Business mating: when startups get it right[1]

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Abstract

The importance of forming business relationships is critical for the prosperity of startups; still, few studies have examined how conditions inside and around the startup together leads to business mating – occurrence of a new business relationships. To clarify the importance of proper fit among management style, invention features for high mating chances, this paper tackles this need by taking a configurational approach. We use Qualitative Comparison Analysis (QCA) to analyze case studies from 16 invention-based startups seeking marketing partners. Findings indicate different solutions leading to high chances of forming business relationships. This study contributes with a typology to the business relationship and startup literature, as well as discusses future directions to the emerging sub-domain of business mating research.

Keywords: business mating, business relationships, startups, configurations, QCA, invention, entrepreneurship, markets, entrepreneurial orientation, relationship formation

Introduction

When firms are started to capitalize on an invention, they, like most infant startup firms, are likely to lack some assets internally that are necessary to survive without business partners (Hunt and Morgan, 1995). Startups have a need to form relationships with other firms and outsource selected activities that the startup is unable to accomplish by itself (Nkongolo-Bakenda, 2001). For a startup, several various types of relationships might have to form, for example with suppliers or production partners. However, this study concentrates on startups' chances to form relationships with marketing partners. The statement that startups need business partners to perform marketing operations is particularly true if the firm has its core competence in technology or manufacturing but possesses vastly incomplete marketing assets and a limited customer base (Teece, 1986). Invention-based startups are therefore likely to build a business model based on accessing complementary assets from incumbent marketing partners, to assist in capturing the value from the invention (Teece, 2010). However, before assets can be pooled across business borders to gain benefits for the partners, two independent firms must mutually agree to form a relationship. This ability to form relationships becomes a critical step for startups to be able to compete (BarNir and Smith, 2002). Especially for invention-based startups, it seems crucial to be successful in attracting a marketing partner with the desire to pool assets. In contrast, invention-based startups that are not able to attract a partner will need to perform all their marketing activities by themselves. This requires valuable resources that would be considerably difficult for startups to gain, such as marketing knowledge, a customer network, time and a brand name (Davis and Eisenhardt, 2011; Stinchcombe, 1965).

Previous research in relationship formation has covered[2], for example, the importance of a previous network (Ahuja, Polidoro, and Mitchell, 2009; BarNir and Smith, 2002), social capital (Ahuja, 2000), and strategies for relationship formation (Hallen and Eisenhardt, 2012). The term "business mating" has been previously used in the relationship formation literature by Wilkinson, Freytag, and Young (2005). They argue that we know too little about whether the attraction between firms causing business mating occurs mostly when firms show common characters, or when characters and assets are complementary. Their study call for more research to investigate business mating that scrutinizes how firms' relative positioning versus the market of possible partners impacts on their attractiveness.

We are interested in the circumstances where attractions between potential future partners germinate. Wilkinson, Freytag, and Young (2005) address the issue that for firms to be chosen it is critical to demonstrate characters in common to potential partners with respect to management style (innovativeness, mindset, and etcetera) and core technology consensus (cohesive systems). Therefore, we will in this article elaborate how the internal conditions fit with the present situation in the market in which the startup proposes to operate. We argue that when firms find

[2] For a comprehensive review of the small business relationship literature, see Street and Cameron (2007)

internal fit between management style and invention type they become attractive to potential partners. When firms are also able to align themselves with the external market situation they show similarities with the potential marketing partners that exist in the market.

Moreover, a large amount of the prevailing research on strategy for manufacturers and startups seems to treat partner selection as a one-sided option for choosing the best available middlemen (see for example, Rosenbloom, 2007; Stern, El-Ansary, and Brown, 1989). For startups it cannot be taken for granted that any incumbent firm will accept a proposal for cooperation. Conversely, startups based on inventions with vastly incomplete marketing assets are assumed to be most eager to propose to would-be partners. Thus, the partnering decision will, most likely, be in the hands of the incumbent firm that controls the necessary market access. We assume, thus, that relationship formation for startups is about attracting, proposing and being chosen. Hence, this study focuses on how configurations of conditions inside and around the startup facilitate business mating – defined as the occurrence of a business relationship. We are content to see if a relationship was formed or not, and do not focus on whether it became a successful relationship to the parties.

A few studies, such as that by Wiklund and Shepherd (2005), have developed a framework that investigates the fit of internal conditions with the market situation. In the marketing literature, noticeably, both researchers who link the features of inventions to performance (see for example, Gans and Stern, 2003) and those who accentuate the importance of attractive management styles (see for example, Mohr and Spekman, 1994) have emphasized only internal conditions. Facing different market situations, startup managers receive limited direction from previous research that isolates specific internal variables. Thus, it is essential to understand how the configurations of internal and external conditions affect the likelihood of mating in order to create sound implications for enlarging mating chances. Nevertheless, we still lack a framework that takes a configurational approach to detect how the multidimensionality of conditions in and around startups is connected to business mating odds.

Our study addresses and investigates whether particular combinations of invention features, management styles and market situations may enhance invention-based startups' chances to mate with a marketing partner. From a configurative point of view, we first combine the extant literature and propose two configurations of management style, invention features and market situation that would lead to high chances of mating with a marketing partner. Then, empirical data from fieldwork in 16 invention-based startups are analyzed using Qualitative Comparison Analysis (QCA) (Ragin, 1987). Our findings are similar to the proposed typologies that led to higher chances of forming a business relationship than any alternative combination. To a great degree, our findings demonstrate that startups have their best chance of mating when their management style and invention features fit the present situation in the market.

Our study makes five contributions to the business relationship and business startup literature, as well as to the emerging sub-domain of business mating. First, we introduce a theoretical model for business mating that we also examine with empirical cases. This model highlights that there are two configurations that are the opposite of each other yet lead to the same outcome. Second, we suggest that business mating is not about simply choosing a marketing partner. Rather it is about being attractive to a marketing partner and becoming chosen by this partner. Third, to the best of our knowledge, this is the first configurational business relationship study that focuses on the mating aspect from an external and an internal point of view. Fourth, we use a variety of both primary and secondary data sources to enable a rich understating of the cases, which we consider can give method-wise directions for future business mating studies. Finally, we also contribute to the debate (Wiklund and Shepherd, 2005) about entrepreneurial orientation (EO); our findings indicate both theoretically and empirically that high EO is not always a necessity for startups to form business relationships with marketing partners. In contrast, high EO might, in certain situations, prevent startups from mating with a marketing partner.

The article now proceeds with a review of the three conditions on which we base our configurational model. The paper then advances to illustrate how these different conditions interact with each other. Thereafter follows an elaboration of two theorized configurations that lead to high mating chances. We then continue with an empirical cross-case analysis based on fieldwork in 16 invention-based startups that are seeking a marketing partner. The paper concludes with a discussion of the findings, implications for managers and contributions.

