisan & Baron, 2010), brand value (e.g. Smith, Fischer & Yongjian, 2012), and new product enhancements and innovations (e.g. Boudreau, 2012; Jeppesen & Frederiksen, 2006). In contrast, by de-centering the contributions of particular types of market actors and considering organizational outcomes more broadly, this research illustrates that co-creation can be associated with negative as well as positive consequences for new, entrepreneurial firms. Specifically, the co-creation intensity of Twitter was associated with multivalent firm-level assessments by stakeholders. On the one hand, a cadre of committed co-
creators was established, Twitter attracted large amounts of financial capital, and “Twitter” entered the global lexicon. On the other hand, users, application developers and advertisers perceived considerable friction in engaging with Twitter and became disengaged. It would not be accurate to say that the consequences of intense co-creation for Twitter were positive or negative; rather, they were intrinsically and simultaneously both.

As part of the data analysis, we looked for temporal brackets (Langley, 1999), periods of discontinuity in the valence of outcomes, in order to determine whether there were periods in the company’s history where stakeholder assessments of Twitter were predominantly positive or predominantly negative. Evidence of changes in these assessments over time would indicate the possibility of temporal explanations for the patterns in outcomes observed. Temporal discontinuities in theoretical relationships are particularly important to examine for new firms because key elements of organizations are likely to be unsettled early on (e.g. Baker & Nelson, 2005; Dencker, Gruber & Shah, 2009). However, as has been shown in the Findings section, multivalent assessments were persistently observed throughout the 2006 to 2013 period examined.

Although not part of the formal analysis, we note that these mixed outcomes persist three years later, in 2016. In 2016, Twitter was still unprofitable and user numbers and revenue were stagnating (Mims, 2016). Revenue fell short of analysts’ expectations and the company was “dogged by charges that it is a haven for hatemongers and other miscreants” (McCracken, 2016). A 2016 article in The New Yorker was titled “The End of Twitter,” and highlighted these problems, as well as the encroachment of rivals (Topolsky, 2016). On the other hand, also in 2016, Twitter won the digital streaming rights for National Football League games over Facebook (Bucholtz, 2016), Twitter was described as a “central piece of our cultural
infrastructure,” where “Shonda Rhimes takes TV viewers behind the scenes of her many series, and Bill Gates shares infographics about progress in tackling the planet’s most important problems” (McCracken, 2016), and analysts estimated that with $3.5 billion in cash reserves, the company can stay in business for over 400 years at the current burn rate (Fahey, 2016).

We believe that an explanation for Twitter’s constancy in the presence of such persistently mixed outcomes may lie in the notion of permanently failing organizations (Meyer & Zucker, 1989). It seems odd to label Twitter a “permanently failing organization” given the company’s $24.57 billion valuation at IPO; however, the ideas behind the label seem relevant to Twitter. Permanently failing organizations are those that survive despite sustained low performance results because there are stakeholders who benefit from the organization and are committed to keeping it alive. Meyer and Zucker argue that permanent failure is more likely when there are more market actors dependent on the firm, when they are more influential, and when they are more densely connected (1989: 155-6). In the case of Twitter, the intense level of co-creation by socially-influential actors such as politicians, celebrities, and the media may play a role in explaining why Twitter has survived in its current form for so long, in defiance of its weak financial performance. Thus, an important question for future research is whether intense co-creation may increase the odds of survival for weakly performing firms by establishing a base of committed co-creators with the clout and the innovativeness to keep the firm alive. A related question is whether intense co-creation from a firm’s earliest days may adversely impact performance if a base of committed co-creators inhibits founders’ ability to make the early market or product changes that are so often beneficial for new firms (Gruber, MacMillan & Thompson, 2008).
Another avenue for future research on stakeholder assessments of firms with intensive
co-creation relates to their market categorization. Categories have been described as the
“cognitive infrastructures that stabilize and make possible markets, valuation, and exchange”
(Schneiberg & Berk, 2010: 257). Audience members categorize based on perceptions of whether
an entity’s attributes fall within categorical boundaries (Vergne & Wry, 2014). Organizations
have ambiguous market categorization when they are identified with multiple category labels or
with an ambiguous label (Pontikes, 2012: 84). Although we do not have data that captures
individuals’ market categorizations of Twitter, our data does indicate that knowledgeable
observers had difficulty in categorizing the firm. For example, prior to the company’s IPO, Om
Malik commented on his difficulty in categorizing Twitter over seven years as a Twitter user: “I
tried to define Twitter then, and failed. I have tried many times since, and failed. After all these
years, I still have not been able to come up with one singular definition” (Gigaom, 06/11/13).
Three years later, in 2016, the Twitter blog itself reported that while 90% of people globally
recognized the Twitter brand, “most didn’t know or simply misunderstood what Twitter was for”
(Twitter blog, 25/07/16).

