GROWING WITH THE MARKET: HOW CHANGING CONDITIONS DURING MARKET GROWTH AFFECT FORMATION AND EVOLUTION OF INTERFIRM TIES

Pinar Ozcan

Warwick Business School

e-mail: cpozcan@gmail.com

Scarman Road, Coventry CV47AL UK

telephone: (+44) 79 20 40 79 30

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Abstract: Market conditions are known to matter for firm performance and growth. This study explores how changing levels of uncertainty and competition affect interfirm ties of entrepreneurial firms as markets transition from nascent to growth stage. Tracing 6 entrepreneurial game publishers during the growth stage of the US wireless gaming market, the findings reveal that in a growth stage market, as uncertainty decreases, certain ties of entrepreneurial firms are terminated. First, existing partners may cut ties and become competitors after entering the market directly. This is a "winner's curse" as more successful firms are more likely to entice their partners to enter the market directly. Second, ties may be terminated as prominent firms that are "overwhelmed" with too many partners cut ties with low to mediocre performance while their remaining partners enter a positive spiral of tie strength and performance. Finally, as uncertainty decreases, new firms may enter the market as competitors to prominent firms. While entrepreneurial firms with high and low performing ties to prominent partners may find ties with these new entrants attractive, those with mediocre ties to few prominent partners find this move too risky and wait for a first mover to legitimate it. Overall, the findings show that changing levels of uncertainty and competition in growth stage markets can have different consequences for firms due to heterogeneity in their ties and power relative to partners. The findings provide several contributions to literature regarding the relationship between interfirm ties, firm performance, and market evolution.

Keywords: interfirm ties, entrepreneurial firms, market growth, competition, uncertainty

Market conditions are known to matter for firm performance and growth (Anderson and Tushman, 1990; Gort and Klepper, 1982; Hite and Hesterly; 2001; Koka and Prescott, 2008). While extant work has widely explored firms' chances of survival as markets evolve, e.g. during industry shakeouts (Argyres and Bigelow, 2007; Klepper and Grady, 1990), the question of how changing market conditions affect interfirm ties has received much less attention (Balland, De Vaan and Boschma, 2013). On the one hand, scholars suggest that changing environmental conditions and external shocks are likely to affect the formation and evolution of interfirm ties (Koka and Prescott, 2008), and that there might even be a coevolutionary relationship between these factors (Jacobides and Winter, 2005). On the other hand, extant literature, discussed in the following section, focuses mostly on how ties can help firms mitigate uncertainty and competition, but not how the formation and evolution of network ties are in turn affected by these conditions.

This study is based on the premise that understanding the effects of changing market conditions on firms' ties requires consideration of firm, partner, and tie heterogeneity as prior work has shown that firms' different positions, resources and power relative to partners affect their ability to form and manage ties (Powell et al, 2005; Ozcan and Eisenhardt, 2009; Santos and Eisenhardt, 2009). Thus, with a longitudinal and qualitative approach, this study explores the complex dynamics of *how changing levels of uncertainty and competition during market growth affect the formation and evolution of interfirm ties* during the transition of the US wireless gaming market from nascent to growth stage. The findings uncover what might await entrepreneurial firms that depend on interfirm ties for survival in a rapidly growing market; e.g. which of their ties will strengthen or break due to the changing levels of competition and uncertainty. They reveal that in a growth stage market, as uncertainty decreases, certain ties of entrepreneurial firms are terminated. First, existing partners may cut ties and become competitors after entering the market directly. This is a "winner's

curse" as more successful firms are more likely to entice their partners to enter the market directly. Second, ties may be terminated as prominent firms that are "overwhelmed" with too many partners cut ties with low to mediocre performance while their remaining partners enter a positive spiral of tie strength and performance. Finally, as uncertainty decreases, new firms may enter the market as competitors to prominent firms. While entrepreneurial firms with high and low performing ties to prominent partners may find ties with these new entrants attractive, those with mediocre ties to few prominent partners find this move too risky and wait for a first mover to legitimate it. Overall, the findings show that changing levels of uncertainty and competition in growth stage markets can have different consequences for firms due to heterogeneity in their ties and power relative to partners.

The findings provide several contributions to literature. Leveraging the rich data of a longitudinal, qualitative study, this paper provides a comprehensive picture of how market conditions affect entrepreneurial firms directly through their interfirm ties *and* indirectly through the actions of other firms in the network. The findings reveal, for instance, that during market growth stage, prominent firms that operate in multiple markets may experience a lag in allocating resources to the new market, which, along with reduced market uncertainty, leads them to cut off most of their partners. This suggests that entrepreneurial firms and large corporations may experience market growth differently and that these experiences are intertwined through the ties that they form, manage, and cut. The interaction of such firm, interfirm, and market level dynamics improve our existing knowledge on the coevolution of firm strategy, interfirm ties and market networks[1] (e.g. Hoffmann, 2007; Koka et al, 2006; Koza and Lewin, 1998).

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[1] A market network is the entire collection of firms operating in a structured context for exchange (Fligstein, 2001) in order to deliver a product/service to customers. This definition emphasizes collaboration among firms, which is common in nascent markets that lack an agreed-upon architecture (Eisenhardt and Schoonhoven, 1996) and "networked" or "platform" markets where high interdependence among multiple firm types contribute to an entire product system (Eisenmann, 1997; Ozcan and Eisenhardt, 2009) or knowledge-intensive fields (e.g. biotech, Powell et al, 1996).

By tracing the different growth trajectories of entrepreneurial firms with similar starting positions, this study also contributes to extant literature in entrepreneurship (e.g. Eisenhardt an Schoongoven, 1990; Ozcan and Eisenhardt, 2009) by showing that entrepreneurial growth not only depends on how the executives 'prepare their firm' before the competition intensifies, but also on the strategies and limitations of their partners. It shows for instance that large and resourceful partners may not be as beneficial as previously thought (Baum et al, 2000; Stuart, 2000; Powell et al, 1996) as it takes them time to divert their attention and resources from other markets.

Finally, this study builds on extant work on the external (Balland, 2012; Broekel and Boschma, 2012) and internal forces (Gluckler, 2007; McKelvey, 2002; Volberda and Lewin, 2003) that drive network structures by providing a glimpse at network dynamics during market growth. While confirming that decreasing uncertainty leads to more firms entering the market (Aldrich and Fiol, 1994; Baron et al, 1999), the findings also highlight endogenous counterforces driving the market towards a small world (Watts and Strogatz, 1998). One implication of this for work on industry shakeouts (Gort and Klepper, 1982; Klepper and Grady, 1990) is that in interdependent (i.e. networked) environments, a partner shakeout may precede the industry shakeout. More generally, this field study reveals that market conditions driving change are more complex than just a joint increase in competition and reduction in uncertainty. Firm and interfirm level factors also fuel network dynamics and create heterogeneity in how environmental conditions affect firm survival. Overall, the theoretical model emerging from the findings is a step towards understanding the relationship between firm strategy, interfirm ties, and market evolution.

THEORETICAL BACKGROUND

There is vast empirical evidence that interfirm ties can significantly improve a firm's performance and chance of survival (Baum et al, 2000; Doz et al, 2000; Dyer and Nobeoka, 2000;

Gulati and Higgins, 2003; Hoffman, 2007; Lavie, 2007; Madhavan et al, 1998; Powell et al, 1996; Stuart et al, 1999), and that these positive effects are particularly significant in the presence of high degrees of transaction volume and collaboration between partners (Dyer and Singh, 1998; Madhok and Tallman, 1998), as well as partners' experience with ties and tie management capability overall (Anand and Khanna, 2000; Heimeriks et al, 2015; Kale et al, 2002; Lavie and Singh, 2012).

Interfirm ties are particularly important in dynamic environments where firms, particularly entrepreneurial ones with limited resources, are dependent on an ever-changing set of resources for survival (Eisenhardt and Schoonhoven, 1996; Ozcan and Eisenhardt, 2009). One environment where ties are arguably critical for firm survival is the transition of a market from nascent to growth stage where environmental conditions change rapidly (Aldrich and Fiol, 1994; Anderson and Zeithaml, 1984). Work in various streams of literature (Aldrich and Fiol, 1994; Baron et al, 1999; Klepper, 1996) shows that at the emergence of new markets, uncertainty, which is defined as the unpredictability of the environment (Beckman et al, 2004; Folta, 1998; Martin et al, 2014), is high due to customers' limited experience and preferences (Benner and Tripsas, 2012; Walker and Weber, 1984), particularly when the product / service is perceived as novel (Fleming, 2001), as well as due to supply related issues such as performance limitations and long-term value of the new product / service, particularly if it concerns a new technology (Anderson and Tushman, 1990; Sorenson, 2000; Tushman and Anderson, 1986). Over time, as products are tested, uncertainty decreases (Porter, 1980; Utterback and Suarez, 1993; Klepper, 1996), making the market attractive for new entrants and increasing competition (Aldrich and Fiol, 1994; Baron et al, 1999). Industry life cycle studies have shown quantitatively that as markets grow, they go through a period of "shakeout" in the number of producers (Gort and Klepper, 1982; Klepper and Grady, 1990) where those firms that are unable to efficiently produce the "dominant design" that emerges are selected

out of the market in the face of intense competition. Later studies have also looked at firm heterogeneity and survival rates and showed how, for instance, firms' transaction misalignment led to lower rate of survival during industry shakeouts (Argyres and Bigelow, 2007).

While these studies provide great insights into firms' chances of survival as markets evolve, they have paid much less attention to the changing nature of collaboration during these times (Malerba, 2006; Ter Wal and Boschma, 2011). Scholars suggest that as markets evolve, the nodes in a network change due to the entry and exit of firms (Boschma and Frenken, 2010) and that industries that are subject to continuous flows of new firms entering due to disruptive technological change (Rosenkopf and Tushman, 1994; Rosenkopf and Padula, 2008) should have interfirm network structures that are less stable. For example, incumbent firms can increase the number of firms that adopt a specific technology by entering into a partnership with new entrants (Rosenkopf and Padula, 2008), which can in turn increase these new firms' success rates. Balland et al (2013) argue that "while the entry and exit of firms and the changing nature of competition are inextricably interwoven with changing network structures, this domain of research has remained largely unexplored" (Balland et al, 2013: 745). In fact, a review of studies looking at the relationship between interfirm ties and market conditions reveals that these studies mostly focus on how ties can help firms mitigate uncertainty and competition, but not how network ties are affected by environmental conditions and how firm, partner, and tie heterogeneity play a role.

