

1042-2587
© 2015 Baylor University

Do Effectuation Processes Shape the Relationship Between Product Diversification and Performance in New Ventures?

Ioanna Deligianni
Irimi Voudouris
Spyros Lioukas

This study applies the lens of effectuation to product diversification and examines the moderating effects of effectuation processes on the relationship between diversification and performance in new ventures. Effectuation processes are conceptualized in terms of experimentation, affordable loss, flexibility, and pre-commitments. The findings indicate that, with the exception of affordable loss, effectuation processes exert a positive effect on the diversification–performance relationship. Theoretical and empirical implications are discussed.

Introduction

In this study, we examine product diversification in new ventures through the lens of effectuation. Diversification, which refers to a venture's expansion into new markets with new products (Ansoff, 1957) constitutes an important alternative for new venture growth (Levie, 1997; Qian, 2002). Several studies have demonstrated that many new ventures diversify (Bhidé, 2000; Iacobucci & Rosa, 2005; Xie & O'Neill, 2014) because entering new product markets is easier for younger firms (Coad & Guenther, 2013). Diversification in new ventures is primarily an entrepreneurial process (Rosa, 1998) resulting from opportunity creation. The pursuit of attractive opportunities in diverse product markets may affect performance (Iacobucci & Rosa; Xie and O'Neill). Despite the liability of newness and smallness in new ventures (Stinchcombe, 1965), some related evidence supporting the diversification–performance relationship exists (Levie; Qian). However, the question of why certain new ventures perform better in effecting diversification than others remains underexplored.

Please send correspondence to: Ioanna Deligianni, tel.: +30 210 8203563; e-mail: idelig@aueb.gr.

Most studies on the diversification–performance relationship refer to established, mature organizations (e.g., Markides & Williamson, 1994; Pehrsson, 2006). This literature has revealed that successful diversification results from economies of scope in valuable and rare resources that are difficult to substitute and imitate (e.g., Tanriverdi & Venkatraman, 2005) and is based on planning (Goll & Sambharya, 1998). However, these core premises of successful diversification are unlikely to apply in the context of new ventures. New ventures are constrained by a lack of resources due to the liabilities of newness and smallness (Stinchcombe, 1965). Entering diverse product markets with limited resources may eliminate the source of economies of scope that drive high performance in established diversified firms. In addition, new ventures are exposed to situations with limited information and high degrees of uncertainty because they are confronted with the challenge of establishing themselves as organizations in the marketplace while lacking past records (Stinchcombe) and knowledge. Effecting diversification requires the development of knowledge regarding diverse product markets and related factors, many of which are difficult to predict in advance. This injects additional uncertainty, which, combined with the uncertainty inherent in new ventures, renders prediction and planning difficult for diversification initiatives.

Against these constraints, we argue that the investigation of the diversification–performance relationship in new ventures requires the consideration of effectuation, which has often been shown to be used by expert entrepreneurs (Dew, Read, Sarasvathy, & Wiltbank, 2009; Sarasvathy, 2001; Wiltbank, Dew, Read, & Sarasvathy, 2006). Effectuation takes “an active and agentic stance toward resources” (Sarasvathy, Kumar, York, & Bhagavatula, 2014, p. 78) and considers value as inherent in the very notion of “resources,” suggesting that any and all resources at hand may become valuable, as they are not stable but develop during effectual processes over the course of exploration. In addition, by not focusing on prediction, effectuation provides normative approaches to problem solving that are designed to be functional in uncertain situations. Entrepreneurs who adopt an effectual approach work with means within their control, use experimentation, select alternatives based on affordable loss to reduce the risk in case of failure, and maintain flexibility by making adjustments when necessary (Chandler, DeTienne, McKelvie, & Mumford, 2011; Dew et al.). Instead of attempting to predict the future, they seek to control it by developing partnerships and securing pre-commitments from various stakeholders, such as customers, suppliers, and even competitors (Chandler et al.; Dew et al.).

Several studies in the diversification literature, though not in the same context, have noted the value of such processes. For instance, the trial-and-error approach has been suggested to add dynamism to the diversification process, enabling firms to successfully diversify by reshaping existing resources (Ng, 2007) and facing the uncertainty inherent in this strategy (Matsusaka, 2001). Efforts to minimize risks have been shown to provide a response to the information asymmetry associated with diversification (e.g., Baysinger & Hoskisson, 1989). The role of partnerships has also been highlighted by some scholars (e.g., Peng, Lee, & Wang, 2005; Wan, 2005). However, to the best of our knowledge, a direct link with effectuation has not been attempted.

This study adds to previous research in several ways. First, by establishing links between the effectuation literature and research on diversification, it contributes to our understanding of the underexplored diversification–performance relationship in new ventures. More broadly, it adds to diversification research (e.g., Kumar, 2009; Markides & Williamson, 1994) by challenging the value of planning and supporting instead the value of effectuation for successful diversification under conditions of limited resources and uncertainty. Second, by providing evidence of effectuation operating in the context of

strategic decision making under uncertain conditions, this study adds to prior effectuation research that has recently begun to explore the effects of effectuation on performance (e.g., Read, Song, & Smit, 2009). In doing so, it contributes to the burgeoning effort to shift the effectuation literature from a nascent to a more advanced phase (Perry, Chandler, & Markova, 2012). Finally, by employing the quantitative measures of Chandler, DeTienne, and Mumford (2007) and Chandler et al. (2011), the study furthers the ongoing debate in the empirical literature regarding the identification of the most relevant subcomponents of effectuation (Perry et al.).

The article begins with a brief summary of effectuation research, followed by argumentation on why new venture product diversification is an appropriate context to apply the lens of effectuation. Next, we develop our hypotheses concerning the moderating effects of effectuation processes, which are tested based on data from 129 Greek ventures. The results of the empirical analysis are then presented and discussed.

Theoretical Background

A Brief Summary on Effectuation

Effectuation posits a theoretical framework of decision making in uncertain situations (Sarasvathy, 2008, p. 227) that emphasizes control rather than prediction. It focuses on human action as the “predominant factor shaping the future” (Sarasvathy, 2008, p. 87) and explains how new artifacts, such as products, firms, and markets, emerge rather than assuming them to be predetermined (Chandler et al., 2011; Sarasvathy, 2001; Sarasvathy et al., 2014). Being a nonteleological theory, effectuation releases entrepreneurs from specific, predetermined goals and allows them to convert uncertainty into opportunity by treating it as a tool for the development of new goals (Wiltbank & Sarasvathy, 2010). The theoretical underpinnings of effectuation lie in cognitive science (Chandler et al.; Sarasvathy, 2001). In light of the cognitive perspective, under conditions of high complexity and uncertainty, cognitive models and heuristics are suggested as effective guides for strategic actions, enabling the simplification of the intricate and/or unstructured problems that such actions entail (Schwenk, 1988). Such models and heuristics build on limited or key experiences, which some argue that entrepreneurs employ more extensively than managers, who adopt a more factual-based logic (Alvarez & Busenitz, 2001).