A configurational-theoretic typology

The foundational principle in any configuration model is that some combinations of conditions are better co-aligned than others (Drazin and Van de Ven, 1985; Miller, 1996; Venkatamaran, 1989). A configuration-theoretic approach (see, for example, Doty and Glick, 1994) with a theorized typology, of principally requested profiles, investigates the "fit" among conditions. According to Miller (1996), configurations close to ideal profiles occur at a notable rate in a sample, and account for an increased share since configurations with a poorer fit will be demoted by selection mechanisms. A typology can help researchers in organizing complex relationships between different conditions into meaningful explanations (Fiss, 2011). Doty and Glick (1994) claim that theory building with typologies offers a particular form of theorizing that allows for describing causal relationships between several different conditions to anticipate an outcome. The configuration reasoning which is nested in the conceptually derived typologies take into account the complex and interdependent relationships and recognizes that fit is dependent on several conditions (Fiss, 2011).

We extend this reasoning, assuming that fit between management style of the owner/manager, the market situation for the invention and the radicalness of the invention together are linked to higher chances of business mating. In entrepreneurship research it is recognized that the personal characteristics of the owner/manager are essential in startups, as well as the environment (Miller, 1987). The startups in this article are all based on a specific invention. Thus, it is reasonable to argue that also the invention itself is a condition to assess. These conditions also relate to the importance of showing attractive management style and an aligned product technology to be chosen as a partner (Wilkinson, Freytag, and Young, 2005).

Conditions framing the configurational model

Invention features. An invention refers to an original solution for a product that is novel and not obvious (Utterback, 1971). Inventions that are granted a patent are all unique and novel, but inventions can still differ in their degree of radicalness – how unique and different from the alternatives they are. Since this study is about business mating, a market perspective is taken, and we characterize inventions based on how the market perceives them. If there are only minor changes or no apparent improvements in relation to what is customary in the market, then the invention is classified as incremental. It is important to note that incremental inventions adhere to the logic of the product category and also the standard process for marketing and sales, reinforcing cohesive systems. In contrast, if the invention provides substantially different features from the existing solutions in the product class, then the invention is radical (Chandy and Tellis, 1998). Radical inventions can break down the logic of the product category and require different processes and knowledge for marketing and sales (Henderson and Clark, 1990).

Management style. Management style relates to how the top manager(s) runs the firm, for example priorities, attitudes towards change and risk, how decisions are made and how the manager relates to and leads subordinates. Typologies of management style in the literature have been assessed along various dimensions that examine the characteristics and/or strategies of founder(s) and leader(s); for example, the "exploitation" of existent assets and certainties versus the "exploration" of new opportunities (March, 1991), "formal planning" versus "mere improvisation" (Bresser and Bishop, 1983), "autocratic" versus "democratic" decision making

(Rotemberg and Saloner, 1993) and risk-taking (March and Shapira, 1987) have been attributed to contradictory styles. Many, if not all, of these characteristics converge in one meta-dimension, a continuum that extends from entrepreneurial to conservative (Covin and Slevin, 1989). We follow Covin and Slevin (1989) who state that "entrepreneurial firms are those in which top managers have entrepreneurial management styles, as evidenced by the firms' strategic decisions and operating management philosophy" (p. 77). Thus, because of EO's comprehensive use in analyses of alignment and performance implications in the management and entrepreneurship literature, we operationalize a firm's management style as the degree of EO running from low (equals a conservative style) to high. This is also in line with a recent call for configurational research using EO as a variable (Miller, 2011; Short, Payne and Ketchen, 2008).

The EO scale estimates the tendency to take risk, to be proactive and to be innovative (Covin and Slevin, 1989). Highly entrepreneurially oriented managers are characterized as risk-takers and highly innovation-focused, but less occupied by formal decision rules, hierarchies and control (Miller, 1983). The entrepreneurially minded manager makes quick decisions based on intuition and trial and error instead of formal investigations as part of being an opportunity-oriented risk-taker and proactive (Hills, Hultman, Kraus, and Schulte, 2010). In contrast, a conservative-administrative manager is risk-averse, non-innovative and reactive (Miller, 1983).

Market situation. The prior research acknowledges several dimensions to describe the differences between the market situation extremes. Turbulence, predictability, rate of change and rules for competition are regular markers to classify the situation under investigation. A common denominator for these is that they are greatly determined by the presence or absence of a "dominant design." This term can characterize technological descriptions consisting of coevolved systems, subsystems and components that somehow have been promoted and spread to become the reigning archetype within a given market or industry (Abernathy and Utterback, 1978; Murmann and Frenken, 2006). The dominant design is defined as a set of core design concepts embodied in a technology's subsystems and components, in accordance with the major functioning of the whole archetype (Henderson and Clark, 1990). For example, the standardized principles of the combustion engine severely limit the design space for all its included parts and, hence, constrain the design variability in the car engine product class. Nevertheless, there is some variation between brands if we consider the details, and adjustments over time have improved the performance, but within the frames of the elemental core design.

Conceptualized in this way, the dominant design externalizes two important notions. First, out of many different possibilities, one design has been adopted more than the alternatives. Adaptation in this sense does not necessarily imply optimization or higher value than the alternatives. Dominance can also be achieved due to better marketing, strategic maneuvering and licensing, quicker introduction and economies of scale (Abernathy and Utterback, 1978; Arthur, 1989; Klepper, 1997; Liebowitz and Margolis, 1995). Second, markets become stable when the rate of change decreases and predictability increases. This is when a dominant design emerges and the rules for competition change. When a dominant design is present, firms can concentrate their knowledge and resources on relying on efficient operating procedures, economies of scale and improvements in performance of the standard design by improving the components (Henderson and Clark, 1990). Consistent with the reigning terminology (see, Anderson and Tushman, 1990; Murmann and Frenken, 2006; Rosenkopf and Tushman, 1998), we classify market situations where a dominant design reign as being in a relatively stable era of incremental change. A market situation without any dominant design is classified as being in a turbulent era of ferment, which refers to the period in which multiple prospects compete.

Associations in configurational model

To theorize how the three conditions above fit with each other we will examine how the conditions are related in pairwise associations. For each pair of conditions we predict based on

prior research how the conditions best match to enhance the potential of business mating. The pairwise associations will then assist in theorizing the complete configurations.

Invention features and management style. Reasonable, different types of management styles are needed depending on the type of invention the startup possesses. Inventions that are radical require a more risk-taking and proactive management style (Miller, Kets de Vries, and Toulouse, 1982), which we associate with high EO. For radical inventions that have a wide scope, the industry to which the invention should be applied might not be clear; thus, proactiveness is needed to be able to identify a suitable market niche. Also, the future value of a radical invention is unknown and it requires a firm to allocate the necessary resources, which may result in costly failures; thus, a risk-taking strategy is needed. This is in line with the empirical work of Avlonitis and Salavou (2007) and Zhou, Yim, and Tse (2005), which also found that EO positively moderates the breakthrough of pioneering inventions. On the other hand, the commercialization of inventions that are incremental does not require as much risk-taking or relearning, because they build on more familiar ideas and technologies, and thereby involve a low degree of new knowledge (Dewar and Dutton, 1986). Incremental inventions align with managers who adopt a less risk-taking strategy but instead possess deep market and technology-specific knowledge and high administrative efficiency – characteristics associated with low EO. In sum, radical inventions are typically beneficial and attractive to potential partnering firms when they are aligned with high EO and incremental inventions are typically beneficial and attractive to potential partnering firms when they are aligned with low EO.