Studies that look at interfirm ties during market uncertainty find that when uncertainty is high, firms rely more on past ties and partner status in forming new ties (Galaskiewicz and Shatin, 1981; Podolny, 1994). They are also more likely to opt for contractual ties with lower costs of formation, management, and dissolution (Gulati, 1995; Santoro and McGill, 2005) and commit fewer relation-specific resources (Rowley et al, 2000). At the ego-centric alliance network (portfolio) level,

scholars find that firms manage uncertainty by forming more ties (Beckman and Haunschild, 2002; McGrath, 1997), adding more diversity (i.e. non-redundant ties) to their network (De Vaan, 2014; Rowley et al, 2000) and building multiple parallel "probing alliances" (Hoffmann, 2007; Ozcan and Eisenhardt, 2009). Industry life cycle studies similarly find that the stage of the industry affects the type of ties firms form such that at the early stages of an industry when uncertainty is high, firms form ties to "explore" and facilitate technological innovations, while later, the goal is to "exploit", e.g. with geographically closer and cognitively similar partners (Balland et al, 2013; Elg, 2000; Hagedoorn, 1993). In a rare attempt to link interfirm ties, firm survival and environmental conditions, De Vaan (2014) shows that in uncertain environments, the failure of arms' length partners lowers focal firm's chance of survival while in stable environments, losing strong (i.e. durable, intensive) ties affects firm survival more. While providing a clear picture of tie formation and management as means to mitigate market conditions, these studies focus much less on how firms' ability to form and manage ties might be affected by changing levels of uncertainty. Discovering these effects requires a look at firms' entire ego-centric network, e.g. how its partners increase / decrease their number and strength of ties as uncertainty levels change in the market.

A second key characteristic of markets is the level of competition. Studies that look at interfirm ties and market competition find that firms typically respond to increasing competition either by forming alliances with competitors' partners or by forming "countervailing alliances" with similar partners (Gimeno, 1994). Others suggest that in a market with limited resources and partners, firms often get into a "race" to enhance their position ahead of their competitors, or to block rivals from forming ties with key partners (Gomes-Casseres, 1996; Gulati, 1995; Nohria and Garcia-Pont, 1991; Park et al., 2002). In certain industries like airlines, firms may mitigate competition by joining a constellation of ties (Lorenzoni and Ornati, 1989; Nohria and Garcia-Pont, 1991).

However, as with uncertainty, extant work has fallen short of explaining the effects of competition on interconnected firms, which requires consideration of heterogeneity among firms' partners in terms of different types, resources and tie strength. Specifically, critical questions such as how, during market growth, the direct ties of focal firms are affected by market entry of firms of the same type, of a different type, and of a new type remain unanswered regarding the effects of competition.

As outlined above, prior research on interfirm ties and market conditions has mostly explored how ties can help firms mitigate varying levels of uncertainty and competition as markets change and not how these conditions in turn affect interfirm ties. Secondly, the majority of extant studies have a cross-sectional approach to examine the effects of uncertainty or competition separately rather than simultaneously, as it would happen in reality. A noteworthy exception is Koka et al (2006), who consider both factors at the network level and predict that as uncertainty decreases and competition increases, e.g. during market growth, networks will "shrink" with more ties terminated and fewer new ties formed, whereas if uncertainty increases and competition decreases, the network will "expand". This work provides a stepping-stone for studying the combined effects of market uncertainty and competition on interfirm ties. However, as a conceptual piece where all nodes and ties in the network are identical, it does not go beyond first order effects to look at how, in a heterogeneous network, the formation, strengthening/weakening and dissolution of ties coevolve.

As indicated above, examining the consequences of varying levels of uncertainty and competition for interfirm ties requires consideration of the different types of firms at different positions and with different levels of resources and power in a market network. Prior work has shown that these factors have consequences for firms' ability to form and manage ties. In a seminal paper, Powell et al (2005) showed how firms with strong ties to prominent partners in a network can use the resources flowing from these partners to invest into more business with existing partners and

new business with new ones. Other studies have shown how entrepreneurial firms resort to unique strategies to form and manage ties with prominent partners in nascent markets, e.g. promoting interdependence in a mutually beneficial market architecture, forming simultaneous ties with interdependent prominent firms that are not yet connected, sequential resource allocation (Ozcan and Eisenhardt, 2009), and uniting against a prominent firm claiming the nascent market (Santos and Eisenhardt, 2009). While we know that changes in a network result from tie formation and management decisions of organizations with heterogeneous characteristics such as age or size (Balland et al, 2013), there still is a gap in how changes in market conditions affect interfirm ties of these firms differently, and how, in turn, these decisions trickle down the network.

The present study addresses these gaps through a longitudinal and qualitative examination of interfirm ties of entrepreneurial firms and their prominent partners in a setting where market conditions rapidly change, i.e. when markets transition from nascent to growth stage. By exploring the research question, *how changing levels of uncertainty and competition during market growth affect the formation and evolution of interfirm ties*, it aims to answer previous calls to explore the coevolutionary relationship between interfirm ties and market conditions (Koka et al, 2006) as well as among interfirm ties within a network (Zaheer and Soda, 2009; Ahuja et al, 2012). From an entrepreneurship perspective, uncovering this process can help us understand what might await an entrepreneurial firm in a rapidly changing market, e.g. which ties they can expect to strengthen or lose. More broadly, it can provide insights to the limitations of firm strategy (Koza and Lewin, 1998; Park et al, 2002) and contribute to knowledge on the role of structure versus agency in interfirm networks (Gulati and Gargiulo 1999; Powell et al. 1996, Santos and Eisenhardt, 2009). Finally, at a macro level, it can contribute to extant research on how networks evolve (Briscoe and Tsai, 2011; Gulati and Gargiulo, 1999; Human and Provan, 2000; Zaheer et al, 2000), how interfirm dynamics

constitute markets (Jacobides, 2005; Ozcan and Santos, 2015; Powell et al, 2005) and uncover microprocesses that lead to variances in performance among firms in a certain market stage (Gort and Klepper, 1982; Klepper and Grady, 1990; Porter, 1980; Utterback and Suarez, 1993).

METHODS

Given the limited theory and lack of empirical accounts on the research question described above, this study is based on an inductive theory building approach (Eisenhardt, 1989), which is particularly useful to uncover a process (Eisenhardt and Graebner, 2007). The research design is based on multiple-cases, which enable a replication logic (Yin, 1984), where each of the six cases, described below, confirm inferences drawn from the others. In addition, the study is embedded with multiple units of analysis (firm, interfirm tie, and alliance network), which is critical for uncovering the various factors that may drive tie evolution during market growth in different subunits.

The setting is the U.S. wireless gaming industry, a market that emerged in late 1999 with scattered activity by several firms to create games for wireless phones. This market is attractive for the research question due to the high interdependence among several types of firms in the industry. Carriers, handset makers, software platforms, brand owners, developers, and publishers all provide an essential part of the product, which makes interfirm ties important for the survival of these firms (Figure 1). In addition, following a market from nascent to growth stage in real-time allows the examination of changes in interfirm ties as market uncertainty and competition levels change.

---------INSERT FIGURES 1, 2 AND TABLE 1 ABOUT HERE-----------

6 entrepreneurial publishers were chosen as focal firms. Entrepreneurial firms are a good choice because we can track their ties from founding and avoid left-censoring. In addition, they typically have limited resources, and high dependence on interfirm ties for performance (Baum et al, 2000; Eisenhardt and Schoonhoven, 1996). Among different types of entrepreneurial firms in the research setting, game publishers are a good choice because they depend on many different types of

market players for survival (see Figures 1 and 2 for details). The chosen publishers are representative of the 41 entrepreneurial publishers that were operational in the nascent market as most publishers were stand-alone firms whose founders came from related industries (e.g. video gaming, telecommunications). Second, these firms were all founded in the nascent market and were operational during growth market with multiple interfirm ties (Table 2). Finally, the sample is stratified by geography across the three most important areas for wireless gaming firms: San Francisco, Los Angeles, and Seattle, to avoid regional biases.

---------INSERT TABLE 2 ABOUT HERE-----------

Data Sources

There were several data sources: (1) in-depth semi-structured interviews; (2) extensive archival data (e.g. business publications, corporate materials, database of published wireless games) and (3) e-mails, phone calls, observations and follow-up interviews. Triangulation of data from multiple sources strengthens confidence in the robustness of the findings (Jick, 1979).

The primary data source is semi-structured interviews. 95 interviews were conducted between late 2002 and late 2005, covering the entire nascent market period and the first three years of the growth period. Interviews at focal firms lasted 60-150 minutes and covered the firm's tie formation and general activities since founding. Follow-up interviews were conducted at 6-9 month intervals to track real-time changes. In addition, for each focal firm, interviews were conducted with two to three key informants in major partner firms, whom focal firm informants identified as important partner contacts. Finally, interviews were also conducted with 8 industry experts (e.g., journalists, investors, consultants) to triangulate the data. Table 2 details the various types of informants that were interviewed in each focal and partner firm as well as other important aspects of data collection.

Data Analysis

Data analysis began with incorporating interview transcriptions and archival data into case

histories (Yin, 1984) using triangulation logic to give more validity to themes that emerged from different data collection methods (Jick, 1979). Two independent researchers reviewed the data to form independent opinions of events in each case. As is typical of inductive cross-case analysis, I used charts and tables to compare several categories at once (Eisenhardt and Graebner, 2007, Miles and Huberman, 1994). Quantitative measures from the Wireless Gaming Database (e.g. number of games, carriers and handset models per publisher) strengthened the comparison at this stage. From the emerging constructs and patterns, tentative propositions were formed and refined through replication logic. As the theoretical framework crystallized, comparison with the extant literature to highlight similarities and differences strengthened the internal validity of findings and raised the generalizability of results. The theoretical framework that emerged is described below.

FINDINGS

In order to explore the research question, *how changing levels of uncertainty and competition during market growth affect the formation and evolution of interfirm ties,* this study traced 6 entrepreneurial firms in the US wireless gaming market. The first section of the results describes the changes in market conditions as the market transitioned from nascent to growth stage while the second section focuses on the consequences for the interfirm ties of the focal firms.

MARKET TRANSITION FROM NASCENT TO GROWTH STAGE

The market emerged in late 1999-early 2000 with few firms creating the first games for wireless phones. As typical of nascent markets, uncertainty was high and competition was low at that time (Anderson and Zeithaml, 1984; Klepper, 1996; Steensma and Corley, 2000). There was a high degree of *technological uncertainty* due to primitive purchasing and gaming interfaces. First, it was difficult to purchase a game. An analyst described: *"The purchase process was so torturous... Like you have to enter your credit card every time you buy a new game!"* The actual gaming

experience was not smooth either. A publisher VP remembered: *"Back then, you couldn't do half the things you can do in a game today. It was just so unbelievably primitive…Like you couldn't even do multi-player games. You were locked into your own phone."* As expected, these technological limitations and the low number of games led to *market (demand) uncertainty*. Users remained either unaware of wireless games or discouraged by the difficulty of purchasing and playing them. As sales numbers remained low and purchasing systems primitive, target consumers and preferred game genres were also ambiguous. As an industry analyst summarized, *"At that point, there was some availability of mobile games, but it was very spotty and very very niched."*

By mid 2002, technological uncertainty decreased as carriers (e.g. Verizon, Sprint, Cingular) launched more user-friendly interfaces for purchasing and gaming. One analyst described, *"So it was really in the 3rd quarter of 2002 when all of a sudden consumers could go into a store, buy a phone, download content, and the price of that content would show up on their monthly bill."* This meant that carriers could track their game sales more easily and do targeted marketing. A further decrease to market uncertainty came once carriers began advertising campaigns. An industry expert said, "*In Q4 2002, Verizon, Sprint and AT&T all took out TV ads, print ads, like on the first page of USA Today. Verizon had trailers that were running before movies. Even in New York City, they were wrapping little bus kiosks with their stuff."* In addition, wireless gaming got a "kickstart" with Verizon's campaign subsidizing game-capable handsets. An expert noted:

"When a consumer went into a Verizon store to upgrade their phone for the holiday season in Q4, they could buy a download-capable handset for $50. And that move really kick-started the installed base of the handsets out there so that people could very quickly get a phone that was capable of downloading entertainment and start using it. It was even possible for consumers to buy a download-capable handset for $50 and get a second one for free during the holiday season of 2002."