The observation that Twitter may have an ambiguous market categorization is consistent
with the enduring venture capitalist interest in Twitter. Pontikes (2012) shows that venture
capitalists favor market category ambiguity because it offers a greater latitude to change
positioning in order to take advantage of new opportunities. Pontikes (2012) also shows that
organizations with ambiguous categorization are less appealing to consumers because they want
to be clear about what they are buying, and this is consistent with the persistently low retention
rate of active Twitter users. However, it is not consistent with the continual replenishment of
new co-creators and the ongoing presence of Twitter’s users who are highly committed to, and
entangled with the company. Our findings show that not all users are deterred by Twitter’s ambiguity, and indicate that some are intrigued by co-creation possibilities. Therefore, we believe that an interesting avenue for future research is to examine ambiguous market categorization in the context of co-creation, with research questions related to the link between co-creation and categorical ambiguity, as well the preferences of heterogeneous co-creators with respect to categorical ambiguity.

**Contextual Conditions Impacting Co-creation Intensity**

With a single case study, it is not possible to provide empirical evidence of the contextual conditions that might impact these consequences of co-creation. However, in order to acknowledge alternative influences on these consequences, we believe that is important to think about possible sources of variation or boundary conditions that may be investigated in future research. Therefore, following Denis, Dompierre, Langley and Rouleau (2011) and Hampel and Tracey (2017), we go somewhat beyond our data and combine our insights about the case with prior research on other organizations in order to identify three contextual conditions that may have enabled co-creation intensity to remain high in the face of adverse consequences.

The first of these contextual conditions is an ideological commitment to co-creation. The data emphasize that from the company’s inception the Twitter co-founders were ideologically committed to open and diverse co-creation. They were bloggers, and saw Twitter as “a very low barrier way to blog what you’re thinking about” to your friends (Interview, Dorsey, 01/12/06). In creating the product, they were creating a tool that they wanted to use to express themselves. They not only made sense of their venture in terms of what was familiar to them, like many entrepreneurs (see Cornelissen & Clarke, 2010), they also celebrated open expression. As shown in the data presented in the section on co-creation intensity, this ideological commitment to
openness was a theme running through the history of the company. This has not been the case for other digital platforms. For example, Airbnb has never had a public API (Yeung, 2016). It is plausible that founders who were less ideologically committed to co-creation would have constrained it over time, either by limiting the diversity of co-creators or co-creation, or by restricting the behavior of co-creators to a greater extent.