Invention features and market situation. Abernathy and Utterback (1978) theorized that when a dominant design is present, firms and industry members emphasize efficiency-seeking and/or cost-cutting process developments. In such stable market situations, in which operational efficiency, specialization and repeatability are vital, it is uncertain whether a radical invention – which often requires further developments before launching – conveys enough net benefits to partners for them to engage in relationships. Having a limited capacity to cope with and assimilate new ideas outside their own knowledge area, specialized firms might not appreciate a radical invention, and therefore reject partnering proposers. Instead, in the presence of a dominant design, when the partners in a relationship can better predict the demands, costs and necessities, incremental inventions that are well aligned with the existing technologies are assumed to be attractive to partners.

Conversely, when no dominant standard is present, no product architecture exists to build on further. In such circumstances, consistent with the strategic management literature, incumbent marketing-centric firms will most likely be attracted by invention-based startups that can offer radical technologies that both hold potential for a future dominant design and are unique enough to protect against imitation in the near future. A radical invention presents many more opportunities than an incremental invention. Radical inventions allow firms to exploit the invention within a broad range of technical areas. If the idea is unsuccessful in one area, there are still other areas left to explore. This gives multiple chances in turbulent and uncertain environments in which the odds of success are unpredictable. In sum, radical inventions are typically beneficial and attractive to potential partnering firms when no dominant design exists and incremental inventions are typically beneficial and attractive to potential partnering firms when a dominant design exists.

Management style and market situation. Traditionally, an entrepreneurial style of management has been seen as a success factor for startups and prior studies have acknowledged the positive impact of an entrepreneurial style on firm performance (Lumpkin and Dess, 1996, 2001). However, some studies have questioned the linear positive association between EO and general performance (Andersén, 2010), arguing that additional variables might moderate whether EO is

beneficial or not. Hart (1992) argued that under certain conditions EO may even be associated with poor performance.

As noted above, in an era of ferment when there is no dominant design in the market, the market situation features dramatic change and rewards proactive exploration and searching for new knowledge. However, when the market solidifies, other abilities are required, such as: efficiency in processing and planning, responsiveness to customers' suggestions and requests, and incremental developments of components and parts within the existent dominant design (Murmann and Frenken, 2006). Borrowing the terms exploration and exploitation (March, 1991), an era of ferment rewards exploration while an era of incremental change rewards exploitation.

Few of us will question professional intermediates' preferred choice of the supplier who can gain the most net benefits for their shared relationship, and on average, the proactive, risk-taking entrepreneur potentially offers more value to a relationship in turbulent situations (Covin and Slevin, 1989). Miller (1988) found that EO in a ferment market situation is related to higher performance, which we assume will also positively affect business mating chances during such eras. In sum, low EO is typically beneficial and attractive to potential partnering firms when a dominant design exists and high EO is typically beneficial and attractive to potential partnering firms when no dominant design exists.

Typology of ideal configurations

To date there have been no studies examining the three conditions together. Nevertheless, we consider that the pairwise associations can be extended to a typology of ideal configurations, each containing the three conditions. To establish a proper fit between conditions in a configuration, we draw on Miller (1990) who posits that the limited variation of configurational profiles in any sample is enforced by interdependent, robust, cyclical and reciprocal relations between the conditions. The pairwise associations noted above show the interdependent and reciprocal nature of conditions within configurations. Moreover, because of its robust and cyclical relations, if any condition in a configuration is known, the composition of the other conditions is expected to be predictable, regardless of which one of the conditions is known. Following Miller (1990), we take these pairwise associations a step further and assume that these associations would also hold between the conditions altogether[3]. Hence, from the pairwise associations, established in prior research, we will now go on and theorize a typology of ideal configurations.

The first pair discussed above is invention features and management style. Here we concluded that *high degree of invention radicalness and high EO*, and *low degree of invention radicalness and low EO*, respectively, are fit matches. The second pair is invention features and market situation. Here we established that *in the presence of a dominant design a low degree of invention radicalness*, as well as *in the absence of a dominant design a high degree of invention radicalness*, are fit matches. The last pair is market situation and management style. Here we concluded that in *the presence of a dominant design a low degree of EO*, as well as in *the absence of a dominant design a high degree of EO*, are fit matches.

If the three conditions are seen as dichotomous conditions then there will be possibly be eight different configurations. We present these in Table 1. They have been named to somewhat capture the characteristics of each configuration. For example, a "Tourist" could be associated as a defensive follower in unknown territory; an "Artist" is more creative in its expressions and likes to explore new areas; while the "Copycat" is expected to take some risks and seek opportunities by mimicking in a stable market.

[Insert Table 1 about here]

Combining the three pairs of fit matches gives us two ideal configurations. First, starting with low degree of invention radicalness which is a good fit with low EO, we can add to that the second pair indicating that low degree of invention radicalness is a good fit with the presence of a

[3] See Appendix A for an illustration of the typology development

dominant design. The last pair indicates that low EO is co-aligned with the presence of a dominant design, completing the first ideal configuration:

Inheritor: In the presence of a dominant design, when the market is in an era of stability and incremental change, there is a functioning configuration set that combines a conservative-orientated management style focusing on exploitation with an incremental invention.

The opposite pairs give us then: a first pair stating that high degree of invention radicalness fits with high EO; a second pair indicating that high degree of invention radicalness is a good fit with the absence of a dominant design; and a third pair that infers that high EO is well aligned with the absence of a dominant design. The theoretical arguments above lead us to the following ideal configuration:

Originator: In the absence of a dominant design, when the market is in a turbulent era of ferment, there is a functioning configuration set that combines an entrepreneurially orientated management style focusing on exploration with a radical invention.

[Insert Figure 1 about here]

Summarizing, we expect that startups with their management style and invention features well-aligned, and also in harmony with the market situation, will be more appealing to potential partners than others (see Figure 1). Therefore, it is proposed that startups that align with the configurations of "Inheritor" or "Originator" have an elevated chance to form a relationship with a marketing partner than those in less aligned alternative configurations. We will now continue with an empirical investigation of the typology.

Method

This section starts with a description of the research site as well as the data and measures. The section continues by elaborating on the method used, the analytical procedure and how we calibrated the data according to qualitative standards.

Research site

Our theorized model calls for the study of invention-based startups. To be able to find these startups, we started by accessing the Swedish patent database. By only including inventions that have been awarded patent protection, it can be ensured that all the cases included in this study encompass startups focusing on inventions that meet minimum standards of originality. In order to limit the variation between cases, a cohort sample was selected to enable the comparison of similar startups that have been facing the same economic and industrial situations. The patent class "sports, games and amusements" (class A63 in the international patent classification system) in the period 2005 until 2008 was selected. We chose 2005–2008 because it was sufficiently distant from our data collection (2012) to allow the startup to form a marketing relationship and yet recent enough that the respondents would be able to recall the events accurately (Huber and Power, 1985). Patent class A63 primarily involves for example apparatus for physical training and other training equipment, including skis and snowboards, as well as equipment for ball games. The patents that were included in the study were only those that resulted in a new firm. Thus, patents that were granted to incumbent firms or to founders with a present network in the actual industry were excluded since they already had relationships with marketing partners. By studying invention-based startups in a particular national and specific patent class, several non-included conditions can be controlled for that otherwise may influence the outcome. For example, cross-national differences, sector differences and differences between time epochs are avoided to the benefit of the validity of the study. Furthermore, all the owners/CEOs were also asked if they had intended to tie the startup to a marketing partner. We did this to ensure that we excluded startups without intentions for business mating. All participating startups had ambitions to form a relationship with a marketing partner.