With the number of game capable phones increasing, playing wireless games quickly became popular. An entrepreneur described: *"We started hearing stories that people would go home and*

play on their phone for hours instead of the Xbox. It was meant to be for when you wait for the bus or at the dentist, you know? But people couldn't put it down..." At the end of 2003, when the new phone number portability law allowed customers to switch carriers and maintain their number, carriers used this opportunity to further raise awareness of wireless games and attract new customers. This marked the end of the market emergence period, or "round 1" as market analysts called it, when market uncertainty decreased and new entrants increased significantly (Table 1).

CONSEQUENCES OF MARKET TRANSITION FOR INTERFIRM TIES

What did the lower uncertainty and higher competition mean for interfirm ties in the market? These ties were strengthened, weakened, or even terminated as a consequence of previous partners becoming competitors or competitors of current partners entering the market. These effects largely depended on firms' tie strength and performance with current partners, as described below.

Finding 1: Previous Partners Becoming Competitors

In the highly uncertain environment during market emergence, focal publishers had formed licensing ties with well-known consumer brands (e.g. Suzuki Motors or Disney) to increase the legitimacy and visibility of their games. These ties were typically based on revenue share (up to 30% for brand owners), which worked well for the entrepreneurial publishers as they had limited resources. It also allowed brand partners to observe game sales based on their own brand directly.

As the market entered growth stage and demand uncertainty decreased, brand partners noticed rapidly growing revenues from wireless, particularly if the branded game became a "hit"[2]. For instance, Starclick had a licensing tie with video game giant Electronic Arts (EA) in the nascent market, which allowed them to successfully transfer well-known EA games such as Tiger Woods Golf to handsets. As Starclick became a market leader and these games reached high sales figures,

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[2]Informants defined a hit game as one with sales in the top 95th percentile. An industry analyst explained that a hit game had about 50,000 downloads while a non–hit game got about 5,000, and thus brought much more revenue. Informants agreed that this was partly because carriers were more likely to further promote the game once it was already popular.

EA became highly aware of the market potential in wireless gaming. Starclick CEO explained: "*When we had visited them for the first time, they had looked at us in disbelief that this would ever take off. It was just not on their radar."* However, in 2004, when it was time for Starclick and EA to renew the annual licensing contracts, EA executives withdrew their licenses to continue "on their own". Interviews revealed that a very important factor in EA's decision was their observation of Starclick's success with EA's game titles. An EA executive explained: *"Wireless games are growing faster than we expected…and companies like <Starclick> are the living proof that sports games work great on mobile phones."* Through Starclick, EA executives had the opportunity to see how many downloads their various games reached at which carriers, and to establish visibility in the market for their games, which helped them sell these games upon direct market entry.

How did the partners' direct market entry affect the focal firms? For Starclick, EA's direct market entry had severe consequences. An industry analyst explained: *"These were top selling games for Starclick. Not only are they losing the games, but EA will now sell the same games that users have gotten to know and love because of Starclick."* The loss of EA games also had an effect on the strength of Starclick's ties with carriers. The executives explained: *"We are visiting our partners one by one and showing them all the games we have in the pipeline for them. We are showing them that we are greater than just those few games that did well in the past."*

Data show that several prominent brand partners similarly entered the market directly during market growth[3] (Table 1). For video game publishers (e.g. EA or Sega), this was a step of forward integration as this new market was highly related to their existing market. For other firms such as media and entertainment channels (e.g. Disney or Fox Sports), the market entry was to take

[3] When a brand owner abandoned a publisher, they had to "rewrite the game" as the code was proprietary to the publisher. For video game brands, the issue was minor as there was already code sharing in order to make the characters look the same across different gaming platforms and the video game brand had the internal capability to do this. Others typically hired coders from the publisher or third party developers and made a new version of the game, which looked slightly different, but was improved in several ways.

opportunity in a promising new market. An executive at Fox Sports, for instance, revealed that a joint marketing campaign with publisher Cellcruise and carrier Sprint PCS "woke them up": "*That competition we organized went very well… It was a bit unexpected for us...But it certainly raised the profile of mobile gaming and accelerated things.*"

As apparent above, brand partners' direct market entry was a "winner's curse": the more successful the tie, i.e. the better the publisher did in the market using their partner's license, the quicker the partner became intrigued to enter directly. High performing publishers such as Starclick or Topmobile suffered from the loss of high-profile brand partners (e.g. EA, ESPN, or Atari). In contrast, lower performing publishers such as Mobilate, Airburst, and Phonemix did not lose partners this way[4] (See Table 3 for supporting evidence). An industry analyst described: *"It's almost like these startups are paying a price for raising the profile of mobile gaming."*

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A primary factor that led to this winner's curse was that the licensing agreements required the partners to work closely during game creation, but not afterwards, which contributed to brand owners not keeping wireless games on their radar unless the incoming revenues were noticeable. For instance, Topmobile VP Publishing and Sales said: "*They don't need to see us at all once they approve the game, so they sometimes even forget that they'd done this deal at all…"* while a Cellcruise executive added: "*There is no real interaction with the brand partners beyond the initial stage, unless we do sequels or a new game or something…"* Overall, this first finding suggests that,

Proposition 1a: *As uncertainty decreases during market growth, prominent firms that have been linked to the market through interfirm (e.g. licensing) ties may decide to cut them and enter directly.*

[4] In line with tie failure due to partners' below-desired benefits from the tie (Arino and de la Torre, 1998; Azouley et al, 2010; Duysters et al, 1999; Heimeriks et al, 2015), firms like Mobilate and Airburst lost a brand partner due to their partners' discontentment from game sales. Airburst, for instance, lost their licensing agreement for the Garfield brand when the partner decided to give the license to a larger competitor who knocked on their door.

Proposition 1b: *For their partners, this effect is a "winner's curse": the more successful the tie, the more likely that the prominent firm will break it off, and the more detrimental the performance consequences of this loss for the abandoned partner.*

Finding 2: Existing Partners Dissolving Ties to Downsize Their Network

Another form of competition that affected focal firms during market growth was tie competition against new market entrants, both entrepreneurial firms and large ones such as the brand owners discussed in the previous finding. For example, Phonemix was an entrepreneurial publisher that entered the market at the end of the nascent stage, and already had ties with two prominent carriers by the end of 2002 (Table 1). As these ties were still relatively new compared to those of some other publishers, the executives worked hard to strengthen them, scheduling frequent carrier visits to increase their games' visibility on carriers' networks. The CEO explained: *"We knew we were the new guys, so we gave them all our attention, called and visited them whenever we could."* By early 2004, however, Phonemix executives were caught by surprise when both carriers announced that they were cutting many ties including Phonemix. Among Phonemix's competitors in the sample, only Starclick and Topmobile maintained ties with those carriers.

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In total, four out of the five prominent carriers downsized their publisher network during market growth (Table 4). Interviews revealed that a number of factors drove this decision. First, as mentioned before, an influx of publishers occurred during the market growth stage. When all new publishers started knocking at carriers' doors to sell games, the first response of the carriers was to accept all to increase the variety of games in their network. However, soon carrier executives realized that they had too many partners and prospective partners to deal with. They explained that as the market became more competitive, publishers became quite insistent towards carriers to get a

better placement for their games[5]. The Topmobile CEO explained: *"Shelf space in mobile is vertical rather than lateral. I walk through a store, I can find potato chips, and cookies and salsa all at my eye level. A mobile phone has only six spots on that little screen and 2000 games are fighting for those spots."* A carrier executive described how this competition led to publishers "harassing" carriers to get a visible spot on the network: *"My phone doesn't stop ringing. Some of these guys even show up in my office unannounced to show me their new games."* Another executive said: *"<Publishers> chase me to my car after work. I feel like a celebrity sometimes*."

The second factor that fueled carriers' decision was the lower uncertainty in the market, which allowed them to select a few publishers based on game sales record. A carrier executive explained:

"We are going to work with a select number of publishers from now on. They all have a track record that we can judge by now and plus, we have gotten to know several of them very well. It's more efficient this way."

As predicted by extant work (e.g. Koka et al, 2006), the combination of higher competition and lower uncertainty led to many publisher ties being discontinued in this growth stage market. But surprisingly, data revealed that carriers' decision to downsize and the magnitude of the downsizing were not entirely voluntary; they were also due to their internal limitations at the time. These executives were part of large and resourceful corporations, but their gaming/ mobile content departments were still small and understaffed, typically with 3-5 people, as wireless gaming was only slowly gaining visibility within the larger corporation. The Topmobile President said: "*The process of working with them and getting our games on the deck has been a nightmare. It can take like 3 months for them to even look at the stuff we send them…Part of it is that they are seriously understaffed.*" Publishers explained that these limitations were partially due to carriers still thinking that their business was about selling handsets and voice calling plans. Mobilate CEO explained:

[5] Publishers' survival depended on the availability/visibility of their games at carriers' network. The primitive nature of handsets and gaming databases in this pre-smartphone era prevented consumers from previewing all games available in a genre easily. This made purchasing decisions heavily dependent on carriers' product placement and promotions.

"The biggest challenge with carriers is that they have not yet become effective partners for content. Even the executives we work with seem forced from their organization to support marketing programs for handsets and voice calling plans, occasionally using content as a hook. You know, buy this game-capable handset and get another one for free kind of stuff…"

In addition, carriers were large and traditional corporations that were slow in updating their infrastructure and had interdepartmental coordination difficulties. Topmobile President complained:

"Their ability to execute on new products is very low. They have difficulties with their general network infrastructure, data network infrastructure and interconnection, billing and product management systems. Getting things to work is often a very very long and drawn out process. For example, the consumer says I don't want to pay for games every time, I want to subscribe to a monthly service. So the carrier goes to their billing department and the billing guys say "sure, it will be about 2.5 years until we can do that".