Several studies have demonstrated that expert entrepreneurs are likely to employ effectuation heuristics (Dew et al., 2009; Sarasvathy, 2001; Wiltbank et al., 2006). Most of these studies have been either experimental, using verbal protocol analysis (e.g., Dew et al.; Read et al., 2009; Sarasvathy, 2014; Sarasvathy & Dew, 2005), or qualitative case studies (e.g., Harmeling, Oberman, Venkataraman, & Stevenson, 2004; Sarasvathy & Kotha, 2001). In 2009, Wiltbank, Read, Dew, and Sarasvathy and Read et al. took the first steps toward the development of empirical measures of effectuation. In this vein, Chandler et al. (2011) developed and validated effectuation measures in the context of new venture creation.

In this study, we use these measures and conceptualize effectuation in terms of four dimensions. The first dimension, experimentation, is aligned with McGrath’s (1995, p. 122) notion of ventures “as competence-building experiments, involving some degree of trial-and-error learning.” The second dimension, affordable loss, involves efforts to minimize the risks associated with overspending. The third dimension, flexibility, relates to acknowledging unexpected events and leveraging them into new opportunities. The fourth dimension, pre-commitments, involves the creation of avenues for stakeholder

self-selection, which may result in some of these stakeholders ultimately making actual commitments to the ventures (Sarasvathy et al., 2014). These stakeholders, seeing opportunity in co-creating ventures, help to expand the ventures' means and have a voice in shaping the ventures' goals (Sarasvathy & Dew, 2005; Sarasvathy et al.). This study applies the lens of effectuation to the relationship between product diversification and performance in new ventures.

Product Diversification and Its Link to Effectuation

Prior literature on the diversification–performance relationship has drawn on the premises of the resource-based view (RBV) (e.g., Markides & Williamson, 1994; Pehrssen, 2006). Beginning with Penrose (1959), RBV theorists have posited that successful diversification depends on economies of scope resulting from the replication and transfer of valuable, rare, inimitable, and nonsubstitutable resources (Tanriverdi & Venkatraman, 2005), such as technological, marketing, and production knowledge, and several types of organizational competencies. However, achieving such economies of scope may require significant effort (Kumar, 2009). The process of replicating resources often entails elements of modification (e.g., Kogut & Zander, 1992). To successfully replicate and exploit existing assets in new markets, a firm may need to devote a substantial amount of managerial time and effort to uncover the idiosyncrasies of these markets, to adapt its pool of resources to these idiosyncrasies, and to develop new capabilities and practices specific to these markets (Markides & Williamson). Scholars have recognized the need to perform such activities and have argued that planning is crucial for successful diversification (e.g., Goll & Sambharya, 1998).

The aforementioned premises provide a valuable explanation of successful diversification in established firms. However, their application to new ventures could be problematic for two main reasons. First, new ventures are likely to enter diverse product markets with limited resources. Unlike their established counterparts, which have already achieved a level of viability and market presence, new ventures are subject to the liabilities of newness inherent to the particular difficulties that they face in possessing resources (Stinchcombe, 1965). Having existed for a brief period of time, they lack the physical embeddedness that provides their larger counterparts with access to social and economic capital (Morse, Fowler, & Lawrence, 2007). Thus, newness makes acquiring critical external resources difficult and developing internal assets time-consuming, thus, limiting the ventures' potential to achieve performance goals through the exploitation of economies of scope associated with the replication and transfer of valuable assets (Xie & O'Neill, 2014).

Second, compared with established firms, young diversifiers generally face higher levels of uncertainty. Instead of targeting the “core,” that is, the larger size of established markets, as incumbent firms do, new ventures, which Schumpeter (1934) viewed as sources of innovation and engines of creative destruction, tend to serve the “periphery” of markets (Chandra & Yang, 2011), often pioneering new industries while lacking past records. They are, thus, likely to encounter major knowledge and information gaps regarding market-related factors, such as customer segments and preferences, sales cycle durations, customer purchasing patterns, or regarding the assignment of roles or the development of processes, and structures within their organization. Entering diverse product markets would multiply the number of input elements that could be combined and permuted in an infinite number of ways (Matusik & Fitza, 2012) and could guide ventures along potential evolutionary trajectories outside the realm of what is known and

predictable (cf. Rosenkopf & Nerkar, 2001). This path creates Knightian uncertainty, which renders prediction and planning difficult, as it involves situations characterized by an absence of anything that might yield to known forms of probabilistic calculations (Knight, 1921).

Under such conditions of limited resources and uncertainty, effectuation may provide a helpful explanation in the diversification–performance relationship in new ventures. Indirect evidence in the diversification literature provides support for the value of the four effectuation dimensions, though not in the same context. For instance, previous studies on the role of learning and learning-by-doing (e.g., Lei, Hitt, & Bettis, 1996; Markides & Williamson, 1994; Ng, 2007) have argued that such learning is crucial under conditions of resource scarcity because it may reveal additional resource uses (Ng), thereby allowing firms to diversify successfully without having to garner additional large endowments of resources. Such studies point to the experimentation dimension of effectuation, which can allow resources to be reshaped through a trial-and-error approach. Additionally, in a study exploring diversification as an experimentation process, Matsusaka (2001) argued that the uncertainty inherent in this strategy can only be resolved by entering new businesses, observing the outcomes, and exiting when the outcomes are not the ones expected. An effectuation lens, opting for a trial-and-error approach instead of a planned, goal-oriented approach to diversification, coheres well with this view.

Other studies have shown that managers respond to the problem of information asymmetry, which is greatly magnified when firms diversify by shifting the performance evaluation criteria from achieving strategic goals to realizing immediate financial controls (Chang & Wang, 2007). Such a shift from strategic to financial controls has been shown to produce a short-term orientation and risk-averse behavior (Baysinger & Hoskisson, 1989; Hitt, Hoskisson, & Ireland, 1990), which encourages efforts to minimize risks more than efforts to maximize uncertain returns to increase performance. The affordable loss dimension coheres well with this shift, pointing towards an operating mode that commits fewer resources.

In seeking to explain how economies of scope in diversified firms emerge, several scholars have argued that they are shaped by certain attributes of existing resources. For example, Mishina, Pollock, and Porac (2004) showed that “non-sticky” resources, which can be interchangeably applied to multiple ends, may allow firms to pursue diversification without having to commit additional resources and to achieve high performance. Additionally, in a study of within-industry diversification, Hashai (2015) argued that “scale-free” resources, whose use for a given task is independent of their uses for other tasks, can shape the cost of diversification. Though the lens of effectuation, the “non-sticky” or “scale-free” qualities are arguably not attributes of the resources per se but the de facto side of the flexibility dimension that enables firms to leverage unexpected contingencies into opportunities.