In the patent database patentees' names and addresses were available from the time when the patent was filed. First we searched for patentees' current contact information, through white pages, census data and other search engines. A total of 22 invention-based startups (cases) with accessible informants were identified. The identified firms were approached by telephone and email with an appeal to contribute to the study; 16 out of the 22 startups agreed to participate.

Data and measures

For each case, as a means of attaining more depth and understanding, both primary and secondary data were collected. Primary data were collected from two sets of respondents. Firstly, informants from the startups (owner or CEO) completed questionnaires and were interviewed to learn about the startups. Secondly, knowledgeable expert scholars answered questionnaires to benchmark the addressed invention for each case. Secondary sources were also used, including patent descriptions, firms' websites, media and reports. We addressed potential respondent bias in several ways. First, we triangulated the data from several sources to as great an extent as possible. Second, we offered anonymity to all of our respondents and their startups, which encouraged openness and honesty. Third, our respondents from the firms were genuinely interested in learning about the circumstances in which they had a high chance of mating with marketing partners; this kind of interest usually improves the accuracy of the data given (Hallen and Eisenhardt, 2012). Figure 2 gives an overview of the theoretical conditions, how they have been operationalized, and also the sources used.

[Insert Figure 2 about here]

*Management style***.** Management style is operationalized in terms of the degree of EO. Each respondent from the different cases answered questions from this construct. This scale is the most commonly employed EO measurement in use (Covin and Wales, 2011). This measurement of an organization's EO originated from the work of Miller (1983) and was later applied and refined by Covin and Slevin (1989). In order to portray the magnitude of each firm's attitudinal orientation to entrepreneurship, this construct employed three attributes of entrepreneurial orientation: innovativeness, proactiveness and risk-taking. Each attribute is represented by three items, each measured on a seven-point Likert-type scale. Although, we acknowledge that Lumpkin and Dess (1996) have developed an alternative measurement scale of EO which includes two additional attributes (competitive aggressiveness and autonomy), we use the original Covin and Slevin (1989) scale that has been widely accepted as the standard scale. Recent discussions have pointed toward the usefulness of keeping the original three attributes of EO (George and Marino, 2011). For a manager to be conceived as having an entrepreneurial posture, Miller (1983), the founder of the original thought of EO, theorized that all three attributes have to be present simultaneously. Recently, the notion that all three attributes have to be above certain thresholds has been brought to light by Miller (2011) and Covin and Wales (2011). We define high EO as when the three managerial attributes are all present, and therefore we consider it relevant to use the attribute measure with the lowest score out of the three as the EO score for each case, in line with Miller's original thought about the EO construct[4].

Invention features. To the best of our knowledge, there is no unquestionable way to measure the radicalness of an invention (for a literature review, see Garcia and Calantone, 2001). Other scales assess the number of radical products or how many percent of sales that come from radical products (see for example, Chandy and Tellis, 1998). Nevertheless, an established scale that measures a single invention's radicalness from a market perspective has not yet been identified.

[4] An anonymous reviewer pointed out that this is not the traditional way to operationalize the measurement of EO. We are aware of this and therefore we also conduct a robustness test in the analysis section using EO as a traditional reflective measurement.

For our market perspective it was important to find a relevant scale that considered (i) new product benefits for consumers, (ii) new design, (iii) and new use (Garcia and Calantone, 2001). By combining items from Sounder and Song (1997, 1998), Chandy and Tellis (1998) and Mohr, (2001) we constucted an index of five items, see table 2, that would take into consideration these different aspects. We conducted pilot tests of the index by providing three academic experts with mock inventions and asking them to rate the invention to ensure that the wording of individual items was understandable, and that the different items did measure the same construct. The pilot test indicated conformity and did not reveal problems with the scale or questions. Therefore the construct was used unchanged.

[Insert Table 2 about here]

We submitted a survey to a panel of five academic experts in the product innovation field to rate the degree of radicalness of each invention. Expert panels and peer opinion methods have a rich history in research to evaluate and rate qualitatively a set of inventions on scales (Albert, Avery, Narin, and McAllister, 1991; Ettlie, Bridges, and O'keefe, 1984; Gatignon, Tushman, Smith, and Anderson, 2002). We acknowledged that panels might have the disadvantage of *ex post* confounding the economic impact of an invention with its technological radicalness if they are familiar with the invention or its market success, and arguably more "objective" patent citation methods might have been useful. However, the patents in our cases do not use backward citations that are comparable with patents in the US, which are the basis of the studies that advocate such patent measures (see, for example, Ahuja and Lampert, 2001), and, secondly, these patents are rather recent in time so forward citation (see, for example, Schoenmakers and Duysters, 2010) is not a relevant method either. Panels have the advantage of face validity; they constitute a direct and qualitative method concerned with how the invention appears. This method seems relevant to the purpose of guesstimating how each invention might appear to potential partners. Moreover, by not enrolling product category experts from the particular area of sport and amusement, but rather knowledgeable scholars with a wide understanding of inventions, we avoided after the fact recency bias from personal involvement.

We prepared structured presentations of the cases for the panel based on both primary and secondary data that we had gathered. The experts were asked to rate the invention on five different items that were included in the index. Each item had a five-point Likert-type scale from completely disagree to completely agree. Thus, each invention was operationalized on a continuum from incremental to radical. The index showed reliability and internal consistency as the Cronbach's alpha was 0.78.

Market situation. The market situation is measured in this study by the presence of a dominant design. A dominant design is mostly defined in the literature as having a binary meaning. We apply this dichotomous measure. To determine the presence of a dominant design empirically, Abernathy (1978) argued that a dominant design is present when one archetype has diffused to draw a momentous market share big enough to impose conjunctive adjustments on competing designs. Similarly, Murmann and Frenken (2006) suggested that the key indicator of the presence of a dominant design in a particular product or technology population is whether the majority of competing archetypes embrace the same standardized principle solutions for the elemental core components, which then in turn influence and delimitate the design space for multiple dependent, more peripheral components.

The perception of "a majority" or "momentous share" can be determined in research by means of a threshold or a variety measure, for example the share of the market or the Herfindahl–Hirschman Index (Anderson and Tushman, 1990; Murmann and Frenken, 2006). However, in practice a single reliable quantitative measure for each case might be problematic to calculate. It might therefore be more reliable for the study to triangulate from multiple

approaches. First, we carried out desk research to build a strong understanding of the case and its market situation. This was completed by accessing multiple secondary sources from which we could find out the number of active firms, the size of the biggest firms in the sector as well as design variations of the core components among the competing products. These are all key indicators traced from the literature that can be used to analyze whether any product class is affected by a dominant design. The state of the market situation was considered before the invention was introduced to the market, since the invention itself could have resulted in a new dominant design. To control the accuracy of our findings we also asked the respondents from the startups about the market situation. We asked several different types of questions to the owner/CEOs about the product and the market it belonged to. For example, we asked the respondents whether more than 50% of the market for the product category was dominated by one or two core designs. We also asked if the invention was dependent on another system, with an example of how computer software is often dependent on the operating system. After building each case, we weighted the different sources, which for almost all the cases pointed in the same direction. For the exceptions we had to weight the quality of the data sources in combination with the strength of the data. Then we weighted the different data scores to conclude the direction in which we should score the condition. We could then decide whether there was a dominant design or not for each case.