The CEO at Mobilate similarly said: *"Like any typical large corporation, carriers are slow to adjust to changes in their environment. They still use ancient technology."* VP Marketing at Cellcruise complained about the disconnect between different departments at carriers:

"The correspondence at the carrier is with a department that all carriers have designated to phone games. These departments have an entrepreneurial spirit to them and it is fun to work with them. The people are young and enthusiastic people who enjoy games. But often there is a huge disconnect between the "game department" and other departments like marketing or IT."

Overall, both changing market conditions and resource limitations affected carriers' decision to downsize. They started cuts with publishers with low game sales, which, many publishers complained was not fair as sales volumes depended largely on promotions and visibility received from the carrier. A Phonemix executive said, *"First they don't give you a chance and then they say you didn't do that well. The type of promotion that <competitor> gets from <carrier> is something that I can only dream of."* VP Marketing at Cellcruise added: "*We want an equal opportunity, they don't have to be exactly the same, but roughly equal"*. A carrier executive explained:

"*It could be that we haven't got a chance to get to know these guys yet or maybe they've been around but they didn't have any games that stood out from the crowd…I don't have time to be fair, I need to go with who I know can deliver best-selling games"*.

Following the cuts, publishers could only deliver games to carriers through chosen publishers. As expected, this tie brokerage (Burt, 1992) led to arbitrage opportunities. Airburst CEO added:

"When those guys present new games to <carrier>, they put all of their games first and ours is lucky if it makes the list at all." Carriers admitted the drawbacks of this approach as follows:

"Sure, there is lots of stuff we could do right now. Multiplayer games are becoming a thing. All sorts of interesting games, well, not even games, but content really. It is a very exciting time and I wish I had the bandwidth to pick and choose."

"Do I trust that I will get the best games in the market in an unbiased way? No, of course not. But I will get pretty good games and I will get them much faster this way."

What were the consequences of carrier cuts for focal firms? The termination of these ties set firms like Airburst and Phonemix on a downward spiral. First, they had significantly lower revenues. Second, they lost or could not form new ties with brand partners because brands were interested in publishers with resourceful carrier partners who could promote their games[6]. Without prominent brand partners, they became even lower priority to carrier partners. Third, their limited resources prevented these firms from meeting existing carrier partners' expectations such as joining large marketing campaigns or making games available on a variety of phones. This further weakened their existing ties and even prevented them from receiving venture backing. When Airburst executives sought venture support at the beginning of 2004, for instance, they could not convince investors to make a significant investment due to their lack of prominent partners. The VP indicated:

"They were impressed with our games, but kept asking why we didn't have partners like the other guys…Carriers wanted to see brand partners, brands wanted to see either carrier partners or money, and the investors wouldn't give us money without these. The irony is that we wouldn't need them if we had those partners; we'd have the money!"

In contrast, firms with high-performing ties to prominent partners experienced partners' downsizing positively through even higher performing ties. Starclick CEO explained: *"Of course, it's nice for us if those guys are less busy. They pay more attention to us and we get more work from them.*" These firms also used their new status to form/strengthen ties (i.e. work on more games) with prominent brand partners. A Topmobile executive stated: "*The fact that we are so close to*

[6] That focal publishers were no longer valuable once their prominent partners were gone confirms the *tertius iungens logic* (Obstfeld, 2005), which explains the value of connecting disconnected but potentially complementary parties.

<carrier> *means that our games are more visible on their network. Brand partners like that, naturally.*" Table 4 provides an overview and supporting material for this finding.

Proposition 2a: *As a market enters growth stage, prominent firms that operate in multiple markets may experience a lag in allocating resources to handle the exponential growth in business volume and number of partners. This lag, along with lower uncertainty about partners' performance, can lead these firms to downsize their alliance network.*
Proposition 2b: *In this process, partners with low to mediocre tie-performance typically lose their tie while the remaining partners enter a positive spiral of increasing tie strength and performance.*

Finding 3: New Types of Players Entering the Market

The growth stage of the market also came with a "good kind of competition" for the focal entrepreneurial firms. New types of players such as Yahoo or start-up Handango officially entered the market, offering wireless game purchasing online. Google started discussions to do the same. These new entrants created competition for carriers. An industry analyst explained:

"Yahoo is a new company that spooks the carriers cause they want the customers. Yahoo could easily use their IM client as a software distribution mechanism. People are on My Yahoo page all they long checking stock prices, reading the news and looking at sports scores. If they figure out a way to sell mobile content there... It's a Trojan horse. And the carriers know that."

Focal publishers followed different strategies with regards to forming ties with these new entrants. For publishers who had already lost many prominent partners (e.g. Airburst and Phonemix[7]) during the growth market, this became a 'consolation prize' so they immediately initiated ties with Google, Handango and Yahoo. An Airburst executive explained:

"Carriers can do things like say, "We're going to block this; we don't need another sports game." Once they do stuff like that, you're completely out, you can't do anything. So you need a backup plan if you're not getting your games through."
Airburst CEO added: "*It was either this or closing shop.*" Phonemix VP explained that one advantage of online game sales was that customers looked at a larger screen while choosing, which avoided publishers relying on carriers' favors for product placement:

[7] Mobilate executives were in discussions to sell their firm at that time so did not consider this alternative.

"These websites have a rather transparent display of available games under simple categories. So no more 'feature games' or 'top picks'. Everybody has a fair chance."

Among the focal publishers, Starclick and Topmobile, publishers with high performing ties to many prominent partners, also decided to work with alternative channels to decrease their dependence on carriers. During the interviews, Topmobile and Starclick executives listed two main reasons for their choice. First, as indicated in the previous finding, the publishers were unhappy with the amount of attention and resources the carriers were allocating to the wireless game market:

"Because the carrier guy, they have no clue, right. They're still trying to gage what users are doing. And they don't have the expertise to do it, and they're only going on gut. Which is fine, gut is fine, when you have nothing else to go on; but when you have stats to go on, why don't you use them instead." <VP Marketing, Starclick>
"We ultimately believe that the carriers are the best channel, we still believe that. They have the position to make mobile gaming successful. If they want to… And that´s the crucks. Because sometimes they move on to other stuff, you never know. Like crazy TV on your phone or videos, and suddenly mobile doesn´t get any more attention. I can´t allow my business to be blown like a reed in the wind of whatever the carrier thinks is the hot button issue of the day. I need control, I need some slight degree of control over my destiny." <Topmobile CEO>

In addition, the executives complained about the aggressive partnership terms at the carriers.

"Carriers tend to be self-interested. They believe they are the best, they are the dominant people in the world, so they should get all of the revenue. The challenge in our industry is that the carriers take an undue, unfair share of the revenue for what's being delivered. That ultimately and potentially can be extremely detrimental to the industry." <Topmobile CEO>
Commenting on carriers' harsh terms, Phonemix executives revealed, *"we gave them 70%, I know some guys got better deals, but no deal was good enough."*

Both Starclick and Topmobile started publishing games with Yahoo and Handango. Starclick CEO explained how he tried to convince carriers to accept these new ties:

"Well, it had to be sold to them. I literally went around this last January to every single important US carrier and explained to them why it wasn't a threat. I told them we are trying to grow the market. We are trying to market to people who aren't normally the buyers of games."

Finally, Cellcruise, a publisher that still maintained ties to four carriers, but received much less business compared to Starclick and Topmobile, decided not to approach the alternative sales channels at first. Given their "vulnerable" position, they found this option "too risky."

"Right, so we discussed that and decided not to do it. It would be a mistake to try to go around carriers. You can't piss them off. They actually are the gatekeepers right now; if you're not in bed with the carriers, there's no way you're going to get any distribution at all. So you can't give up carriers. The only thing is, carriers have to have a constant revenue stream. Any company who tries to go around carriers is making a mistake." <Cellcruise CEO>

A VP at Cellcruise further explained that if they did not bring their newest games to the carrier immediately, answer their calls promptly, or make the desired changes to the games, carriers could make them much less visible on their platform or abandon them entirely. He added: *"Second tier publishers like us often feel that if we don't do things exactly right, we will lose big time."*

But Cellcruise executives eventually changed their mind. Once top publishers (e.g. Starclick and Topmobile) formed ties with alternative sales channels, Cellcruise executives also started negotiations. A Cellcruise executive explained: *"This is just something we are doing on the side. Our focus is still the carrier. However, we feel it is a good idea to explore different options without going behind their back."* A Topmobile executive explained how their tie formation had a signaling effect: "*We're the big dog…Nobody will not be with us. So when we went with those guys, it was a signal to the market that this was ok, this was legit."* By the end of data collection, four of the focal publishers, including Cellcruise, were selling games through wireless game websites. These sites continued operations until the competitive landscape dramatically changed with the 2007 launch of the IPhone. Unable to compete with Apple's application store, they were discontinued. Overall, this finding about tie formation with new entrants, summarized in Table 5, illustrates,

Proposition 3a: *In a growth stage market, the entry of new types of prominent firms may threaten the power of existing prominent firms.*
Proposition 3b: *Entrepreneurial firms with high performing ties as well as those with low-performing or no ties to prominent partners are likely to form ties with these new types of firms. In*

contrast, those "stuck in the middle" with mediocre ties to few prominent partners find this move too risky and wait for a first mover to legitimate these ties.

The findings described in this section are summarized in Table 6 while Table 7 shows the general evolution of focal firms' ties and Table 8 the changes in focal firms' performance[8].

---------INSERT TABLES 5, 6, 7, 8 ABOUT HERE-----------

DISCUSSION

This study explored how changing market conditions affect formation and evolution of interfirm ties by tracing 6 entrepreneurial publishers during the growth stage of the US wireless gaming market. The findings reveal that as uncertainty decreases, certain ties are terminated due to competition while others become stronger, suggesting that market conditions in growth stage markets can have different consequences depending on firms' existing ties, relative power and partners' strategies and limitations (Table 9). The section below describes how the findings inform our knowledge of interfirm ties, entrepreneurship, and the evolution of markets and networks.