In addition, diversification researchers are cognizant of the importance of partnerships in the diversification process. In a study that seeks to identify the factors that determine a firm’s optimal product scope, Peng et al. (2005) highlighted the necessity of developing an ability to leverage relationships with crucial actors (e.g., financial institutions) to gain resources and increase legitimacy. In an effort to link firm capabilities and diversification, Wan (2005) argued that the capability to foster social ties with economic or political actors allows firms to maximize returns across a large number of product markets. These studies point to the pre-commitment dimension of effectuation. However, they overlook this dimension’s crucial emphasis with regard to the risk that the two parties share when involved in effectual partnerships. Indeed, viewed through an effectual lens, the issue of developing networks as drivers of successful diversification becomes

one in which the partners put “skin in the game” (Sarasvathy et al., 2014), helping the ventures to confront the uncertainty inherent in this strategy.

The aforementioned evidence supports the argument that effectuation, which disregards the necessity of valuable resources and emphasizes control rather than predictions (Sarsvathy, 2008), may provide an explanation for diversification in new ventures that operate under conditions of limited resources and uncertainty. Successful diversification may relate to whether entrepreneurs enter new businesses by perceiving means and resources where others do not—by asking questions regarding “who I am,” “what I know,” “whom I know,” and “what I have” (Sarasvathy & Dew, 2005) and by taking advantage of “acknowledging the unexpected” (Brettel, Mauer, Engelen, & Kupper, 2012, p. 168) while relying on controllable business aspects to face the uncertainty inherent in this strategy.

In this light, in the current study, we investigate the moderating effects of effectuation processes on the relationship between product diversification and performance in new ventures. In our conceptual model, we also incorporate several venture-specific and environmental controls, namely, a firm’s age, size, human capital, financial resources, technological capabilities, number of founders, sectorial dummies, and environmental uncertainty. The venture-specific variables primarily indicate the extent of means accessible to the ventures, and these variables are included in the model to exclude resource-driven explanations of performance. Regarding the environmental variables, a rich body of research has identified these variables as important performance drivers (e.g., Zahra, Neubaum, & El-Hagrassey, 2002).

Hypotheses

Dimension 1: Experimentation

Experimentation constitutes “part of a process whereby entrepreneurs build mental models” (Nicholls-Nixon, Cooper, & Woo, 2000, p. 497). Conforming to the cognitive perspective, which applies mental models and heuristics to explain complex strategic actions, experimentation can have considerable utility in driving successful diversification in new ventures. It is described as a “groping along” process (Dimov, 2010) that produces focal outcomes and information that, in turn, feed back into the entrepreneurial process and update factors such as entrepreneurial aspirations about market conditions for the next iteration (Arend, Saroogi, & Burkemper, 2015). Such a process “reflect(s) a high degree of fluidity and responsiveness to the market” (Nicholls-Nixon et al., p. 502), promoting the development of cause-and-effect relationships regarding the market. Therefore, experimentation allows diversified ventures that are unable to use past situations or previous data to evaluate *a priori* how to enter different businesses to “make assumptions which are difficult to test before proceeding to action” (Brinkmann, Grichnik, & Kapsa, 2010, p. 28).

Experimentation enables entrepreneurs to identify which businesses to enter into and to create the data needed to justify their choices (Chesbrough, 2010). Entrepreneurs using experimentation begin the diversification process with a general aspiration to pursue opportunities. As they make decisions and observe the results of those decisions, they utilize “new, discomfiting information” (Sarasvathy et al., 2014, p. 74) to abandon infertile experimental actions and change course to leverage emergent opportunities (Chandler et al., 2011). This endows the diversification process with the potential for unintended discoveries (Corner & Ho, 2010; Dew et al., 2009). As an aspect of the experimentation

process, “failures” can be eliminated early, and entrepreneurs can shift their attention to different, more thriving avenues in a timely manner (Chandler et al., 2007, 2011), thereby increasing the possibility of successful diversification. Experiments that conclude poorly and those that are fruitful are both useful, as they can provide the venture with information about what will and will not work (Thomke, 2002) and generate learning-by-doing (Huber, 1991). Experimentation assists entrepreneurs in discovering the best purposes (Chandler et al., 2011) and has been shown to positively affect strategic outcomes under conditions of uncertainty (Brettel et al., 2012). Thus, we formulate the following hypothesis:

Hypothesis 1: Experimentation has a positive, moderating impact on the relationship between product diversification and performance in new ventures.

Dimension 2: Affordable Loss

Affordable loss refers to “find(ing) ways to reach the market(s) with minimum expenditures of resources” (Sarasvathy, 2001, p. 5) rather than “investing in calculations about expected returns” (Sarasvathy, 2008, p. 21). Under conditions of high uncertainty, such as those faced by ventures that diversify, predictions of future value and forecasts of returns cannot be accurate enough to serve as “the key decision criterion” (Dew et al., 2009, p. 112). Instead, reducing the risk by exploring the applicability of the venture’s resources in other product markets (Markides & Williamson, 1994; Silverman, 1999; Wang & Barney, 2006) while keeping immediate financial control (Chang & Wang, 2007) may facilitate successful diversification. Additionally, emphasizing control has proved to yield better results, as Wiltbank et al. (2009) demonstrated when investigating the outcomes of angel investors.

Expert entrepreneurs, adopting the principle of affordable loss when creating or entering new markets (ideally zero expenditures), keep control over risk. Such an approach allows their ventures to avoid overspending (Brettel et al., 2012) and minimize potential losses. By eliminating the necessity of predicting future returns, adopting the affordable loss principle requires less planning time (Sarasvathy et al., 2014). Therefore, embracing this principle also enables diversified ventures to learn more rapidly without risking the entire operation on any single action. Although this approach limits short-term revenues, it tightens the learning cycle, increasing the possibility of successful diversification. This effect has also been supported by previous findings, although in a different context, which revealed that affordable loss is positively related to the success of innovative R&D projects (Brettel et al.). Thus, we suggest the following:

Hypothesis 2: Adopting the “affordable loss” principle has a positive, moderating impact on the relationship between product diversification and performance in new ventures.

Dimension 3: Flexibility

Flexibility reflects the extent to which contingencies, both positive and negative, that arise unexpectedly over time can be leveraged into useful components of new opportunities (Chandler et al., 2007, 2011; Dew et al., 2009; Sarasvathy, 2001). As Brettel et al. (2012) argue, this notion is in line with the learning school (Brinkmann et al., 2010; Wiltbank et al., 2006).

The learning school generally suggests that performance increases when organizations faced with uncertainty learn what action to take next by minimizing commitment to plans and instead moving rapidly to leverage changing circumstances (Mosakowski, 1997). Vera and Crossan (2005) suggest that flexibility is beneficial because it promotes the use of improvisation and enables creative and nonroutine responses to situations in which programmed actions are difficult to design *a priori*. Sanchez (1997) also argues that flexible firms, instead of seeking to select a single, “best” plan from the outset (a rather unrealistic objective when predictability is low), improve their chances for success by being able to pursue alternative courses of action.