Outcome. The research design calls for the study of startups based on inventions and the analysis of their ability to create a marketing relationship. A startup has either a "failing" or a "successful" outcome in forming a marketing relationship. Business mating, the outcome, is thus a dichotomous measure. We acknowledge that there are no widely accepted measures for analyzing whether mating has taken place. Hence, to distinguish cases in which business mating occurred from cases in which no mating occurred we employed an explorative and qualitative straight-on strategy; the startup is considered to have mated if it has formed at least one relationship with a market channel intermediate, such as a licensee, distributor, agent firm or retailer.

Our research on this condition included several sources. We conducted desk research from archival material such as websites, annual reports and media reports to establish whether any of the cases had relationships with market channel intermediates. This information was also controlled by asking the respondents about their marketing-related business relationships. For example, we asked whether the startup had any letters of intent or other legal documents that acknowledged a relationship with a marketing intermediate. With this straight-on strategy we were able to obtain a generous account of whether the startup had achieved business mating or not.

Analytical procedure

In order to analyze empirically whether the three highlighted conditions fit together to enhance business mating as predicted above, a Qualitative Comparative Analysis (QCA) was conducted by cross-comparing these 16 cases. QCA is a method in between the qualitative and the quantitative approach that enables a systematic procedure and is especially useful when cross-comparing more than 10 cases (Rihoux and Ragin, 2009). QCA enable researchers to perform logical analysis rather than traditional statistical variable-centered analysis (Kent and Argouslidis, 2005). QCA has its roots in political science and was developed by Charles Ragin (1987; 2000) to improve cross-case analyses. QCA aims at preserving the complexity of cases and at the same time allow for systematic comparison. The advantages and disadvantages and differences of using QCA compared to quantitative methods have been previously discussed to great extent (see, for example, Fiss, 2007; 2011; Kent and Argouslidis, 2005; Rihoux and Ragin, 2009). It is clear that

more and more studies in business related subjects are using QCA[5]. The basic idea of QCA is that it identifies the links between causal conditions within cases with an outcome. Each case is a member, more or less, of several theorized configurations. The configurations, not the single cases or the sole conditions, are the units of analysis (Rihoux and Ragin, 2009). This enables the researcher to perform a holistic analysis to reveal patterns between the different theorized configurations.

Much of the past research that takes a configurational perspective uses multivariate regression analysis whereby variables compete in explaining the variation instead of showing how they combine to create certain outcomes. This approach is only able to estimate a single configuration for all cases and is not able to account for equifinality (Drazin and Van de Ven, 1985; Fiss, 2007). QCA, on the other hand, takes a case-based approach and is able to account for the fact that there is not always a single best solution. The concept of equifinality has been receiving increased attention lately (see for example Fiss, 2007, 2011; Marlin, Ketchen, and Lamont, 2007) and is important in configurational studies. Our theorized ideal sets are opposite to each other and therefore we need a method that can account for this aspect.

QCA uses Boolean algebra to employ principles of systematic comparison. QCA can recognize which conditions, and combinations thereof, are necessary or sufficient for achieving an outcome – in this case business mating. The QCA approach allows us to compare how the different conditions combine instead of competing against each other to explain the outcome (Greckhamer, 2011; Kent & Argouslidis, 2005). One concern regarding the use of Boolean algebra is that it requires the use of dichotomous variables; however, recent advances have now made it possible to account for continuous variables as well, which is achieved by using fuzzy sets (Kent & Argouslidis, 2005; Ragin, 2000, 2009).

After the data for each condition are collected, the procedure for QCA follows with the calibration of the scores. The intention of calibration is to distinguish rational groupings; in contrast, quantitative approaches treat all variances as equally important. This requires both substantive knowledge of the cases and theoretical knowledge (Rihoux and Ragin, 2009). After the researcher has calibrated the scores of all of the conditions, a truth table is created, which lists all the logically possible configurations. Each configuration has its own row in the truth table, which also displays the outcome. This study has three conditions (invention features, management style and market situation), which result in a total of eight (2^3) possible archetypical configurations.

The next step involves finding similarities and agreement between the theoretical configurations that show the specific outcome the researcher is looking for: in our study, when business mating has taken place. Briefly, this can be achieved with the help of Boolean logic. Software packages such as fs/QCA, which was used in this study, use the Quine–McCluskey algorithm for the reduction process. The algorithm helps the researcher to determine the logically simplest solution. A condition is unnecessary for a configuration if there is no difference in the outcome when the condition is present or absent. For example, assume that ABC and aBC (where capital letters represent presence or 1, and unicase letters represent absence or 0) are two sets that produce the same outcome, D. Then condition A would be considered insignificant in the combination with B and C, because D is not affected by any value of A. The Boolean minimization would thus replace ABC and aBC with the single and simple solution term BC (A could still be significant in producing D when combined with other conditions). These operations are completed until it is not possible to reduce the configurations further. Reappearances among the reduced solutions are deleted and left are the final solution(s).

[5] For a comprehensive introduction to QCA and business related studies, see two prime examples; Fiss (2007) and Greckhamer et al. (2008). Furthermore, the COMPASSS network listed 39 peer-reviewed studies employing QCA within business and economics ("COMPASSS: Bibliography," 2013).

Calibration of Fuzzy Sets

The examination of QCA entails that the collected data can be transformed either into crisp or into fuzzy scores. In crisp data the scores are binary: only full membership or no membership exists. In fuzzy sets, however, degrees of partial set membership can be achieved (Ragin, 2005) by permitting membership scores in the interval between 0 and 1. A score of 1 represents full membership, scores barely above 0.5 represent that the case is more in than outside a set, scores close to 0 indicate weak but not zero membership, while 0 represents complete non-membership. A fuzzy score of 0.5 is the crossover point representing "neither in nor out," or, in other words, the point of greatest ambiguity. Unlike the crisp set analysis constrained to the analysis of dichotomized data, fuzzy set analysis is appropriate for conjecturing from membership scales along continuums. Fuzzy scores are used for management style and invention features, and crisp scores for the presence or absence of a dominant design in the product market and for the occurrence of business mating.

To convert data measurements from different scales into interpretable positions within a distinct vector space (in which each dimension is expressed as the degree of membership from 0 to 1), anchor points are needed to define the corners of the vector space (Byrne, 2002; Ragin, 2008). It is preferred to calibrate scores in the fuzzy sets not only in relation to other scores in the measure, but also relating back to theoretical and/or empirical knowledge so that the fuzzy scores are linked to notions of what is considered high or low for each condition.

Following Ragin (2000, 2008), anchors are defined by specifying the values in the ordinal scales we use, that correspond to three qualitative breakpoints using theoretical knowledge and empirical knowledge accumulated from familiarity with the cases. These qualitative anchors that constitute the degree of membership assign for each fuzzy set: i) the threshold for full non-membership, ii) the threshold for full membership and iii) the "neither in nor out" cross-over point.