---------INSERT TABLE 9 ABOUT HERE-----------

Interfirm Ties during Market Growth

Earlier studies (e.g. Baum et al, 2000; Ozcan and Eisenhardt, 2009; Santos and Eisenhardt, 2009) identified nascent markets as an advantageous environment for entrepreneurial firms to form ties with prominent partners. This study shows that in contrast, entrepreneurial firms may lose a lot of ties during market growth. Extant work suggests that ties are typically discontinued for two reasons. "Tie failure" occurs due to partners' below-desired benefits from the tie, either due to partner's perceived quality or interpartner coordination difficulties (Arino and de la Torre, 1998; Azouley et al, 2010; Duysters et al, 1999; Heimeriks et al, 2015). On the other hand, "expected tie

[8] This study made no attempt to quantify the net effect of these events on firm performance as it largely depended on how many prominent partners were lost versus maintained after partners' downsizing or direct market entry.

dissolution" (at least by one of the partners) occurs due to *learning races* (Hamel, 1991; Inkpen and Beamish, 1997; Khanna et al, 1998), i.e. when one partner dissolves the tie as soon as their private benefits (learning a new technology, conditions of a new market, etc.) are realized, or due to *strategic options* (Kogut, 1991; Chi, 2000; Folta and Miller, 2002), i.e. when the larger partner acquires the smaller partner whose niche product / technology / market proves worthy of investment (Reuer and Koza, 2000; Villalonga and McGahan, 2005). This study finds that entrepreneurial firms at opposite ends of the tie performance spectrum can experience tie dissolution during growth market. Some tie dissolution is due to low tie performance, where, as uncertainty goes down, firms reevaluate their partners and cut low-performing ones. Other ties, however, are dissolved because the tie becomes a strategic option for the partner to enter the market directly. Extant literature suggests that partners' relational rents from a tie and therefore likelihood of investing into a tie increase with the volume of transactions and the degree of collaboration between the partners (Dyer and Singh, 1998; Madhok and Tallman, 1998), as well as the partners' experience with ties and tie management capability overall (Anand and Khanna, 2000; Kale et al, 2002; Lavie and Singh, 2012). This study brings a nuance to these previous findings by showing that those ties that are managed best and reach highest levels of performance are a double-edged sword because they may entice partners that are evaluating a new market to enter the market more quickly.

A surprising effect that this study uncovers regarding dissolution of high performing ties, however, is that some partners, particularly licensors, can be dormant, i.e. may forget about the market over time unless high tie performance wakes them up to dissolve the tie and go it alone. This shows that while initial in-licensing ties are known to be an effective way to test new markets before entry (Atuahene-Gima, 1992; Zahra and Nielsen, 2002), they can be flawed in that licensing ties do not require frequent interaction with licensees after product approval. In addition, prior

research shows that partners receive mostly context-specific information from their alliance (Mulotte, Dussauge and Mitchell, 2013; Yang, Lin and Peng, 2011). The combination of these two factors can lead to dormant ties and attribution errors (Kelley, 1971; Kelley and Michela, 1980) in market entry decisions in that partners of less successful firms may miss opportunities to enter a market due to discounting mediocre tie performance with unfavorable market conditions. The implications of this for entrepreneurial firm strategy are discussed in the following sections.

Another unexpected dynamic that this study uncovers regarding tie dissolution is how internal issues at prominent partners may affect tie dissolution during growth stage markets. Prior work (e.g. Kale et al, 2002; Lavie and Singh, 2012) shows that as their number of alliances grows over time, firms typically build alliance management capabilities (e.g. a formal corporate alliance function) and learn to manage alliances better. This study brings a nuance to these previous findings by showing how the situation may be different for prominent firms that operate in multiple markets. The findings suggest that these firms may experience a lag in allocating resources to handle the exponential growth in business volume and number of partners in a new market. Therefore, if the firm’s alliances are growing in a new market that is not yet a priority within the large firm, the firm may opt for making the alliance network more manageable by pruning it dramatically. This satisficing behavior (Simon, 1956) can in turn lead to reduced access to innovative firms in the market and has significant effects on the performance of entrepreneurial partners. For entrepreneurial firms, this finding provides a nuance to extant work on the benefits of large and resourceful partners for the performance of entrepreneurial firms (Baum et al, 2000; Eisenhardt and Schoonhoven, 1996; Stuart, 2000; Ozcan and Eisenhardt, 2009) and for the development of new markets (Santos and Eisenhardt, 2009). It shows that in new but rapidly growing markets, prominent firms may take time to divert their attention and resources from other markets, which will

cause them to respond slowly to growing market demand and existing partners. At the market level, this implies that while market entrance of prominent firms may help new markets take off quickly (Santos and Eisenhardt, 2009), the dedicated departments at these firms may not be able to grow as fast as the market, thereby limiting their partners' growth opportunities.

While the effect of the lost ties described above is very prominent, growth stage markets are not all about tie dissolution for entrepreneurial firms; new ties are formed as well. First, those entrepreneurial firms that 'win' the partner shakeout also gain other types of partners who want to establish an indirect connection to prominent partners. In addition, firms can form ties with new firms joining the market during growth stage to provide alternative channels for doing business. These later ties may provide the 'losing' firms with much needed resources when other partners are abandoning them. Extant literature suggests that firms can form ties with substitute or competing partners to reduce dependence on certain partners in the network (Gimeno, 2004; Lavie, 2007). This paper shows that while the likelihood of entrepreneurial firms leveraging such an opportunity follows a U-shaped curve, depending on the power of existing partners to threaten the firm to stay loyal or lose business, the signals the firm receives from the market in terms of acceptable behavior also play a role. Contributing to extant work on norms and rules in interfirm networks (e.g. Dyer and Nobeoka, 2000; Kogut, 2000; Podolny and Stuart, 1995; Stuart et al, 1999) this study shows how powerful firms can change rules in a network (e.g. whom to form ties with), which enables others to "mimic" their behavior (DiMaggio and Powell, 1983) to alleviate the limitations of a lower power position in forming new ties that become available during growth market.

Overall, this study makes a contribution to alliance and network literatures by considering the *combined* effects of changes in market uncertainty and competition on interfirm ties. Leveraging rich qualitative data, the findings also help inject organizational reality into interfirm dynamics.

They suggest that firms of different size and network experience market growth differently and that these experiences are intertwined through the ties that they form, manage, and cut over time.

Growing with the Market? Entrepreneurship in Growth Stage Markets

The findings also contribute to entrepreneurship literature by exploring the antecedents of different growth trajectories for entrepreneurial firms with similar starting positions. Prior work had suggested that the highly uncertain but less competitive environment in nascent markets allows entrepreneurial firms to form high performing ties with prominent partners (Ozcan and Eisenhardt, 2009; Santos and Eisenhardt, 2009). This study expands this work by showing that those firms that build strong ties to prominent partners during the nascent market can translate these into high performing ties to survive the 'partner shakeout' in the growth market. The findings reveal that as a market grows, entrepreneurial firms enter a race to tie performance with prominent partners. The finish line is when partners keep those ties above a performance threshold and cut everyone else[9]. This "rich get richer, poor get poorer[10]" effect of carriers' downsizing confirms earlier findings (e.g. Powell et al, 2005) that firms with strong ties to prominent partners can use the resources flowing from these partners to invest into more business with them and new business with new partners. However, there is also a status-signaling element as firms like Starclick became high status in the network and got new partners and better deals with existing partners, as shown in Finding 3.

As suggested above, this study finds that growth markets are mostly about structure. However, there is still room for agency for entrepreneurial firms operating in these environments. In the first finding, for instance, the loss of prominent brand partners resulted in reduced legitimacy and performance for all focal publishers, as predicted by extant work (Humand and Provan, 2000; Dacin,

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[9] Focal firms that entered market growth with strong ties to prominent partners were either acquired for record amounts (Starclick), or continued on their own successfully (Topmobile and Cellcruise) while others were either acquired for much smaller amounts (Mobilate), changed function (Airburst become a developer), or closed shop (Phonemix).
[10] The "Matthew effect" is a phenomenon whereby success replicates itself via a feedback loop (Merton, 1968).

Oliver and Roy, 2006). However, the degree of these effects varied depending on firms' strategy for tie formation and management. While Starclick focused on a few brand ties, Topmobile followed a generalist strategy, dividing resources over a higher number of partners. The advantage of Starclick's strategy was higher quality games derived from more frequent interaction and more resources flowing from partners as well as a deeper understanding of the partner´s brand. But as explained before, this strategy also carried the risk that more successful games enticed partners to enter the market directly, and when they entered, the negative impact of the lost tie was larger. With Topmobile's generalist strategy, the negative effect of lost ties was smaller. However, spending fewer resources on each prominent partner contributed to fewer 'hit games', which in a fad-driven market meant much lower revenues. This suggests that given their limited amount of resources, entrepreneurial firms face a trade-off in their interfirm ties. The specialist strategy (i.e. focusing on strong ties with a few prominent partners) has a higher likelihood of bringing high revenues, but has a significant effect on focal firm performance if these partners cut ties. The generalist strategy (i.e. hedging bets with weaker ties to a higher number of prominent partners) avoids significant negative effects following tie losses, however also has a lower likelihood of generating high revenues in a networked market where interfirm ties can significantly affect firm performance.

The second finding on (carrier) partners downsizing their alliance network suggests that a specialist strategy is better for surviving the tie cuts given that only the highest performing ties survive the downsizing. Particularly for mediocre firms such as Cellcruise, focusing on fewer partners has a higher likelihood of leading to success, given the limited resources of the firm.

Taken together, these two findings confirm that while in certain settings such as growth stage market networks, agency is constrained by network structure (Emirbayer and Goodwin, 1994), firms can still maneuver to improve their network position and subsequent benefits (Hallen, 2008;

Rindova et al, 2010; Santos and Eisenhardt, 2009). However, these findings also point to different directions for the optimal partner strategy. While the first finding suggests that there is a trade-off between specialist and a generalist strategy in tie resource allocation, the second finding suggests that a specialist strategy is better. This seeming discrepancy is explained by the fact that the partners in question in these findings are different types with different positions in the market and different goals for ties with focal firms. Future studies should analyze firms' network strategy with attention to different partner types and the relative power of partners based on network position and size.

Network and Market Evolution

At a macro level, the findings also highlight how networks evolve and interfirm tie choices influence market dynamics. In their theoretical piece, Gulati et al (2000) called for future studies to uncover how networks evolve both exogenously, through environmental changes and jolts, and endogenously through the coevolution of interfirm ties. Later work investigated the dynamics of network structure (e.g. Bonaccorsi and Giuri, 2001; Orsenigo et al., 2001; Gay and Dousset, 2005) and the external (Balland, 2012; Broekel and Boschma, 2012) and internal forces (Gluckler, 2007; McKelvey, 2002; Volberda and Lewin, 2003) that drive network structures, but there is still little understanding of whether the effects of these mechanisms change as markets evolve (Ter Wal, 2011). Looking at a real market network with interconnected firms of different types and sizes, this study contributes to extant work by highlighting various drivers of interfirm coevolution and network evolution following a change in environmental conditions. Confirming earlier work (Aldrich and Fiol, 1994; Baron et al, 1999; Klepper, 1996), the first and third findings show that lower uncertainty leads to more firms, including new types, crowding the market. However, this overall growth can mask nuanced ways in which prominent firms downsize their network during market growth, which can push many partners to the periphery of the network while a few become

more central with stronger ties to prominent firms, driving the market towards a small world network (Watts and Strogatz, 1998). This suggests that market conditions driving change are more complex than just a joint increase in competition and reduction in uncertainty. Other factors such as the ability of large versus small firms to manage ties and keep up with market growth also matter as micro-mechanisms driving network evolution in growing markets.