Chatterjee and Wernerfelt (1991) identify flexibility as a key factor in allowing the deployment of a firm’s resources in profitable product markets. In the same light, Sanchez (1995) suggests that flexibility increases the firms’ capability of generating the variety of responses required to maintain stability in uncertain environments. Wiltbank et al. (2009) also argue that a flexible approach enables the creative use of surprise, which is a regular part of the process under conditions of uncertainty, as a resource in transforming the event space. These benefits are crucial for new ventures that diversify because they allow them to shape opportunities in new product markets as information emerges. Maintaining flexibility, diversified ventures are able to abandon unfruitful situations and move on to other opportunities (Chandler et al., 2011), such that changes in their knowledge and resources drive their assessment of opportunities and opportunity-related decisions, and vice versa (Shepherd, Williams, & Patzelt, 2015). In an article examining the performance outcomes of strategic decisions in new ventures, Sapienza, Autio, George, and Zahra (2004) note that flexibility allows new ventures to reduce the costs of failed experiments when entering new markets. It allows them to leverage their limited resources across multiple capabilities while also enabling the leverage of growth opportunities along multiple new paths at comparatively low costs. As product diversification involves entering new product markets, we extend these arguments on flexibility to our explanation for the diversification–performance relationship. Thus, we suggest the following:

Hypothesis 3: Flexibility has a positive, moderating impact on the relationship between product diversification and performance in new ventures.

Dimension 4: Pre-commitments

Pre-commitments refer to the establishment of partnerships in the process of creating new opportunities to expand means and share risk (Brettel et al., 2012; Chandler et al., 2011; Sarasvathy & Dew, 2005). Rather than being pursued based on pre-selected goals, pre-committed partners self-select into the ventures, making actual commitments because they see opportunity in co-creating the ventures with the entrepreneurs (Sarasvathy & Dew; Wiltbank et al., 2009). “Putting skin in the game,” effectual partners have a voice in shaping the ventures’ goals, both sharing the risk and benefiting from the success of the ventures (Sarasvathy et al., 2014).

Establishing pre-commitments can contribute to successful product diversification, as it actively helps reduce the high level of uncertainty that is inherent in such a strategy. Related evidence suggests that partnerships with customers, suppliers, and even prospective competitors positively affect the performance outcomes of several strategic actions undertaken by young firms, particularly those involving high levels of uncertainty (e.g., Zahra, Ireland, & Hitt, 2000). Effectual partnerships can increase the information, knowledge, and resources available to new ventures (Hansen, 2002; Sarasvathy & Dew, 2005;

Tsai, 2001). This benefit is particularly important for diversified ventures, as it allows them to effectively address both information asymmetries and the complexities diversification entails, along with the uncertainty and resource constraints associated with emerging firms. In essence, pre-commitments allow these firms to test new product markets without having all the resources to do so (Hitt, Ireland, Camp, & Sexton, 2001). Partnerships can also assist young firms in mobilizing external resources from third parties, as they may generate positive signals regarding the ventures' future potential (Hitt, Ireland, & Lee, 2000; Stuart, Hoang, & Hybels, 1999) and may provide the ventures with greater bargaining power (Kogut, 1984). Mobilizing external resources would render new ventures more market-oriented and more capable of transforming a diverse environment into emerging opportunities (Cesaroni, 2004; Robertson & Langlois, 1995). Such mobilization would facilitate successful entry into new product markets, which would presumably increase performance. In addition, partnerships allow new ventures to spread responsibility to other self-selected stakeholders (Chandler et al., 2007, 2011) and, thus, mitigate risk exposure (Van Mieghem, 2007). This process of diversifying risk among diverse stakeholders enables new ventures to limit potential losses from product diversification, thus, rendering such a strategy more affordable. Based on this discussion, we suggest the following:

Hypothesis 4: Pre-commitments have a positive, moderating impact on the relationship between product diversification and performance in new ventures.

Methodology

In line with several extant studies (e.g., Chandler et al., 2011), we adopted a survey research design to enhance the variability and generalizability of our results. Data were gathered from 129 Greek new ventures, based on a structured questionnaire completed by the ventures' founders during personal meetings with them. We relied on primary data for our analysis, as secondary data were very difficult, if not impossible, to obtain for young firms. In each instance, we remained with the respondents while the questionnaire was being completed, which enabled us enhance the completeness and accuracy of the data collected. The questionnaire was designed to capture data on the entrepreneur, the effectuation processes, and information concerning the firm (e.g., product diversification, performance) and its context. The questionnaire underwent two pretests to assess its comprehensibility and clarity prior to launching the survey. The respondents in both pretests were similar to the target respondents of the survey, that is, venture founders. They were asked to complete the questionnaire and comment on the clarity of the instructions, questions, and expected responses. Conducted with three firms, the first pretest led to several modifications with respect to the questionnaire's structure and rephrasing of questions that were not well understood. The revised questionnaire was then tested once more using similar respondents from two additional firms. The final form of the questionnaire was then completed following some minor modifications.

Sampling and Data Collection

The sampling procedure employed to select the firms considered in the analysis was completed in several steps. First, the population of interest was defined to include all domestically owned, private firms belonging to four major industries (namely, information and communications technology [ICT], food and beverages, chemicals, and clothing

and textiles) that were established and managed by individual entrepreneurs and that had been in operation for 7 years or less. The 7 years-of-age threshold was selected because it is widely accepted as an appropriate means of defining a company as a new venture (e.g., Ireland & Webb, 2007; Zahra et al., 2000). The four industries were chosen because of their attractiveness to Greek entrepreneurs (data from the ICAP Greek Financial Directory revealed that over 100 new firms have been established in each of these industries in the 5 years leading up to the survey's implementation). In addition, the inclusion of both high-tech and traditional industries allowed for differences in perceived uncertainty to be taken into account to increase the generalizability of the findings. The exclusion of corporate and public ventures eliminated potential confounding effects of corporate-level considerations and differing investment patterns in exploiting entrepreneurial opportunities (Asker, Farre-Mensa, & Ljungqvist, 2012). Thus, the total population consisted of 620 new ventures, as they were registered in the ICAP Greek Financial Directory database. Second, the founders of the 620 firms were telephoned to solicit participation. Additionally, we mailed the research instrument, consisting of the structured questionnaire and a cover letter clearly explaining the objectives of the study, assuring strict confidentiality and promising an executive report of the results, if desired. Third, follow-up telephone calls were placed a few days after the initial dispatch of the research instrument, and appointments were made.

Data collection was conducted at the beginning of the crisis in Greece (between the end of 2009 and the beginning of 2010) and resulted in 143 questionnaires, yielding a response rate of 23%. This response rate is satisfactory, as it approximates those attained in similar empirical studies on effectuation (e.g., Brettel et al., 2012; Chandler et al., 2011). However, of these questionnaires, only 129 were used in the estimation. The rejected questionnaires exhibited deficiencies in certain variables necessary for the current study. The final sample of firms had been in operation for an average of 5.5 years and had a mean size of 22 employees, ranging from 1 to 132 employees. Of the respondents, 85% were male. Of the firms, 24% were in the food industry, 63% were in the ICT industry, 6% were in the clothing and textile industry, and the remaining 7% were in the chemical industry. *T*-tests on the variables, including age, size, product diversification, and ROE, were conducted to assess nonresponse bias. All of these tests yielded non-significant probability values ranging from .25 to .39 (see Table A.1 of the Appendix), suggesting that responding firms resemble the targeted population in terms of key attributes.