The novelty of Twitter’s business concept is a second contextual condition that may have enabled co-creation intensity to remain high despite the somewhat negative outcomes that ensued. Since Twitter was in a very new market, the relevant success metrics were unclear. Twitter did well on some metrics (e.g. user adoption and market valuation) and poorly on other metrics (e.g. user retention). However, these were not conventional certification contests that provided clear-cut signals of competence vis-à-vis the competition (e.g. Rao, 1994) for two interrelated reasons. First, since the market context was so new, there was no past history of comparable firms. This lack of comparability existed for much of the time period studied, and it was difficult for observers to calibrate how positive or negative particular signals were. In their early days, Twitter and Facebook were not compared much, in the belief that “the two companies ultimately serve substantially different behavioral paradigms” (Techmeme, 07/02/09). As time went on, Facebook and Twitter were compared to a greater extent, but on varied metrics, and it was not clear which mattered most. For example, in early 2013, Facebook had more users than Twitter (Techmeme, 05/02/13), Twitter dominated second-screen advertising (Techmeme, 03/02/13), and the two companies were competing to add users globally (Techmeme, 14/01/13). Second, and related, technological development lagged what people wanted to do on social media platforms. Accordingly, there was great uncertainty with respect to what success looked like in key areas, such as effective online advertising and analyzing vast amounts of data to show
users only what is meaningful to them. New firms in market contexts with clearer comparable 
rivals and metrics of superiority will need to perform strongly on these metrics, which may mean 
constraining co-creation to gain more control over the firm.

A third factor that may have helped to sustain a high level of co-creation intensity is 
resource munificence. While Twitter was never profitable throughout the time period of our 
analysis, the time line in Table 2 shows that the company received considerable investment 
during this time, and the data indicate that even with costly infrastructure increases, large cash 
reserves existed. For example, the company had over $300 million in cash and cash equivalents 
just prior to IPO, which was expected to meet capital requirements for twelve months (Twitter 
Prospectus, 2013: 84-85). Persistent investor commitment to Twitter may have provided a 
measure of organizational slack (Bourgeois, 1981; Thompson, 1967) that buffered Twitter from 
having to respond to the negative consequences of co-creation. Founders of new firms with less 
success at attracting investors may need to constrain co-creation when scope expansion becomes 
too costly.

Thus, there are multiple and diverse avenues to explore in understanding more about 
value co-creation in entrepreneurial firms. In developing the construct of co-creation intensity, 
and illustrating its relationships with important organizational outcomes, this study provides a 
basis for future research which transcends particular market actors and makes room for new 
forms of co-creation. We believe that in an era where digital technologies are growing in 
sophistication and people are increasingly emboldened to use them to participate in 
organizational activities from a firm’s inception, greater scholarly attention needs to be paid to 
co-creation in entrepreneurial firms. We hope that other researchers will find our model useful in
developing their ideas about this growing phenomenon and we look forward to learning from them.
REFERENCES


Table 1
Summary of Data Collected

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Twitter-Generated Data
*Counts for the blog are the number of posts per year*

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Interview Data
*Publicly available online interviews with Twitter executives per year*

<table>
<thead>
<tr>
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<th>2008</th>
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<th>2010</th>
<th>2011</th>
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<th>2013</th>
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<td>217:09</td>
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## Table 2
### Summary of Key Events and Milestones in Twitter’s History

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
</table>
| 2006 | • Twitter founded (March)  
      | • API introduced (September) |
| 2007 | • Twitter received the SXSW Web Award in the blog category (March)  
      | • Raises funding of $5 million (July)  
      | • User proposes use of hashtag (August) |
| 2008 | • Raises funding of $15 million with valuation of $80 million (May)  
      | • Makes 2 acquisitions for search and content creation capabilities (July-November)  
      | • Has 6 million registered users (December) |
| 2009 | • Much publicity around Twitter coverage of Flight 1549 crash in Hudson River (Jan)  
      | • Raises funding of $35 million (February)  
      | • Has over 2,000 third-party apps on platform (March)  
      | • Integration with Salesforce enterprise system (March)  
      | • The “Twitter Guys” included on TIME list of most influential people (April)  
      | • 60% of users reported to leave after one month (May)  
      | • Launched “Verified Accounts” to stop impersonation of celebrities (June)  
      | • Raises funding of $100 million with a $1 billion valuation (September)  
      | • Generates revenue from licensing deal with Google and Microsoft (December)  
      | • Acquires MixerLabs for geo-tagging capabilities (December) |
| 2010 | • Has over 50,000 registered third-party apps in January and 100,000 in May  
      | • Makes 4 acquisitions for user interface, mobile messaging, development and social question-and-answer capabilities (April-December)  
      | • Has over a 100 million registered users, with 300,000 new users each day (April)  
      | • Supports 65 million tweets per day (June)  
      | • Provides a Twitter button for companies to put on their website (August)  
      | • Raises funding of $200 million (December) |
| 2011 | • Much publicity around Twitter’s role in the Arab Spring (January-April)  
      | • Has 200 million registered users (February)  
      | • Makes 6 acquisitions for user interface, analytics and mobile security (May-Nov)  
      | • Second screen deals with Project Runway (July) and The X Factor (October)  
      | • Raises funding of $800 million; valued at $8 billion (August-September) |
| 2012 | • Makes 7 acquisitions for analytics, security, content creation, development (Jan-Oct)  
      | • Releases open-source tools to analyze big data (March)  
      | • Has 13,000 translation volunteers and is available in 28 languages (March)  
      | • Entered into a partnership with NBC to live stream the Olympics (July)  
      | • Lost $50 million in 2012 |
| 2013 | • Makes 8 acquisitions for analytics, security, content creation, development, advertising support (January to September)  
      | • User churn and retention are viewed as Twitter’s “number one headache” (August)  
      | • Twitter has 100 million daily active users and is not yet profitable (October)  
      | • Twitter goes public with a $24.57 billion valuation (November 7) |
### Table 3
**Illustrative Evidence of First-Order Categories**