This also helps us explain the dynamics driving an industry shakeout. While studies have shown quantitatively that developing industries experience a shakeout in the number of producers at some point (Gort and Klepper, 1982; Klepper and Grady, 1990), very few scholars (e.g. De Vaan, 2014) have explored the link between this phenomenon and interfirm ties. This qualitative study helps establish this link by revealing how in interdependent (i.e. networked) environments, where interfirm alliances are critical for firm performance, a partner shakeout may precede an industry shakeout. As prominent firms become more selective in their interfirm ties, many entrepreneurial firms are abandoned and face survival challenges. Overall, these findings build on extant work on market networks to uncover exogenous and endogenous drivers of network evolution.

Managerial Implications

The findings also have managerial implications. First, in contrast to prior literature (e.g. Gulati, 1995; Uzzi, 1997) that emphasizes the benefits of arm's length ties, this study finds that entrepreneurial firms need to enter the growth stage of a market equipped with strong ties to prominent partners to survive a possible partner shakeout. In terms of resource allocation, this means that entrepreneurs are better off picking a few prominent partners and doing well with them early on rather than distributing their time and resources equally among all partners. A second implication for entrepreneurs is to be aware of coopetition with prominent partners that may later enter the market directly. The higher the success of the tie, the more likely it can accelerate

prominent partners' direct market entry. Anticipating this and creating a few alternative ties may prevent the firm from suffering big losses should the partner decide to enter the market directly. Overall, the findings highlight the importance of managing ties differently based on the type of tie and goal of the partner. Building on Bleeke and Ernst (1995) and Heimeriks et al (2015), they advocate remaining flexible during tie management as information asymmetries, intentions and bargaining power of partners can change and lead to abrupt tie dissolution. Earlier studies (e.g. Wassmer and Dussauge, 2011; Heimeriks and Duysters, 2007) suggest that alliance portfolio management is a critical process and goes beyond a firm's capability of managing individual alliances. By anticipating how a firm's ties can evolve depending on the factors described above, this study gives a tool for managers to evaluate their portfolios and take the necessary precautions.

CONCLUSION

This study explored how changing levels of uncertainty and competition during market growth affect interfirm ties of entrepreneurial firms. The findings provide a step towards understanding the relationship between firms, interfirm ties, and market evolution. A clear limitation of the study is its setting in a single market. Future studies should build on this research with larger samples to test some of the specific dynamics such as to what extent firms misattribute alliance success to market growth rather than partner capability; how firms' tie formation with prominent partners' competitors is affected by their extant ties, or to what extent growth markets experience expansion while becoming a small world network at the same time. Such a research agenda would place firm interaction and its multi-level consequences on center stage and continue the story.

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Appendix 1: Measures of Interfirm Ties

Interfirm ties were measured using characteristics commonly used in alliance and network research (e.g. Baum et al, 2000; Rowley et al, 2000) as well as characteristics that the informants regarded as particularly relevant (e.g., importance of strong ties with particular types of partners) as is common in grounded, inductive research (e.g., Eisenhardt, 1989; Strauss and Corbin, 1998). Consistent with prior research (e.g., Gulati, 1995; Rowley et al, 2000; Baum et al, 2005), the market network is defined in terms of the most influential firms in the market at the time of the study, namely the five major U.S. carriers that have over 90% of the subscriber base, two handset makers that together sell over 80% of handsets in the U.S. at the time of the study, two technology platforms that are the only ones used in the industry, and an unconstrained number of brand owners because the number of brands is effectively without limit. This ensures a focus on ties of strategic importance as suggested by the definition of ties that was used (Gulati, 1995). The wireless gaming market network was smaller and more differentiated in terms of number of types of firms with distinct roles, dependences and importance within the network than those often examined in prior research (e.g., Gulati, 1995; Baum et al, 2000; Rowley et al, 2000).

Type of Partners

There are four primary types of partners that the focal firms (i.e., publishers) can potentially have within the wireless gaming market (see also in Figure 1). *Carriers,* who own the distribution channel to the wireless subscribers, *brand owners* whose brand can bring additional legitimacy and sometimes content to the game, *platform providers* who own an industry standard software platform that publishers and carriers use to interface with one another and for billing, and thus are necessary for selling game, and *handset makers* who provide the handsets that the publishers must ensure that their games are operable. Publishers also collaborated with game developers for the writing of game software code. These were mostly free-lance individuals and small firms that worked with publishers on a project basis. Informants did not consider game developers as important partners, and there are many such developers. Thus, these were omitted from the analysis.

Prominence of Partners

Prior research defines a prominent partner as a partner with high status (Podolny, 1993; Stuart et al, 1999) and abundant resources (Kogut, 1991; Powell et al, 1996; Baum et al, 2000; Stuart, 2000). Studies also suggest that prominent partners are particularly advantageous for the performance of ties (Stuart et al., 1999). I measured partner *prominence* in several ways that depended upon the type of partner. For carriers, prominence was measured by the subscriber base of the carrier in the U.S. Data reveal that there were five prominent carriers in the U.S. at the time of study that accounted for over 90% of subscribers. Between the nascent and growth market stages, carriers slightly changed their market share in the market. However, these changes did not affect the overall ranking of the top five carriers. Brand owner prominence was measured through a survey in which 20 students from a major U.S. university (a prototypical target market for wireless gaming) ranked the brands of the focal firms from 1 to 10 where 10 indicated "I know this brand very well" and 1 indicated "I don't know this brand at all". The average of these ratings was taken for each brand, and then averaged over all brands of the firm. Brands with a rating greater than 7 were considered to be prominent. There were two (technology) platform providers in wireless gaming during this study: Brew (by Qualcomm) and Java (by Sun). Both firms had significant market capitalization, employee count, and product innovation track records. The major US carriers chose one of these two platforms to provide games to their subscribers. Thus, both firms were considered prominent. The primary handset makers at the time of the study in the U.S. were Nokia and Motorola who together had approximately 80% market share of handsets. Both firms have significant market capitalization, employee counts, product innovation track records, and other signals of prominence. Thus, both firms were considered prominent. It is important to note that the entry of smart phones (particularly the IPhone) changed the prominent players and the power dynamics in the wireless market. However, this study was conducted before smart phones entered the market.

Importance of Partners

All partner types were valuable to publishers. But as in many industries, some partner types were more important than others. I asked informants to rank partner types in their order of importance for the focal firm's success. These rankings indicated that carriers were most important because they owned distribution, directly reached consumers, and could affect game sales directly (e.g. promotions, deck placement). Brand owners were ranked second because a prominent brand was influential in consumers' purchasing decisions. For instance, a prominent carrier announced that 70% of its game revenues in 2004 were from branded games. Informants differed in their rankings of handset makers and platform providers, but collectively ranked them equivalently. Ties with platform partners helped firms adapt more quickly to advances in the software platform during market emergence. Handset manufacturers were helpful for adapting games to the latest phone models, but publishers also had access to these phones at the carriers. Informants agreed that both platform and handset partners were helpful early in the market because they could provide the publisher with introductions to other firms, opportunities to attend exclusive conferences and/or give keynote speeches. These ties lost their importance in the growth market once publishers had strong carrier and brand ties, which ultimately was critical for the inflow of revenues.

Figure 1: Market Players in Wireless Gaming

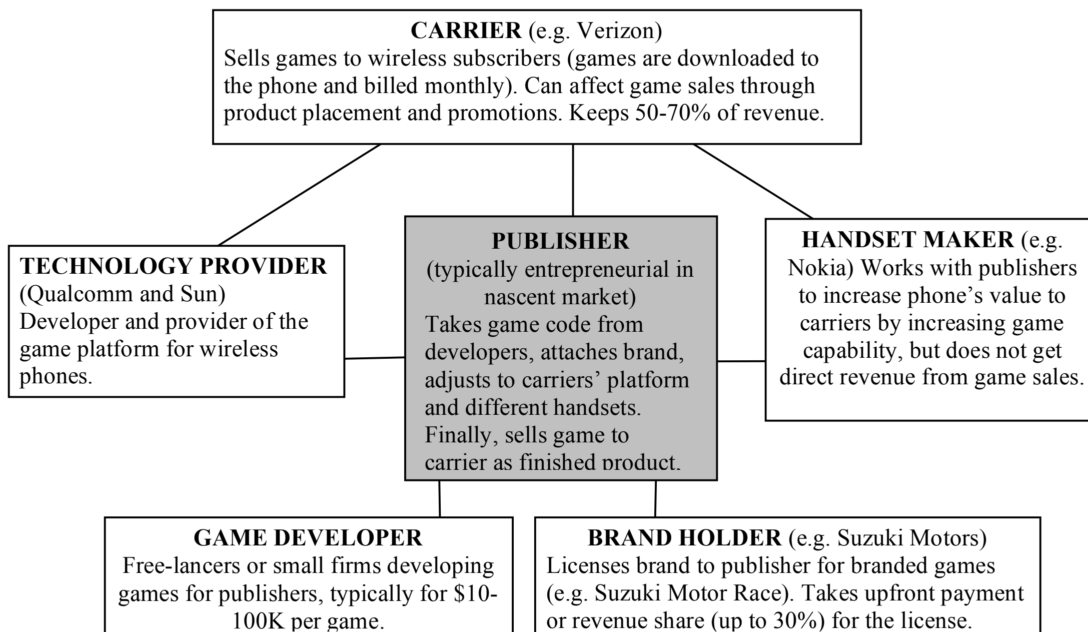
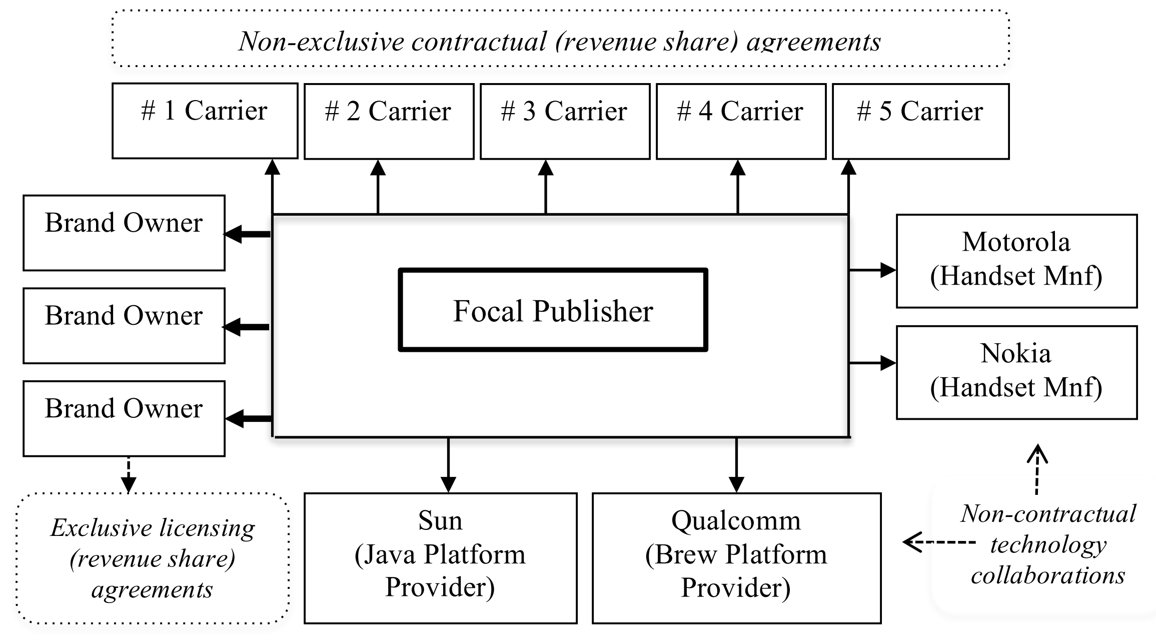