Reliability and Validity of the Data Collected

Although studies investigating new venture performance are commonly based on subjective measures, such studies may suffer from inherent limitations (Chandler & Hanks, 1993). To alleviate possible bias, particular caution was exercised to minimize distortion problems by interviewing major participants who had intimate knowledge of the ventures (Kumar, Stern, & Anderson, 1993). The practice of considering one respondent per firm has been supported when the key respondent is the owner because, in new ventures, the founders' views are identical to the average views of the ventures' staff (Delmar & Shane, 2003). In this study, we were also able to receive responses from a second respondent in 64 ventures, that is, in approximately 45% of the participating firms. A correlation analysis was conducted between the responses of the two interviewees in each firm for all measures. The correlation coefficients range from .76 to .94 ($p < .05$). These results provide support for inter-respondent reliability, suggesting that our measures are reliable and do not reflect the individual characteristics of a single respondent.

Several suggestions offered by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) and Podsakoff, MacKenzie, and Podsakoff (2012) were also followed to control for common method variance. The questionnaire items were based on previously developed scales; the items used in the analysis were distributed during a lengthy interview and reversed scale anchors were used in several instances to minimize the potential presence of specific response patterns. The model employed in the study also considers interaction effects, which renders it difficult for the respondent to establish any link between variables (Chang, van Witteloostuijn, & Eden, 2010). To test the potential threat of common method variance, we performed Harman's single-factor test, following Podsakoff and Organ's (1986) recommendation, and a comprehensive CFA marker technique, as suggested by Richardson, Simmering, and Sturman (2009). Neither of these strategies provides support for a common method bias explanation for the study results (a detailed presentation of these tests is available on request).

Measures

New venture performance is captured by both a subjective and an objective measure. The subjective measure captures the ventures' degree of perceived performance over the last 3 years compared with that of their main competitors in terms of sales volume, profitability, sales growth, growth in profits, and market share growth. This measure was selected following the suggestions of prior researchers (e.g., Tsai, MacMillan, & Low, 1991), who highlighted the need to use both measures of profitability and growth to capture new venture performance. As an objective measure, we used return on equity (ROE). The correlation between the subjective and objective measures is significant (.49, $p < .01$), supporting the validity of the subjective measure.

Product diversification captures the extent to which the venture operates across different product markets and is measured through the Berry–Herfindahl index (Berry, 1975). This index is defined as $1 - \sum_j(p_{ij}^2)/(\sum_j p_{ij})^2$, where p_{ij} is the proportion of the j th classified group to the i th venture's total sales and j indicates the number of classified groups in which a venture operates. The values of the Berry–Herfindahl index range from zero, when the venture operates in a single product market, to one, when the venture's total sales are divided equally among any of the classified groups. This measure accounts for both the number of product markets that a venture operates in and the relative importance of each product market in the venture's total sales, which is widely recognized in the diversification literature (e.g., Tallman & Li, 1996). Here, we should note that, although several other continuous measures of diversification (among the most popular are the entropy and Herfindahl indices) have also been used in the literature, most of these are highly correlated and provide similar results (Caves, Porter, & Spence, 1980, p. 201). Following Nayyar's (1992) suggestions, the data used for the calculation of the Berry–Herfindahl index were internal to the ventures. Specifically, we asked the ventures' founders to list their firms' most significant product markets and to report the proportion of total firm sales that each business contributed. Of the 129 ventures, 102 were operating in more than one product market at the time of the survey.

Experimentation. This measure is based on Chandler et al. (2007, 2011) and uses a four-item scale. Respondents were asked to indicate the extent of the following on a one-to-seven scale: (a) experimenting with different product markets, (b) serving product markets that were essentially the same as originally conceptualized, (c) serving product

markets that were substantially different from those originally imagined, and (d) trying different approaches until the firm found product markets that worked.

Affordable Loss. This measure is based on Chandler et al. (2007, 2011) and uses a three-item scale. Respondents were asked to indicate the extent of the following on a one-to-seven scale: (a) attention to not committing more resources than the entrepreneurs could afford to lose, (b) attention to not risking more money than the entrepreneurs were willing to lose, and (c) attention to not risking so much money that the venture would experience financial distress in the event of failure.

Flexibility. This measure is based on Chandler et al. (2007, 2011) and uses a four-item scale. Respondents were asked to indicate the extent of the following on a one-to-seven scale: (a) building on emergent opportunities, (b) adapting to the resources available, (c) being flexible and exploiting opportunities as they arose, and (d) undertaking actions that enhanced adaptability.

Pre-commitments. This measure is based on Chandler et al. (2007, 2011) and uses a two-item scale. Respondents were asked to indicate the extent of the following on a one-to-seven scale: (a) the use of a substantial number of agreements with customers, suppliers, and other organizations to reduce uncertainty and (b) the use of pre-commitments from customers and suppliers as often as possible.

Controls. We also included eight contextual control variables that may help explain new venture performance: the firm's age, size, human capital, financial resources, and technological capabilities; number of founders; industry; and environmental uncertainty. Age is measured by the number of years that the firm has operated, while size is captured by the logarithm of the number of employees. Human capital is measured by three items that capture the extent of the employees' education, work experience, and skills (adapted from Carmeli & Tishler, 2004). Financial resources are measured by a single item that captures the venture's access to financial resources. The number of the venture's founders is a continuous variable, reflecting the size of the entrepreneurial team. Technological capabilities are measured by three items, capturing the intensity of the venture's R&D investment, its skills in developing new products/services, and its ability to upgrade existing products/services (adapted from Zahra, Neubaum, & Larraneta, 2007). To operationalize the industry, we included three dummy variables (food and beverage, ICT, and textiles). Environmental uncertainty is measured as a three-item scale that captures the rate at which products/services become obsolete, the predictability of competitors' actions, and the predictability of demand and customer tastes (Miller & Droge, 1986).

To assess the construct validity of all variables, we followed the process suggested by Spanos and Lioukas (2001), which involved tests of unidimensionality, reliability, and convergent validity. The results of this process indicate good construct validity (see the Appendix).