<table>
<thead>
<tr>
<th>First-Order Categories</th>
<th>Second-Order Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value Co-Creation via Sharing</strong>: “Kogi Korean BBQ(@kogibbq) in Los Angeles… sends updates to its 2,100 followers telling them where its taco truck will go next, prompting customers to line up before the van arrives.” (Fortune, 01/06/09)</td>
<td>Co-creation heterogeneity</td>
</tr>
<tr>
<td><strong>Value Co-Creation via Innovating</strong>: “[The @ replies function] was not originally part of Twitter until people started doing it. Then we began linking the updates together and enough people started using it that requests for specific levels of control began rolling in. We received enough feedback from folks who enjoy using the @replies feature to create a new setting” (Twitter blog, 06/12/07)</td>
<td></td>
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<tr>
<td><strong>Value Co-Creation via Embedding</strong>: “Thanks to an aggressive, coordinated effort that saw the debut of the world’s first full-time Twitter jockey and tweets and Twitter data (such as 9,242 Lady Gaga tweets per minute) displayed on 28-foot-high screens on stage, the VMAs became the most elaborate Twitter-integrated live televised event to date.” (Fast Company, 22/11/10)</td>
<td></td>
</tr>
<tr>
<td><strong>Value Co-Creation via Aggregating</strong>: “Scientists from the University of Pennsylvania … are mining message boards and Twitter feeds to see what breast-cancer and prostate-cancer patients are saying about herbal and nutritional supplements--including whether they take them and why and what side effects they encounter.” (Wall Street Journal, 15/02/13)</td>
<td></td>
</tr>
<tr>
<td><strong>Enabling co-creators</strong>: “While Google+ or Facebook will ban your account if you call yourself Bozo123 in lieu of using your real name, Twitter CEO Dick Costolo welcomes the Bozos — and he thinks Twitter will make more money because of that choice. ‘We are wedded to letting people use the service as they see fit,’ Costolo said.” (Wired, 09/08/11)</td>
<td>Co-creator empowerment</td>
</tr>
<tr>
<td><strong>Restricting co-creators</strong>: “[Twitter’s] consumer product manager Michael …made it obvious that developers who stray outside of the lines are taking a big risk: ‘[W]e’ve already begun to more thoroughly enforce our Developer Rules of the Road with partners, for example with branding, and in the coming weeks, we will be introducing stricter guidelines around how the Twitter API is used.’” (Gigaom, 30/06/12)</td>
<td></td>
</tr>
<tr>
<td><strong>Value proposition (VPs) for users</strong>: “Twitter opens the exchange of information to people everywhere … and lowers the barrier to entry for communication … to the lowest possible level. …Twitter is a simple tool that allows people to do good … It’s a rich information network.” (Interview, Stone, 06/05/10).</td>
<td>Proliferation of value propositions</td>
</tr>
<tr>
<td><strong>VPs for app developers</strong>: “Application developers play a fundamental role in helping people get the best out of Twitter. As an ecosystem, we’ve just crossed one million registered applications, built by more than 750,000 developers. … Since December 2010, more than $500 million has been invested in ecosystem companies, and more than a billion dollars has been paid out in acquisitions. This level of investment is indicative of the opportunity for developers and entrepreneurs to build successful businesses as part of the Twitter platform.” (Twitter blog, 11/07/11)</td>
<td></td>
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<tr>
<td><strong>VPs for platform partners</strong>: “Wiltshire’s hire is the first in an expansion of the company’s partner program in the UK. [Wiltshire said] ‘So we work with our broadcast partners with creative integration and using twitter to drive viewership’” (Gigaom, 13/01/12)</td>
<td></td>
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<tr>
<td>Evidence Type</td>
<td>Description</td>
</tr>
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<tr>
<td><strong>VPs for advertisers</strong></td>