Calibrating the EO scores, there is little consensus or established knowledge of what threshold corresponds to a fully-fledged entrepreneurial posture; nonetheless the founders of the EO concept state that a management style is considered to be highly entrepreneurially oriented if, and only if, all three attributes are present (Covin and Wales, 2011; Miller, 1983). Drawing from this argument, while still regarding EO mostly as a relative quality in this study, we anchored the thresholds based on our qualitative interpretation from interviews and the distribution in our data. Starting with the anchor for full membership, we found two cases where all three composing management attributes were 4.3 or above. These two cases also corresponded best with our qualitative assessment of who stand out as the most entrepreneurially oriented. So, assuming that these two managers had, clearly, relatively high EO, we placed the anchor for full membership just below their scores (at 4.2). At the other end of the scale, five cases stand out which have one, or two, management attributes as low as at 2.3, or even lower. These are qualitatively interpreted from interviews as clearly conservatively oriented. Moreover, we have two more cases which are also mostly conservatively oriented with at least one EO attribute score below 2.8. We decide therefore that a score of 2.7, or lower, for any of the three EO attributes would represent a non-membership. Lastly, halfway between the floor at 2.7 and the ceiling at 4.2, we placed the cross-over point at 3.4. This anchor ties in well with our interpretation of the cases, because the managers who had their lowest attribute scores in the range of 3.0 to 3.7 seemed to have inconclusive management styles.

About what should be considered a radical invention on the scale of invention radicalness, we regard that, too, a relative quality. No theory could guide us whether "strongly agree" or "agree" is equivalent to full membership in the radical invention. Instead, we found it justified to use the intrinsic calibration of the operationalized 5-point Likert scale, but positioned the cross-over point just below its mid-point to compensate for a slightly skewed distribution in our data. The median score in the data (2.7) was chosen as the cross-over point. To introduce the floor and

ceiling thresholds we took into account that all the inventions in this study fell within the interval 1.6 to 3.6, despite the fact that several of the experts qualitatively expressed that some inventions were "very innovative" while others were considered more or less the same as previous products. Acknowledging this, we considered the four cases with the highest values and the four cases with the lowest values, fully in and fully out, respectively. This resulted in these anchors: 3.2 for full membership and 2.2 for non-membership. Table 3 below displays for each condition the value that we used in this study to establish the threshold levels for the fuzzy set analysis.

[Insert Table 3 about here]

Findings

Starting the analysis of sufficient solutions to meet the criterion condition (business mating) a truth table covering eight logically possible combinations was created; these represent the theorized configurations. In the truth table ones represent complete membership and zeros represent complete non-membership. For example, theorized "Inheritor" can be found in our truth table (table 4) with low EO (0), low invention radicalness (0) and the presence of dominant design (1). In our empirical data, this configuration is demonstrated by three cases that predominantly reside there. The truth table is sorted by case frequency; the number of cases with strong set membership in each configuration.

The second step in the fuzzy set comparison analysis is to develop two rules for the separation of the irrelevant sets from the relevant ones. The first rule defines the frequency threshold of the number of cases in each configuration. In our analysis we selected a frequency threshold of 1, following the recommendation for small-N analysis (Ragin, 2005). Hence, the theorized configuration "Copycat" was deleted, as no cases in our sample resided predominantly in this set. The seven other sets contain cases and remained in the analysis.

The second rule defines a consistency threshold to make a distinction among the remaining sets by considering whether each set is largely a subset of the criterion condition, or not. In table 3, the consistency measures addresses, for each set, how closely a subset relation exists with business mating. If a particular set is a sufficient subset of business mating, its consistency score should be as close to 1 as possible. The truth table algorithm introduced by Ragin (2008), and now an integral part of the fs/QCA software package we use, calculates the consistency measures.

Among the remaining sets we have three (Tourist, Technician and Intruder) with the consistency interval from 0 to 0.32, and four (Inheritor, Originator, Gambler and Artist) in the interval from 0.78 to 0.98, and no sets in the wide gap in between. We therefore determined that the four sets in the upper range of consistency should be considered successful solutions for business mating. This is above the recommended threshold of 0.75 or higher (Ragin, 2006). The determination of sufficient solutions in our data was, hence, made according to a threshold level of 0.78. The "outcome" column in the truth table (table 4) denotes which configurations were treated as sufficient solutions for business mating.

[Insert Table 4 about here]

The next step in a standard analysis is to find the sufficient solutions for business mating. This was completed with the fs/QCA software, which makes use of the Quine–McCluskey algorithm to reveal the logical solutions. The output displayed in table 5 constitutes measures of coverage and consistency for each separate causal solution and the total coverage and consistency for all the sufficient alternatives combined.

In simple terms, coverage measures the percentage of memberships of the outcome that are represented by a solution. For example, "solution coverage" in table 5 addresses that in our data, the three final solutions combined represent 89% of all business mating, while "raw coverage" is

the corresponding measurement for each separate solution individually and "unique coverage" represents each separate solution's membership of the outcome that is not covered by any other solution. In basic Boolean language * is used for AND, + is used for OR and ~ is used for NOT. OR is not exclusive to "either or"; instead, OR represents (1) one, (2) the other (3) or both.

[Insert table 5 about here]

Table 5 has resulted in three sufficient solutions linked to business mating. Solution #1, which is the combination of an entrepreneurially oriented manager in times of no dominant design in the product market, indicates exceptional chances for business mating with a consistency of 99%. This solution covers uniquely 24.0% of all mating success in this cross-case comparison. Solution #2, which is the presence of a radical invention in the absence of dominant design in the product market, also indicates superior chances for business mating with a consistency of 86%.This composition covers uniquely 21.5% of business mating in our data. Solution #3, represents a combination of a conservative-orientated management (low EO) primarily focusing on the exploitation of an incremental invention (not a radical invention) in the presence of a dominant design. This solution reveals emanate chances for business mating with a consistency of 80%. This precisely conforms to our theorized configuration "Inheritor," and covers uniquely 21.3% of business mating in this study.

After the software produced the three solution terms, we conducted further factoring out. Solution terms #1 and #2 are commutative, or equal, to (EO + RI) * ~DD, where RI is Radical Invention and DD is Dominant Design. Therefore, we can conclude that we obtained two final solutions that fit well for high mating chances. These are:

(EO + RI) * ~DD
+ → business mating
~EO * ~RI * DD

The first solution calls for entrepreneurial orientation and/or radical invention when a dominant design in not present to enable high chances of business mating. The second solution calls for entrepreneurial orientation and high invention radicalness to be absent when a dominant design is present to enable superior chances of business mating.

Sensitivity Analyses

Multiple sensitivity analyses were carried out to test whether the findings are robust. First, we followed Fiss (2011) examining the crossover points for the fuzzy conditions; EO and invention radicalness. The cross-over point was varied between +/- 25 percent for each of the two conditions. The final solutions for each test remain essentially unaffected, even though minor deviations in consistency and coverage numbers were detected. Second, we conducted a complementary robustness check by running an analysis for configurations related to partnerless outcomes. As expected, we got the inverted responses, as it was found that "Tourist", "Technician" and "Intruder" in sum represent a total solution consistency for a partnerless outcome of 82.5%. This could be compared to the solution consistency of 87.5% (see table 5) for mating outcomes in the sufficient solutions for high mating chances. The insight that three configurations represent high solution consistency for a partnerless outcome, while four other configurations represent high solution consistency for mating, strengthening the conclusion that configurational fit means substantial difference to the mating chances.