Findings

Table 1 reports the descriptive statistics and correlation coefficients for all variables in this study. All correlation coefficients are below .42, indicating that multicollinearity may not arise as an issue. In addition, all the variance inflation factors (VIFs) and the condition indices (CIs) were computed in each of the estimated models. The VIFs are all

Table 1

Descriptive Statistics and Correlations Among the Study's Variables

Variables	Mean	S.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age	5.48	1.05	1.00																
2. Size	1.12	.41	.07	1.00															
3. Food and beverage	.24	.43	-.18**	.19**	1.00														
4. ICT	.63	.48	.13	-.30***	-.34***	1.00													
5. Textile	.06	.24	.03	.09	-.14	-.32***	1.00												
6. Number of founders	2.82	1.30	-.06	.09	-.06	.09	.03	1.00											
7. Environ. dynamism	4.10	1.44	.06	-.18**	-.18**	.16	-.04	.05	1.00										
8. Human capital	5.51	.95	.05	-.08	-.02***	.35***	-.02	.09	.11	1.00									
9. Financial resources	4.55	1.56	.06	.16*	-.01	.13	-.07	-.05	-.06	.15*	1.00								
10. Tech. capabilities	5.14	1.29	.14	.19**	-.27***	.24***	.07	.06	.05	.30***	.28***	1.00							
11. Product diversif.	.32	.24	-.02	-.08	-.11	.22***	-.20***	-.01	.19**	.05	.07	.05	1.00						
12. Experim.	3.50	.92	.02	-.20**	.05	-.15*	.09	.07	.11	-.33***	-.70***	-.37***	-.09	1.00					
13. Afford. loss	4.22	.74	.09	-.04	-.06	-.01	.17**	.07	.09	.12	-.14*	.06	-.27***	.09	1.00				
14. Flexibility	5.21	.85	-.01	.23***	.07	-.06	-.05	.04	-.20**	.18**	.08	.14	-.02	-.18**	.01	1.00			
15. Pre-commitments	5.39	1.12	-.10	.18**	.22***	-.16*	.00	.02	-.30***	.14	.18**	.03	-.07	-.24***	.01	.37***	1.00		
16. Perform.	4.46	1.06	-.03	.24***	-.01	.06	-.07	-.06	-.21**	.13	.22***	.16*	.10*	-.42***	-.09	.25***	.21**	1.00	
17. ROE	.28	.111	-.01	.18**	-.06	.15*	-.10	-.06	-.13	.12	.23**	.03	.14	-.42***	-.18**	.20**	.19**	.49***	1.00

*** $p < .01$; ** $p < .05$; * $p < .10$. ICT, information and communications technology; ROE, return on investment.

below the threshold value of 10. Furthermore, the CIs are below 30 in all models. These findings further suggest that multicollinearity does not pose a problem for the results of the analysis (Netter, Kutner, Nachtsheim, & Wasserman, 1996).

Table 2 reports the results of the hierarchical ordinary least squares (OLS) regression analysis conducted to predict whether effectuation processes affect the diversification–performance relationship. The independent variables were standardized prior to the formation of interaction terms, as recommended by Aiken and West (1991). Models 1 and 7 are baseline models that consider the effect of the control and independent variables on performance. Models 2 to 5 and 8 to 11 separately introduce the interaction terms between diversification and each of the four dimensions of effectuation, giving an explanatory contribution over and above those in Models 1 and 7. Models 6 and 12 are the final models, which jointly include all interaction terms.

However, in testing our hypotheses, recalling that strategy is a choice variable in which firms “self-select” into product diversification strategies was crucial. Self-selection could lead to endogeneity issues that might affect the sign, magnitude, or statistical significance of our results. To account for potential endogeneity issues, we adopted an instrumental variable (IV) methodology, estimating a two-stage least squares (2SLS) regression. The 2SLS results (which are available on request) are very similar to the OLS results, indicating that our results are robust with regard to endogeneity concerns.

Hypothesis 1 proposes that experimentation has a positive effect on the diversification–performance relationship. The results support this hypothesis (Model 2: $b = .207, p < .05$; Model 6: $b = .200, p < .10$; Model 8: $b = .020, p < .05$; Model 12: $b = .024, p < .05$), as the moderating effect of experimentation is positive and significant. Hypothesis 2 states that diversified ventures’ adoption of the affordable loss principle increases their performance. Hypothesis 2 is not supported (Model 3: $b = -.095, p > .10$; Model 6: $b = -.113, p > .10$; Model 9: $b = -.004, p > .10$; Model 12: $b = -.010, p > .10$). The interaction between diversification and affordable loss is insignificant. Hypothesis 3 suggests that flexibility has a positive impact on the relationship between diversification and new venture performance. Indeed, the interaction between flexibility and diversification is positive and significant (Model 4: $b = .294, p < .01$; Model 6: $b = .273, p < .01$; Model 10: $b = .023, p < .05$; Model 12: $b = .024, p < .05$) in all models, thus confirming this hypothesis. Hypothesis 4 predicts that pre-commitments improve diversification performance in new ventures. The estimated positive and significant interaction between pre-commitments and diversification provides marginal support for this hypothesis (Model 5: $b = .178, p < .10$; Model 6: $b = .173, p < .10$; Model 11: $b = .012, p < .10$; Model 12: $b = .017, p < .10$).

Finally, the effects of the controls are insignificant in Model 1, whereas size and human capital have marginally significant effects in Model 6 ($b = .057, p < .10$; $b = -.16, p < .10$, respectively), and financial resources have a negative significant effect in Model 6 ($b = -.17, p < .05$), strengthening the exclusion of resource-driven explanations of performance.

To further illustrate the interaction effects, we graphed the interactions in Figure 1. Figure 1 illustrates the interaction effects by plotting the regression lines between new ventures’ subjective performance and product diversification for low (one standard deviation below the mean) and high values of the three dimensions of effectuation processes (i.e., experimentation, flexibility, and pre-commitments). The slopes of the regression lines were computed from the coefficients derived from the following equation: New venture performance = $b_1 + b_2 * \text{Product diversification}$.

Finally, as different studies employ different age criteria to define new ventures (e.g., Zahra et al., 2000), we shifted the cut-off from seven to six years and re-estimated the