Figure 2: Nature of Ties Formed by Focal Publishers



<table>
<tr><th colspan="7">TABLE 1: MARKET TRANSITION FROM NASCENT TO GROWTH STAGE: NUMBERS AND QUOTES</th></tr>
<tr><th colspan="2">Market Stage</th><td>Nascent (1999-2002)</td><td colspan="3">Growth (2003 onward)</td></tr>
<tr><th colspan="2">Year</th><td>2002</td><td>2003</td><td>2004</td><td>2005</td></tr>
<tr><th rowspan="3">Market Growth by Numbers</th><th># Wireless Game Players</th><td>1.3 mil</td><td>2.9 mil</td><td>5.5 mil</td><td>9.5 mil</td></tr>
<tr><th>Total $ Spent by Customers</th><td>$21 mil</td><td>$91 mil</td><td>$345 mil</td><td>$605 mil</td></tr>
<tr><th># Games in the Market</th><td>252</td><td>1557</td><td>2548</td><td>2673</td></tr>
<tr><th rowspan="2">Evidence of Increasing Competition</th><th># Publishers in the Market</th><td>41</td><td>136</td><td>217</td><td>169[11]</td></tr>
<tr><th>Prominent Firms Entering the Market</th><td>Carriers: Sprint, Verizon, AT&T</td><td>Carriers: Cingular, T-Mobile; Video Game Publishers: Sega, THQ; Media & Entertainment: Disney, ESPN.</td><td>Video Game Publishers: Electronic Arts; Media & Entertainment: HBO, Yahoo, Fox Sports.</td><td>Video Game Publishers: Atari, Activision; Media & Entertainment: CBS Television.</td></tr>
<tr><th rowspan="4">Evidence of Decreasing Uncertainty</th><th>Technological Uncertainty</th><td>Technical difficulties regarding the purchasing and gaming experience, no multiplayer games</td><td colspan="3">Streamlined purchasing and gaming experience, availability of multiplayer games</td></tr>
<tr><th>Supporting Quotes for Technological Uncertainty</th><td>“The purchase process was so torturous... Like you have to enter your credit card every time you buy a new game!”
“There were game download difficulties, crashes while you played, small screens, it wasn’t pretty back then.”</td><td colspan="3">“So it was really in the 3rd quarter of 2002 when all of a sudden consumers could go into a store, buy a phone, download content, and the price of that content would show up on their monthly bill.”</td></tr>
<tr><th>Market Uncertainty</th><td>Low sales volumes, uncertainty about target consumers and popular game genres</td><td colspan="3">Exponentially growing sales, availability of sales numbers leading to increasing clarity about target consumers and popular game genres,</td></tr>
<tr><th>Supporting Quotes for Market Uncertainty</th><td>“We’re shooting darts in the dark.”
“<Carriers> don’t know anything either… We’re figuring this out together… It’s all about who can make a convincing argument about which types of games would sell.”</td><td colspan="3">“Ok, the business is big enough now. There will be the entrance of new competitors for the people who survived Round 1.” “It’s much clearer now who plays games and what types of games they like. You wouldn’t expect it, but it turns out women play a lot, and they like casual games.”
“<Publishers> all have a track record that we can judge by now.”</td></tr>
</table>

[11] In 2005, a decline is visible in the number of publishers in the market. This can be explained by the increased failure rate and acquisitions of smaller publishers as a result of higher competition, confirming the findings of Carroll and Hannan (1989), Hannan and Freeman (1987; 1988).

TABLE 2: OVERVIEW OF FOCAL FIRMS AND INTERVIEW DATA

Firm	Location	Founded	Initial Investors	Founding Team Characteristics			Details of Data Collection[12]		
				# Founders	Prior Industry	Prior Connections	# Interviews	Focal Firm Informants Interviewed	Types of Partners Interviewed
Starclick	Los Angeles	1999	Corporate VC	3	Video Games / Software	Brand Owner	21	CEO / Founder, VP Marketing, VP Sales, Chief Creative Officer	Carrier, Brand, Handset, Platform
Topmobile	Seattle	1999	VC	2	Telecom / Video Games	Carrier	20	CEO / Founder, President / Founder, VP Publishing and Sales	Carrier, Handset, Platform
Cellcruise	San Francisco	2000	VC	3	Video Games	Brand Owner	20	CEO, VP Biz. Dev., VP Publishing, VP Licensing, VP Production	Carrier, Brand, Platform
Mobilate	Los Angeles	2002	Self	3	Telecom	Platform Provider	18	Founder, CEO, President, VP Licensing, Director of Development Studio	Carrier, Brand, Platform
Phonemix	Seattle	2002	Corporate VC	1	Telecom	Carrier, Handset	15	CEO / Founder, VP Marketing, VP Development	Carrier, Handset, Platform
Airburst	San Francisco	2001	Self	2	Video Games	-	13	CEO / Founder, VP Business Development / Founder	Carrier, Handset, Platform

[12] The focal firm interview guide started with the background and strategy of the firm and continued with major events in the formation / evolution of each tie, using an open-ended format and prompting with questions (e.g. how the opportunity presented itself, who was involved). Failed tie attempts and discontinued ties were noted in this process. The next section asked the informant to step through the key events of the tie, describing how and by whom these were handled. At later waves of data collection, the questions focused on changes in the firm's ties since the last interview. The partner interview guide had the same basic structure. All interviews were tape-recorded and transcribed, most within 24 hours. Potential informant bias was addressed first, by using both real-time and retrospective data (Leonard-Barton, 1990). Collecting the data in several waves over 30 months also increased accuracy. Third, several interview techniques (e.g., "courtroom" questioning, event tracking, non-directive questioning) were used to yield accurate information from informants ((Eisenhardt, 1989; Huber and Power, 1985). Fourth, informants were chosen from multiple levels of hierarchy (e.g., CEO and VP levels) and in different functional areas (e.g., marketing, business development, engineering) to obtain a more accurate picture of events. In addition, highly knowledgeable industry experts were used as an independent data source. Fifth, anonymity was assured to informants to encourage candor. Finally, interviews were complemented with observations from five industry conferences and extensive archival data (e.g. business publications, Internet sources, and corporate materials).

TABLE 3: LOST BRAND TIES AT FOCAL FIRMS DURING MARKET GROWTH (FINDING 1)		
Firm	**Lost Brand Ties**	**Supporting Quotes**
Starclick	2	*"When we had visited them for the first time, they had looked at us in disbelief that this would ever take off. It was just not on their radar. But in time, this has changed. The more successful we became, the more they realized that they should be in there themselves"* *"We are visiting our partners one by one and showing them all the games we have in the pipeline for them. We are showing them that we are greater than just those few games that did well in the past."* Starclick CEO *"Wireless games are growing faster than we expected…and companies like <Starclick> are the living proof that sports games work great on mobile phones."* EA Executive *"These were top selling games for Starclick. Not only are they losing the games, but EA will now sell the same games that users have gotten to know and love because of Starclick…Oh sure, it was a surprise, not that it happened, but when it happened... The sense is that <EA> were lucky to work with a great publisher that opened their eyes to this great new opportunity"* Industry Analyst
Topmobile	3	*"We always knew that Atari would come in for example. But with the other guys, it wasn't clear to me at all. They just didn't seem interested. But then suddenly they were…They don't need to see us at all once they approve the game, so they sometimes even forget that they'd done this deal at all…"* Topmobile VP "*It's almost like these startups are paying a price for raising the profile of mobile gaming."* Industry Analyst
Cellcruise	1	*"After this loss, I would say we are in a less good position. But luckily, this happened to the other big guys too"* Cellcruise CEO *"That competition we organized went very well… It was a bit unexpected for us...But it certainly raised the profile of mobile gaming and accelerated things."* Fox Sports Executive

(Phonemix, Mobilate and Airburst did not lose any brand ties due to partners' direct entry)

TABLE 4: CHANGES IN CARRIERS' PUBLISHER TIES DURING GROWTH STAGE MARKET (FINDING 2)

Carrier	Tie Management Strategy	# Cut Ties	Focal Publishers Affected	Supporting Quotes
1	No official cuts, but stopped face-to-face meetings except with a few publishers and managed many partners thru website	-	Among focal firms, only Starclick maintained face-to-face meetings.	*"<Publishers> chase me to my car after work. I feel like a celebrity sometimes."* Carrier Exec *"You can deliver to their website, but there is no way to see whether they are looking at your games"* Phonemix CEO
2	In 2005, carrier cut down number of partners to make it more manageable	Q1 2005: Cut from 32 to 18 publishers	Among focal firms, only Cellcruise, Starclick, and Topmobile were chosen as key publisher partners.	*"My phone doesn't stop ringing. Some of these guys even show up in my office unannounced to show me their new games…It could be that we haven't got a chance to get to know these guys yet or maybe they've been around but they didn't have any games that stood out from the crowd…I don't have time to be fair, I need to go with who I know can deliver best-selling games… Sure, there is lots of stuff we could do right now. Multiplayer games are becoming a thing. All sorts of interesting games, well, not even games, but content really. It is a very exciting time and I wish I had the bandwidth to pick and choose."* Carrier Exec *"We will continue to work with them. This is key for us"* Cellcruise CEO *"We were too late to be a key publisher for them."* Phonemix VP
3	Had an exclusive tie with Topmobile until 2004. In 2004, opened doors to new publishers, but decided to focus on top performers	-	Among focal firms, only Cellcruise, Starclick, Topmobile delivered to carrier. Others were told carrier was still terminating their exclusive contract.	*"We are unofficially working with them. They are not announcing it publicly yet"* Starclick CEO *"We were told they are going to meet with us soon. They are just in the middle of a legal mess right now"* Mobilate VP *"The process of working with them and getting our games on the deck has been a nightmare. It can take like 3 months for them to even look at the stuff we send them…Part of it is that they are seriously understaffed."* Topmobile President
4	In mid 2004, carrier cut down number of partners to make it more manageable	Q4 2004: Cut from 50 to 12 publishers	Among focal firms, only Starclick and Topmobile were chosen as key partners.	*"We have decided to only work with a few publishers to streamline our process...We had a great relationship with <Airburst> guys, but they just don't have the connections in the market that we look for… Do I trust that I will get the best games in the market in an unbiased way? No, of course not. But I will get pretty good games and I will get them much faster this way."* Carrier exec. *"First they don't give you a chance and then they say you didn't do that well. The type of promotion that <competitor> gets from <carrier> is something that I can only dream of."* Airburst CEO *"The correspondence at <carrier> is with a department that all carriers have designated to phone games. These departments have an entrepreneurial spirit to them and it is fun to work with them. The people are young and enthusiastic people who enjoy games. But often there is a huge disconnect between the "game department" and other departments like marketing or IT."* Cellcruise VP
5	Maintained partners for a while, but took time to organize gaming service	Q1 2005: Cut from 58 to 27	Focal firms all formed ties with carrier, but sales volume never became satisfactory.	*"We are going to work with a select number of publishers from now on. They all have a track record that we can judge by now and plus, we have gotten to know several of them very well. It's more efficient this way."* Carrier exec. *"We are one of their top partners. But things are very slow over there"* Airburst VP/Founder