<td>“Promoted trends give companies an opportunity to optimize what they’re already doing on Twitter and increases conversation about whatever is being promoted. … We have a resonance score for every tweet that shows how much people are engaging with it.” (Interview, Williams, 18/11/10)</td>
</tr>
<tr>
<td><strong>Need for reliability</strong></td>
<td>“We unleashed this API and people started using it. It’s the best problem to have. Everybody loved it. But the thing was, we built it in such a way that it was … not focused on the atomic unit of the infrastructure which is the update itself. We are routing messages in real time. People were hitting us every ten seconds. … Our servers just could not handle that” (Interview, Dorsey, 01/04/09)</td>
</tr>
<tr>
<td><strong>Infrastructure investments</strong></td>
<td>“Later this year, Twitter is moving our technical operations infrastructure into a new, custom-built data center in the Salt Lake City area…. Importantly, having our own data center will give us the flexibility to more quickly make adjustments as our infrastructure needs change.” (Twitter blog, 21/07/10)</td>
</tr>
<tr>
<td><strong>Capability-enhancing acquisition</strong></td>
<td>“Twitter announced Wednesday it has acquired Julpan, a New York City-based startup that analyzes real-time data collected from blogs, Tweets, status updates and news sources. Financial terms of the deal have not been disclosed. The Julpan deal is just the latest in a series of moves Twitter has made in recent months to develop its in-house ability to analyze the huge amounts of data that flow through its service.” (Gigaom, 21/09/11)</td>
</tr>
<tr>
<td><strong>Volume of content</strong></td>
<td>“We’ve got to figure out the way to capture all the volume at the same time you separate the signal from the noise.” (Interview, Costolo, 18/10/11)</td>
</tr>
<tr>
<td><strong>Off-putting content</strong></td>
<td>“Death and rape threats now plaster many Twitter feeds.” (Economist, 05/08/13)</td>
</tr>
<tr>
<td><strong>Dysfunctional societal dynamics</strong></td>
<td>“A BBC report earlier this month did not identify the Tory it wrongly suggested had molested a child, but Twitter users did. Some 1,000 individuals implicated Lord McAlpine, and a further 9,000 retweeted those messages to a wider audience. The former Conservative Party treasurer called it &quot;trial by Twitter&quot;.” (Economist, 17/06/10)</td>
</tr>
<tr>
<td><strong>Advertiser difficulties</strong></td>
<td>“Kenneth Cole Productions Inc. apologized after making a joke on its Twitter page suggesting the Egyptian protesters who toppled the country's government earlier this year were really clamoring for the company's fashions.” (Wall St. Journal, 09/12/11)</td>
</tr>
<tr>
<td><strong>Love of the platform affordances</strong></td>
<td>“Qatar-based news network Al Jazeera launched an educational campaign this month that aims to teach viewers in Turkey, Bosnia and elsewhere in the world how to use Twitter and Facebook. … The network’s ambitious goal is to raise a new generation of citizen journalists.” (Gigaom, 08/03/12)</td>
</tr>
<tr>
<td><strong>Perceived need to persist with platform use</strong></td>
<td>“Twitter is a very important tool for protestors … it allows us to share on the ground info like police brutality, things to watch out for, activists getting arrested, etc.” A certain class of activists are armed with smartphones, which allow them to live-tweet the protests. … Watching hashtags such as #Jan25 and #Egypt become worldwide Twitter Trends also helped them gauge the support and visibility they were getting outside of Egypt.” (Techmeme, 16/02/11)</td>
</tr>
<tr>
<td><strong>Cultural embeddedness of platform</strong></td>
<td>“Twitter, the communications platform that launched in 2006, has become more than just a hot tech startup. It’s a cultural sensation, having amassed 55 million unique monthly visitors worldwide and become a fixture of the international zeitgeist, from protesters in Iran to flood victims in the Philippines.” (Fortune, 09/11/09)</td>
</tr>
</tbody>
</table>