Moreover, as noted above we used an unorthodox readout of the EO measurement, assuming that all three attributes must be above a threshold for the manager to be classified as entrepreneurial. To see if the traditional interpretation of EO; i.e. which instead use the average value of the three attributes as a reflective construct, gives different final solutions, we also

completed such a test as a third type of robustness check. But despite that all the cases got new EO values, and the distribution of EO values was changed, the final solution terms were the same as in our main test (table 5) when anchoring the cross-over point near the median in our data on the traditionally-measured EO's ordinal scale (4.2). However, doing so, the final consistency measures for the two solutions including EO are different: Solution #1 has a consistency of 83.0% (compared to 99.0% in our original test), and solution #3 81.5% (79.6%)[6]. Using the traditional EO measurement, the total solution consistency for the three solution terms combined is 86.8% (87.5%). As both ways to measure EO gave the same final solutions and in both instances high consistency scores, we infer that subset relations may exist between these solution terms and business mating. In short, this could indicate that cases share a particular set of explanatory conditions, likely also share the odds to succeed in finding a marketing partner.

Discussion

We contribute to the study of startups' mating chances with marketing partners. The paper has four contributions that will be discussed below.

First, a primary contribution is the empirically tested typology with two configurations that lead to high mating chances with a marketing partner for an invention-based startup. These two configurations are the opposite of each other. This theoretical model also suggests that startups need to find a good fit between the conditions, including the internal (management style and invention features) and the external (market situation) conditions. Those startups that are able to find a good fit between these three conditions are more likely to be more attractive to a marketing partner and therefore more likely to be able to form a relationship. Establishing this marketing relationship also enables the startup to continue with its core competencies instead of focusing on marketing and sales activities.

In the ideal configuration "Inheritor" we theorized that in the presence of a dominant design when the market is in an era of stability and incremental change, a combination of conservative-orientated management style focusing on exploitation with an incremental invention will facilitate high chances of business mating. This configuration was completely confirmed by the findings in our study. Here we are able to show that the well-established notion that EO is always a positive asset is not true. Our findings suggest that startups increase their mating chances when there is a dominant design in the marketplace by acting more conservatively and focusing on an incremental invention.

In the ideal configuration "Originator" we theorized that in the absence of a dominant design when the market is in a turbulent era of ferment, the combination of an entrepreneurially orientated management style focusing on exploration with a radical invention will enable high chances of business mating. This configuration was in part confirmed as sufficient. However, the findings did not completely support that all the input conditions are needed for the configuration to result in mating. After the logical deduction it is apparent that there is not enough evidence to conclude that radical invention *and* high EO act *together* at times when a dominant design is not present. Instead, it was confirmed that invention-based startups either need a radical invention *or* high EO when there is no dominant design. This is relatively close to our theorized configuration "Originator," but it does not conform completely. This solution is also close to the "Gambler" and "Artist" configurations, which also seemed to have good chances of mating. The "Gambler" configuration has especially high consistency. The finding that "Tourist" does show high risks of a partnerless outcome, inferring that either high EO or a radical invention should be present to facilitate business mating. In sum, there is not enough evidence to show that high EO and radical invention act together or independently, but the findings also show that both affect business mating. This configuration needs further investigation to be fully able to explain how EO and

[6] Solution #2 without EO remains unaffected

radical inventions combine to affect business mating or whether they go against the theoretical model and act independently in favor of business mating.

Second, the paper shows both theoretically and empirically that it should not be taken for granted that an invention-based startup can pick and choose a marketing partner to its liking. Rather, the invention-based startup should focus on aligning its internal and external conditions to become attractive to marketing partners. If an invention-based startup can become attractive enough, it will have a chance of being chosen by an incumbent marketing partner. This results in the incumbent firm having the upper hand when it comes to establishing a relationship with an invention-based startup.

Third, this paper also contributes to the business relationship literature by extending beyond the market versus firm debate and presenting elements from both approaches from which a greater understanding of business mating in the novel stage of invention-based startups' lifecycle can be reached. By using configurations we are able to fuse different theories, both those focused on internal conditions and those focused on market conditions. Thus, our construction of configurations of management style, invention features and market situation bridge the contemporary literature from different starting points. These fragmented theories can, when assembled, help us to draw new holistic conclusions and create new knowledge that the single theories alone would not be able to provide.

Fourth, we used rich empirical data that has been collected from many different sources which includes primary data from the owner/CEO, as well as academic experts rating the inventions. Several secondary sources have also been used including the Swedish patent database, firm websites, as well as industry reports. The rich understanding of the cases would not be possible from only, for example, a single survey. This assumingly can give further directions method-wise to the emerging sub-domain of business mating research.

Finally, our results regarding EO help support a growing debate on the effects of EO (Andersén, 2010). Most previous studies have treated high EO as enhancing performance. Instead, supporting Wiklund and Shepherd (2005), we outline that high EO is advantageous in certain situations, but in other situations it can be more favorable to have a conservative management style, and thus suggest that the current debate should move on from "whether entrepreneurial orientation matters" to "when entrepreneurial orientation matters."

In sum, by synthesizing business mating with a configurational approach, the paper offers new knowledge on why and when particular management styles and invention features fit with a specific market situation for elevating mating chances.

Conclusions

For product managers and other stakeholders, the presented claims signify that there is more than one combination that can lead to high chances of business mating. This conclusion is encouraging because all valuable inventions – either of a radical or of an incremental nature – have great chances to attract a partnering firm if the management style of the infant firm holding the invention and the present market situation match. Even though it is beyond the scope of this article, it was interesting to find that any of the startups that did not find a marketing partner had not achieved any significant amounts of sales yet. In fact, most of the startups that did not find a marketing partner have not survived. In the future, a potential research question could be "How does business mating affect startup performance?" Further research questions could also be directed towards the continuing debate about EO's effect on performance, as our findings show that an entrepreneurial posture is not always beneficial for business mating.

Concerning the generalizability of the results, QCA offers an approach to analyzing data that can handle the interaction effects between conditions. QCA can be accomplished with a small numbers of cases, typically recommended as around 10 or more cases (Marx, 2006; Ordanini & Maglio, 2009). Generalization is by theory, rather than by statistical assessment of a population. Thus, the researchers need substantive knowledge about each case to be able to select causal

conditions, calibrate cases and analyze the findings (Crilly, 2011). Our research design fits this method well. Our sample is small (n=16), and the characteristics of a sample of a few cases do not permit statistical generalization. However, analytical generalization and informed interpretation of the results are possible as we are very familiar with the underlying cases. Marx (2006) showed by means of a methodological experiment that QCA is able to distinguish representativeness from random data when the proportion of conditions on cases falls below a certain threshold. For models like ours, which encompasses four conditions (including the dependent condition), Marx (2006) implicated that 10 or more cases will reveal contradictions if the result was merely due to randomness. Even though Marx's tests ensure that 16 cases are a large enough sample for QCA to reveal a pattern in the data (if there are any), we, still, cannot generalize the findings by statistical means outside this sample of 16 cases. Therefore we would like to encourage future research testing this typology in different ways, possibly in other contexts.