Table 2

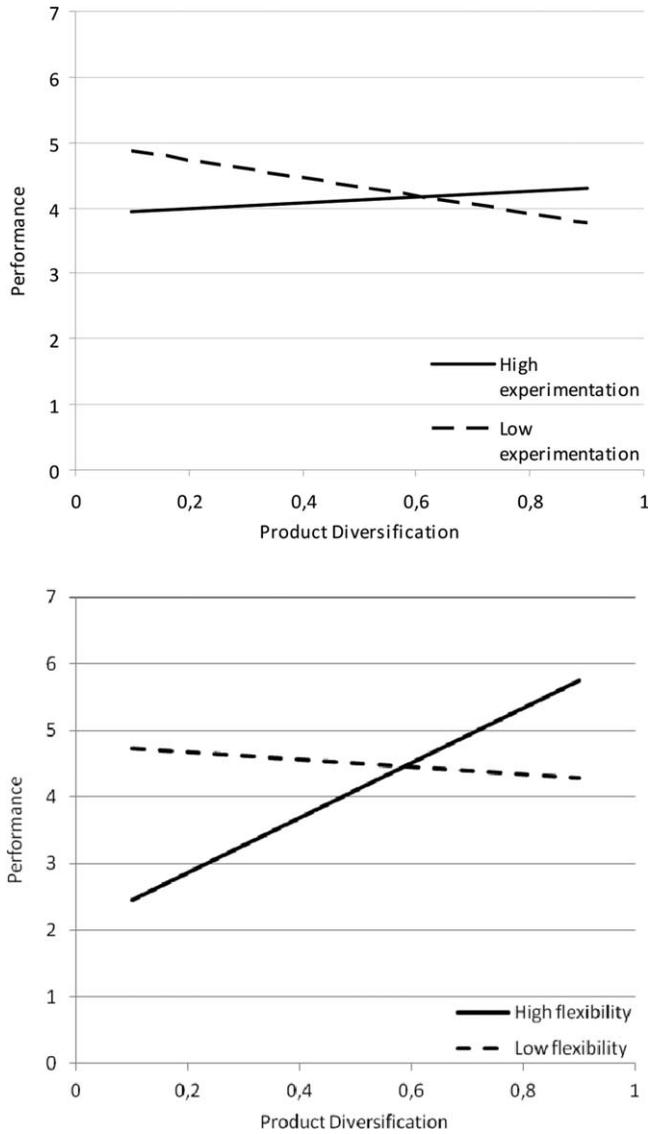
Hierarchical OLS Regression on New Venture Performance

	Performance											Return on Investment				
	Model 1 (n = 129)	Model 2 (n = 129)	Model 3 (n = 129)	Model 4 (n = 129)	Model 5 (n = 129)	Model 6 (n = 129)	Model 7 (n = 118)	Model 8 (n = 118)	Model 9 (n = 118)	Model 10 (n = 118)	Model 11 (n = 118)	Model 12 (n = 118)				
Age	-.031	-.048	-.020	-.053	-.033	-.031	.000	-.002	.000	-.003	-.001	-.003				
Size	.390	.364	.423*	.465*	.410	.544**	.049*	.048	.051*	.053*	.051*	.053**				
Food and beverage	.131	.114	.153	.236	.219	.410	.000	.000	.000	.010	.007	.031				
ICT	.320	.478	.366	.433	.347	.620	.047	.060	.049	.052	.050	.072*				
Textile	-.019	.060	-.083	-.010	.019	.065	.018	.028	.016	.019	.021	.034				
Environmental uncertainty	-.076	-.117*	-.074	-.093	-.066	-.098	-.006	-.009	-.006	-.007	-.005	-.008				
Number of founders	-.070	-.109	-.078	-.072	-.095	-.094	-.007	-.010	-.008	-.007	-.009	-.010				
Human capital	-.017	-.026	-.022	.049	.029	.052	-.001	-.003	-.002	.003	-.002	.001				
Financial resources	-.122	-.087	-.130	-.137	-.128	-.149*	-.014*	-.011	-.015*	-.016*	-.015*	-.017**				
Technological capabilities	-.102	-.098	-.108	-.106	-.120	-.142*	-.017**	-.016**	-.017**	-.015*	-.017**	-.016*				
Product diversification	.368	.066	.333	.569	.368	.550	.029	.010	.028	.046	.027	.056				
Experimentation	-.637***	-.620***	-.625***	-.610***	-.634***	-.601***	-.058***	-.058***	-.058***	-.059***	-.059***	-.062***				
Affordable loss	-.064	-.172	-.061	-.018	-.104	-.083	-.015	-.023*	-.015	-.010	-.017	-.011				
Flexibility	.071	.151	.054	.106	.081	.098	.013	.018*	.012	.014	.013	.011				
Pre-commitments	-.017	.019	.006	-.058	-.075	-.074	.005	.008	.005	.000	.000	-.004				
Product diversification × Experimentation		.207***				.200*		.020**				.024**				
Product diversification × Affordable loss			-.095			-.113			-.004			-.010				
Product diversification × Flexibility				.294***		.273***				.023**		.024**				
Product diversification × Pre-commitments					.178**	.173*					.012*	.017*				
R ²	.238	.346	.244	.298	.258	.334	.281	.375	.283	.319	.309	.357				
ΔR ²		.108**	.006	.060***	.019*	.096***		.094**	.002	.038***	.028*	.077**				
F	2.357***	3.664***	2.260***	2.978***	2.430***	2.881***	2.654***	3.751***	2.479***	2.951***	2.871***	2.866***				

*** $p < .01$; ** $p < .05$; * $p < .10$. ICT, information and communications technology.

Figure 1

Interaction Effects of Effectuation Processes on Performance



regression analyses to further check the robustness of our results. The results are similar to those presented in Table 2.

Discussion

In this study, we applied the theoretical lens of effectuation to new venture product diversification and investigated the moderating effects of effectuation processes on the

diversification–performance relationship. Effectuation was conceptualized along four key dimensions: experimentation, affordable loss, flexibility, and pre-commitments (Chandler et al., 2007, 2011). The results demonstrate that, with the exception of affordable loss, effectuation processes strengthen the effects of diversification on new venture performance.

Concerning experimentation, the results reveal positive moderating effects. Entering diverse product markets likely increases the complexity faced by new ventures and renders the relationships among diverse choices not merely uncertain but unknown. Under such conditions, experimentation can assist firms in gathering customer and market feedback (Nicholls-Nixon et al., 2000) and generate learning-by-doing (Huber, 1991), which they can then use to update their product market choices and to derive performance benefits (Gruber, MacMillan, & Thompson, 2008; Lichtenstein, Dooley, & Lumpkin, 2006; Minniti & Bygrave, 2001). Thus, our findings refine previous arguments in favor of experimentation in new ventures (e.g., Brinkmann et al., 2010) by putting them in the context of product diversification. They show that new ventures, when diversifying, can benefit from experimental action, as a means of coping with complexity and uncertainty, which are likely to prevent such ventures from evaluating *a priori* which businesses are appropriate for them.

Regarding affordable loss, our findings show insignificant effects, which appears to contradict previous arguments in favor of affordable loss in other settings (Brettel et al., 2012; Chandler et al., 2011; Wiltbank et al., 2009). However, the context is different here, as we are concerned with product diversification in new ventures that have survived. These ventures have likely eliminated the risk of being out of the game and have diversified by spending less than they could afford to lose, or they have been lucky enough to survive, even though they have undertaken the risk to diversify by spending more than they could afford to lose. As a result, these new ventures may form a context where affordable loss works in both ways. Therefore, this topic should be further investigated in an experimental setting in which differences in risk perceptions might be more easily understood (Read et al., 2009) in association with outcomes.