**Table 3**

Illustrative Evidence of First-Order Categories (continued)
Figure 1
Data Structure Diagram

- Co-creation via sharing
- Co-creation via innovating
- Co-creation via embedding
- Co-creation via aggregating

- Enabling co-creators
- Restricting co-creators

- Value proposition (VPs) for users
  - VPs for app developers
  - VPs for platform partners
  - VPs for advertisers

- Need for reliability
  - Infrastructure investments
  - Capability-enhancing acquisition

- Volume of content
  - Off-putting content
  - Dysfunctional societal dynamics
  - Advertiser difficulties

- Love of the platform affordances
  - Perceived need to persist with platform use
  - Cultural embeddedness of platform

First-order categories
Second-order themes
Aggregate theoretical dimensions
Figure 2
Theoretical Model of the Consequences of Intense Co-creation
Figure 3

Excerpts from the Value Propositions Section in the Twitter Prospectus (2013: 4-7)

Our Value Proposition to Users
People are at the heart of Twitter. We have more than 230 million MAUs from around the world. People come to Twitter for many reasons, and we believe that two of the most significant are the breadth of Twitter content and our broad reach. Our users consume content and engage in conversations that interest them by discovering and following the people and organizations they find most compelling.

Our platform provides our users with the following benefits:
- Sharing Content with the World. …
- Discovering Unique and Relevant Content. …
- Breaking News and Engaging in Live Events. …
- Participating in Conversations. …

Our Value Proposition to Platform Partners
The value we create for our users is enhanced by our platform partners, which include publishers, media outlets and developers. These platform partners have integrated with Twitter through an application programming interface, or API, that we provide which allows them to contribute their content to our platform, distribute Twitter content across their properties and use Twitter content and tools to enhance their websites and applications. We provide a set of development tools, APIs and embeddable widgets that allow our partners to seamlessly integrate with our platform.

We provide our platform partners with the following benefits:
- Distribution Channel. …
- Complementary Real-Time and Relevant Content. …
- Canvas for Enhanced Content with Twitter Cards. …
- Building with Twitter Content…

Our Value Proposition to Advertisers
We provide compelling value to our advertisers by delivering the ability to reach a large global audience through our unique set of advertising services, the ability to target ads based on our deep understanding of our users and the opportunity to generate significant earned media. Advertisers can use Twitter to communicate directly with their followers for free, but many choose to purchase our advertising services to reach a broader audience and further promote their brands, products and services.

Our platform provides our advertisers with the following benefits:
- Unique Ad Formats Native to the User Experience. …
- Targeting. …
- Earned Media and Viral Global Reach. …
- Advertising in the Moment. …
- Pay-for-Performance and Attractive Return on Investment. …
- Extension of Offline Advertising Campaigns. …

Our Value Proposition to Data Partners
We offer data licenses that allow our data partners to access, search and analyze historical and real-time data on our platform. Since the first Tweet, our users have created over 350 billion Tweets spanning nearly every country. Our data partners use this data to generate and monetize data analytics, from which data partners can identify user sentiment, influence and other trends.