TABLE 5: TIE FORMATION WITH NEW PLAYERS (FINDING 3)

Firm	Ties Formed with Alternative Distribution Channels	Supporting Quotes
Starclick	Negotiated with Google, Yahoo, Radio Shack. Published games, but terminated after being acquired.	Rationale for Tie Formation: *"Because the carrier guy, they have no clue, right. They're still trying to gage what users are doing. And they don't have the expertise to do it, and they're only going on gut. Which is fine, gut is fine, when you have nothing else to go on; but when you have stats to go on, why don't you use them instead."* Outcome: *"Well, it had to be sold to them. I literally went around this last January to every single important US carrier and explained to them why it wasn't a threat. I told them we are trying to grow the market. We are trying to market to people who aren't normally the buyers of games. So by doing that, it's good for them."*
Topmobile	Published games on Handango and Yahoo Games. Websites closed after 2 years due to low traffic.	Rationale for Tie Formation: *"We ultimately believe that the carriers are the best channel, we still believe that. They have the position to make mobile gaming successful. If they want to… And that's the crucks. Because sometimes they move on to other stuff, you never know. Like crazy TV on your phone or videos, and suddenly mobile doesn't get any more attention. I can't allow my business to be blown like a reed in the wind of whatever the carrier thinks is the hot button issue of the day. I need control, I need some slight degree of control over my destiny." "Carriers tend to be self-interested. They believe they are the best, they are the dominant people in the world, so they should get all of the revenue. The challenge in our industry is that the carriers take an undue, unfair share of the revenue for what's being delivered. That ultimately and potentially can be extremely detrimental to the industry."* Outcome: *"We're the big dog…Nobody will not be with us. So when we went with those guys, it was a signal to the market that this was ok, this was legit."*
Cellcruise	Initially avoided it. Approached these alternative channels only after Starclick and Topmobile formed the first ties.	Rationale for (No) Tie Formation: *"Right, so we discussed that and decided not to do it. It would be a mistake to try to go around carriers. You can't piss them off. They actually are the gatekeepers right now; if you're not in bed with the carriers, there's no way you're going to get any distribution at all. So you can't give up carriers. The only thing is, carriers have to have a constant revenue stream. Any company who tries to go around carriers is making a mistake." "When you talk to <carriers> it's very clear that you will not be given a favorable position in their network if your focus is elsewhere." "Second tier publishers like us often feel that if we don't do things exactly right, we will lose big time."* After competitors formed ties: *"We went back and forth for a long time." "Everyone is doing it right now" "This is just something we are doing on the side. Our focus is still the carrier. However, we feel it is a good idea to explore different options without going behind their back."* Outcome: *"<Carriers> are being surprisingly open minded about it."*
Phonemix	Published games on Handango and Yahoo Games. Websites closed after 2 years due to low traffic.	Rationale for Tie Formation: *"We gave <carriers> 70%, I know some guys got better deals, but no deal was good enough" "These websites have a rather transparent display of available games under simple categories. So no more 'feature games' or 'top picks'. Everybody has a fair chance."* Outcome: "*I mean, we don't know if this will pick up right, we are just getting started."*
Mobilate	Did not pursue strategy, execs were busy negotiating with a buyer.	Rationale for (No) Tie Formation: *"It was not on our radar at that time. Plus, it's a gutsy thing to do."*
Airburst	Published games on Handango and Yahoo Games. Websites closed after 2 years due to low traffic.	Rationale for Tie Formation: *"Carriers can do things like say, "We're going to block this; we don't need another sports game." Once they do stuff like that, you're completely out, you can't do anything. So you need a backup plan if you're not getting your games through."" It was either this or closing shop.*" Outcome: "*If you're still trying to please the carriers then it's not as straight-forward as it was for us."*

TABLE 6: OVERVIEW OF CHANGES IN ON FOCAL FIRMS' INTERFIRM TIES DURING MARKET GROWTH

Firm	Lost Brand Ties due to Brands' Direct Entry (P1)	Effects of Carriers' Decision to Downsize Publisher Network (P2)		Tie Formation with New Players Providing Alternative Distribution Channels (P3)
		Lost Ties	Stronger Ties	
Starclick	2	-	w/ # 1, 2, 3, and 4 Carriers	Negotiated with Google, Yahoo and Radio Shack. Published games, however terminated these ties after being acquired.
Topmobile	3	-	w/ # 2, 3, and 4 Carriers	Published games on Handango and Yahoo Games websites.
Cellcruise	1	w/ # 4 Carrier	w/ # 2 and 3 Carriers	Initially found strategy "too risky" and avoided it. Approach these alternative channels only after Starclick and Topmobile formed the first ties.
Phonemix	-	w/ # 2 and 4 Carriers	-	Published games on Handango and Yahoo Games websites.
Mobilate	-	w/ # 2 and 4 Carriers	-	Did not pursue strategy, as executives were busy negotiating with a buyer.
Airburst	-	w/ # 2 and 4 Carriers	-	Published games on Handango and Yahoo Games websites.

TABLE 7: COMPARISON OF FOCAL FIRMS' INTERFIRM TIES IN NASCENT VERSUS GROWTH MARKET

Firm	Types of Partners (in order of importance)																
	Carrier ties						Brand ties					Handset ties			Platform ties		
	# Carrier Ties		Total # Games Promoted by at least One Carrier		Effect of Carriers' Downsizing		# Brand Ties			Average Brand Prominence		# Handset ties		Strength of ties	# Platform ties		Strength of ties
	2003	2005	2003	2005	Lost ties	Stronger ties	2003	2005	# Brand ties lost	2003	2005	2003	2005		200 3	2005	
Starclick	5	5	15	20	-	4	3	11	2 (due to direct market entry)	8.2	7.9	2	2	As handset ties lost importance, focal firms stopped strengthening these ties	2	2	As platform ties lost importance, focal firms stopped strengthening these ties
Topmobile	5	5	15	18	-	3	4	19	3 (due to direct market entry)	6.9	6.3	1	2		2	2	
Cellcruise	4	3	1	2	1	2	4	9	1 (due to direct market entry)	5.7	6.1	0	2		2	2	
Phonemix	2	-	-	-	2	-	-	4	-	-	2.9	2	2		2	2	
Mobilate	3	1	-	-	2	-	4	5	1 (due to poor performance)	6.0	5.5	1	2		2	2	
Airburst	2	-	-	-	2	-	2	2	1 (due to poor performance)	4.4	3.2	2	2		2	2	

TABLE 8: CHANGES IN FOCAL FIRM PERFORMANCE

FIRM	# GAMES		TOTAL # HIT GAMES		INDUSTRY RANKING		OTHER CHANGES IN PERFORMANCE	QUALITATIVE ASSESSMENT (TYPICAL QUOTES)
	2003	2005	2003	2005	2003	2005		
SC	55	118	8	13	1	Top 5	Successful IPO in 2004. Opened London office early 2005. Was acquired for $700M in 2005, which was considered a great success story in the industry.	*"The pond is bigger, right? But we are still a relatively large fish"* CEO *"I must say they held their own against the big guys that recently entered the market"* Industry Analyst
TM	102	189	7	10	2	Top 5	Opened London office in 2004. Remained private and a top 5 publisher until end of data collection.	*"You can't really look at it and say "we're doing worse" cause it's a lot harder now in this market"* VP Sales *"They continue to do well"* Carrier Executive
CC	27	41	2	3	8	Not Top 10	Experienced drop in performance due to competition in growth market. New CEO sought another round of VC financing in 2004 to fund turnaround.	*"The game has changed in a major way. We are trying our best to stay above the surface. Many of our competitors from earlier are sinking right now"* CEO
PM	5	20	0	0	Not top 10	Not top 10	Exited publishing business in 2004.	*"They were too late to get brands. They played it wrong and lost"* Competitor *"Haven't heard of them in a while"* Carrier Executive
ML	9	15	1	1	Not top 10	Not top 10	Acquired for about $30M at end of 2004 by major European publisher.	*"It's a global market now, so you're competing against the European guys too"* CEO *"I personally think small guys are better off selling as quickly as possible before more of the big guys enter the market. So <CEO> did the right thing."* Carrier executive
AB	8	17	0	0	Not top 10	Not top 10	Exited publishing business in 2004 to become a game developer, delivering games to former competitors.	*"We know how publishers work, so I think we can do very well as a developer"* CEO

TABLE 9: COMPARISON OF NASCENT AND GROWTH STAGE MARKETS IN MARKET CONDITIONS AND CONSEQUENCES FOR INTERFIRM TIES

Nascent Market	**Market Condition**	High Uncertainty	Low Competition
	Effect of Market Conditions on Interfirm Ties	Prior literature: Higher likelihood of adding new prominent partners and exclusive ties as prominent firms cannot assess prospective partners.	Prior literature: Higher likelihood of adding new prominent partners and exclusive ties as prominent firms have few alternatives for partnership.
Growth Market	**Market Condition**	**Decreasing Uncertainty**	**Increasing Competition**
	Effect of Market Conditions on Interfirm Ties	**Proposition 1a:** As uncertainty decreases during market growth, prominent firms that have been linked to the market through interfirm (e.g. licensing) ties may decide to cut them and enter directly. **Proposition 1b:** For their partners, this effect is a "winner's curse": the more successful the tie, the more likely that the prominent firm will break it off, and the more detrimental the performance consequences of this loss for the abandoned partner.	
		Proposition 2a: As a market enters growth stage, prominent firms that operate in multiple markets may experience a lag in allocating resources to handle the exponential growth in business volume and number of partners. This lag, along with lower uncertainty about partners' performance, can lead these firms to downsize their alliance network. **Proposition 2b:** In this process, partners with low to mediocre tie-performance typically lose their tie while the remaining partners enter a positive spiral of increasing tie strength and performance. **Proposition 3a:** In a growth stage market, the entry of new types of prominent firms threaten the power of existing prominent firms. **Proposition 3b:** Entrepreneurial firms with high performing ties as well as those with low-performing or no ties to prominent partners are likely to form ties with these new types of firms. In contrast, those "stuck in the middle" with mediocre ties to few prominent partners find this move too risky and wait for a first mover to legitimate these ties.	