As with any case-based studies it is worth to reflect on the transferability of our findings. On the one hand it can be argued that our firms are situated in a very specific context which might make generalizations difficult. On the other hand, the theoretical model that we launch in order to understand business mating for invention-based startups are not necessarily linked to the particular setting, but could also be applied in other settings. Arguably, the underlying concept that internal and external fit will lead to higher chance of business mating is most likely not only applicable to invention-based startups in a specific industry. Rather, we believe this concept can be transferred to other contexts. However, the research on configurations and fit that enable business mating is still in its infancy, but the conceptualization in this paper merits further conceptualization and empirical tests too. Thus, let us end by recapitulating Wilkinson, Freytag, and Young's (2005) call for more research on business mating. We believe both normative and explorative research is needed.

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Table 1
Configuration possibilities with outcome "business mating"

Configuration	Entrepreneurial Orientation	Invention Radicalness	Dominant Design	Business Mating
Inheritor	Low	Low	Yes	Yes
Originator	High	High	No	Yes
Gambler	High	Low	No	No
Artist	Low	High	No	No
Tourist	Low	Low	No	No
Technician	Low	High	Yes	No
Intruder	High	High	Yes	No
Copycat	High	Low	Yes	No

Table 2
Items in the invention radicalness index[a]

Item	Source
Invention had unique features	Souder and Song (1997, 1998)
Invention was unlike any other	Souder and Song (1997, 1998)
Invention required users to change their ways	Souder and Song (1997, 1998)
Invention incorporated substantially different core feature(s) relative to previous products or concepts	Chandy and Tellis (2000)
Invention was a further development/improvement of a previous product or concept	Mohr (2001)

[a] The items are abbreviated somewhat from the actual statements in the questionnaire.

Table 3
Calibration criteria

Condition	Measurement	Scaling	Min.	Max.	Fully In	Cross-Over	Fully Out
Business mating	Business mating	Yes or No	0	1	Dichotomous		
Market situation	Dominant design	Yes or No	0	1	Dichotomous		
Management style	Entrepreneurial orientation	Likert scale	1	7	4.2	3.4	2.6
Invention features	Invention radicalness	Likert scale	1	5	3.2	2.7	2.2

Table 4
Truth table for the outcome "business mating" [a]

Configuration	Entrepreneurial Orientation	Invention Radicalness	Dominant Design	n	Consistency	Outcome
Inheritor	0	0	1	3	0.80	1
Originator	1	1	0	3	0.98	1
Gambler	1	0	0	3	0.98	1
Artist	0	1	0	2	0.78	1
Tourist	0	0	0	2	0.32	0
Technician	0	1	1	2	0.10	0
Intruder	1	1	1	1	0.00	0
Copycat	1	0	1	0		

[a] The frequency cut-off point was 1, while the consistency cut-off point was 0.78.

Table 5
Truth table final solution

Solution Terms [a, b]		Raw Coverage	Unique Coverage	Consistency
#1	EO * ~DD	46.2%	24.0%	99.0%
#2	IR * ~DD	43.6%	21.5%	85.7%
#3	~EO * ~ IR * DD	21.3%	21.3%	79.6%
Solution coverage:		88.9%		
Solution consistency:		87.5%		

[a] * is used for logical AND; ~ is used for logical NOT.
[b] Entrepreneurial orientation is abbreviated as EO; dominant design is abbreviated as DD; radical invention is abbreviated as IR.

Figure 1
Theoretical model

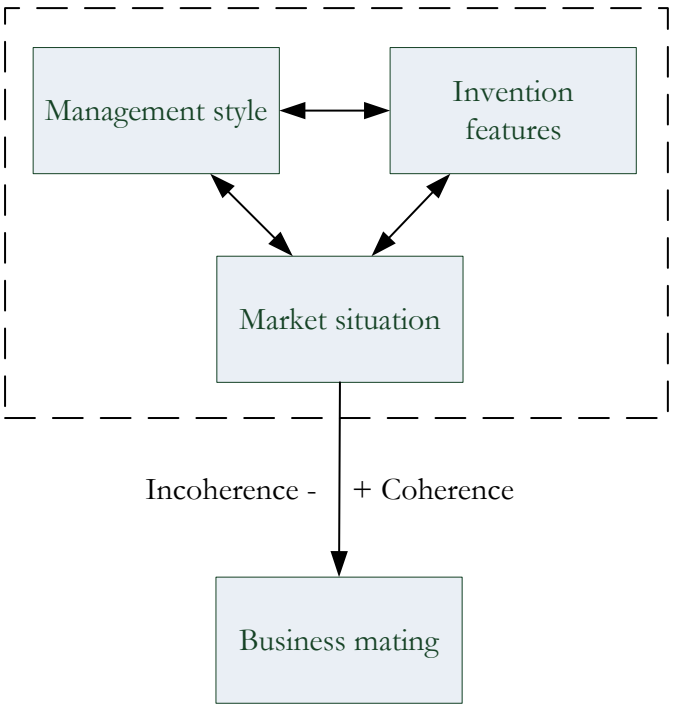
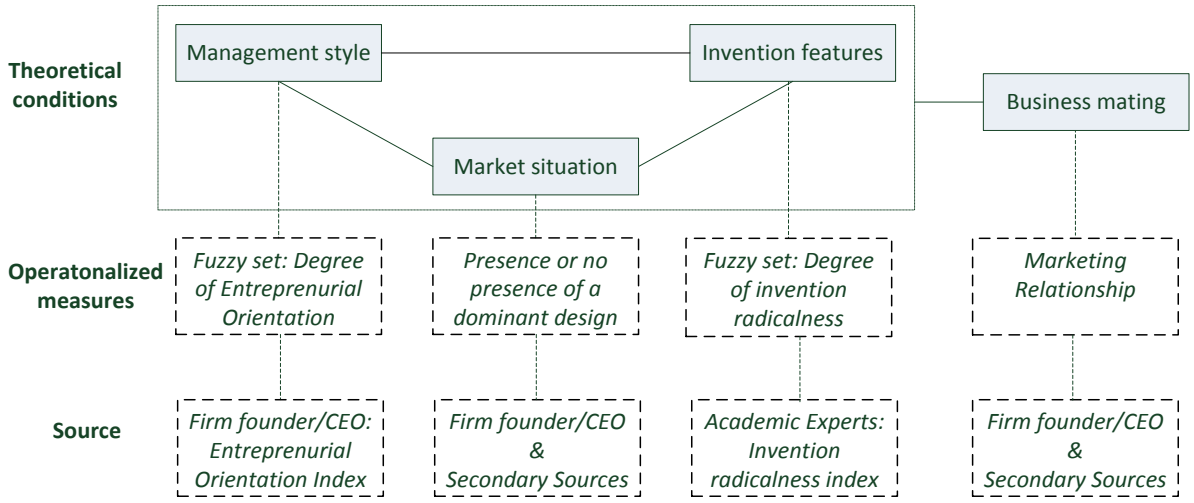


Figure 2
Theoretical model, operationalized measures, and data sources



Appendix A: Typology development