Flexibility is found to positively moderate the diversification–performance relationship. Flexibility, which can promote improvisation (Vera & Crossan, 2005), appears to facilitate diversified new ventures' efforts to cope with unpredictable factors, to make adjustments as necessary, and to achieve higher performance (Loch, Solt, & Bailey, 2008). Thus, our finding corroborates the argument of Wernerfelt and Karnani (1987) that flexibility is more attractive under high degrees of uncertainty, such as diversification, enabling the firms to reduce risk. It also extends Sapienza et al.'s (2004) contention, referring to internationalization, and shows that flexibility is beneficial for the outcomes of strategic action in the context of product diversification. The finding of a positive, though marginally significant, moderating effect of pre-commitments supports their value for diversification. This finding is in line with the arguments of prior researchers (e.g., Cesaroni, 2004; Chandler et al., 2007, 2011) that partnerships constitute a critical asset for firms because they allow them to acquire access to complementary resources, to increase their legitimacy, and/or to share the responsibility of a specific action with other stakeholders.

Overall, our results provide evidence that effectuation moderates the diversification–performance relationship, such that diversified new ventures using the effectuation processes of experimentation, flexibility, and pre-commitments perform better than others. To the best of our knowledge, these findings are unique in the literature. They have important theoretical implications, as they challenge prior suggestions regarding the diversification–performance relationship in established firms. Previous studies suggest that successful diversifiers are those who engage in planning and predictions to uncover the traits of the target markets and the resources that are worth replicating or that need to

be modified to be applicable to these markets to achieve economies of scope (Kumar, 2009; Markides & Williamson, 1994). Our findings cast doubt on the value of planning in the context of new ventures. They instead indicate that successful young diversifiers are those entering diverse product markets based on experimentation while maintaining the flexibility to make adjustments as necessary and taking advantage of pre-commitments in a process of gaining economies of scale and control rather than predicting the future. Of course, these findings do not imply that new ventures have no need for planning and prediction. As soon as valid market information is available through experimentation, effectuation processes may be combined with planning approaches to boost successful diversification. However, these three effectuation processes appear capable of helping new ventures overcome problems associated with the lack of resources or past records and the uncertainty created by product diversification. To draw wider conjectures, the use of these effectuation processes could be linked with successful diversification under conditions of limited resources and uncertainty beyond the context of new ventures. Thus, apart from contributing to our understanding of the underexplored diversification–performance relationship in new ventures, our findings could provide the diversification literature with promising avenues for future research involving effectuation modifications.

In addition, our findings contribute to the burgeoning effort in the literature to shift the effectuation stream from a nascent to a more advanced phase (Perry et al., 2012) in several ways. First, they strengthen the findings of recent empirical studies indicating that effectuation may affect firm performance (e.g., Fischer & Reuber; 2011; Read et al., 2009). In doing so, they contribute to the expansion of effectuation from a theory describing entrepreneurial behavior (e.g., Dew et al., 2009; Read et al.; Sarasvathy & Dew, 2005; Wiltbank et al., 2009) to a theory explaining performance variances. Furthermore, by providing evidence of the moderating effects of effectuation on the diversification–performance relationship, our findings provide evidence not on *whether* but on *how* effectuation processes affect performance. Thus, they contribute to a deeper understanding of the workings of effectuation in the context of new venture strategic decision making under uncertainty. Second, our findings provide a quantitative, empirical foundation for the discussion on effectuation, which—to a great extent—has been conceptual or qualitative in nature (Harmeling et al., 2004; Sarasvathy & Kotha, 2001). In this study, we adopt the quantitative measure of effectuation developed by Chandler et al. (2007, 2011), which captures effectuation as a formative construct composed of reflective subconstructs. Our findings concerning the effects of effectuation on diversification outcomes provide confirmatory evidence that supports the formative nature of effectuation, as the inclusion of outcome variables is argued to serve as a gauge of the nomological validity of formative constructs (MacKenzie, Podsakoff, & Jarvis, 2005). Finally, our finding regarding the insignificant effect of affordable loss contributes to the ongoing debate in the literature regarding the identification of the most relevant subcomponents of effectuation (Perry et al., 2012). This finding indicates, first, that a new measure could incorporate other elements that might be central to effectuation (e.g., beginning with a given set of means) and, second, that the identification of the most relevant subcomponents could be context-specific, meaning that different dimensions are more relevant in the context of product diversification than in other contexts.

The specific results have important practical implications for entrepreneurs facing diversification decisions, who should bear in mind that “the true method of knowledge is experiment” (Blake, 1788) and that “those who learned to improvise most effectively and collaborate have prevailed” (Darwin, 1859). The main implication is that, in an effort towards successful diversification, entrepreneurs need to experiment and remain flexible to adjust to unexpected situations while securing pre-commitments with self-selected stakeholders. Engaging in experimentation will provide rapid access to information and

knowledge, thereby allowing entrepreneurs to determine the best markets for their given means, which may even be artificially created by the venture's actions. By contrast, if gaps in the market and valuable resources are the starting point for diversification, then it is much more probable that entrepreneurs will spend time evaluating market opportunities that they will likely never act on due to limited resources. In addition, expert entrepreneurs should strive for flexibility to benefit from shorter periods of instability by making rapid and effective changes. Such a benefit would likely enable entrepreneurs to reduce the potential costs of adaptation and to be successful in entering new businesses. Finally, expert entrepreneurs should benefit from interacting early and forging partnerships with customers, suppliers, and even prospective competitors. By securing pre-commitments with self-selected shareholders, they will be able to overcome many of the hurdles associated with the uncertainty that accompanies new business entry and to spread risk among their partners.

However, the results should be evaluated in light of the study's limitations. First, this study is based on cross-sectional data, meaning that no causal implications can be drawn. We accounted for potential endogeneity issues by adopting an IV methodology and obtained results similar to OLS. However, future research may benefit from a longitudinal research design that would reveal specific cause-and-effect associations between variables over time. Second, following prior studies (e.g., Brettel et al., 2012), we used outcome-related measures of performance. Although such measures are well established and appropriate, future studies could incorporate more means-related measures (Brettel et al.; Sarasvathy, 2008), such as the human capital characteristics of the entrepreneurs. Third, the results are based on data from ventures that have survived and could be subject to "survivor bias." We examined ventures that are, on average, 5.5 years old, and firm failure rates decline between year three and seven, according to Agarwal and Gort (2002); nevertheless, future studies could also retrieve data on failed ventures. Failed diversified ventures may present different behavioral patterns than survivor firms; thus, comparisons between the two groups may allow for a more insightful understanding of the relationship examined. Fourth, we should acknowledge that the results might be culture- or country-specific because they are based solely on data from Greece. As Brinkmann et al. (2010) highlight, in cultures with higher levels of uncertainty avoidance, as is the case in Greece (Hofstede, Hofstede, & Minkov, 2010), the benefit of planning is significantly reduced. In addition, Greece has undergone a serious economic crisis. Although the data collection was conducted at the beginning of the crisis, when the business world in Greece had not yet realized the extent of this phenomenon and its impact on future firm performance, the economic recession may have an impact on the external validity of our results. Therefore, the adoption of a cross-country research design could provide an interesting avenue for future research, as it could reveal the different effect of contextual dimensions on the value of planning and effectuation processes. Finally, future research could account for potential interdependencies among the four dimensions of effectuation processes. For example, pre-commitments with partners likely affect experimentation, as they may limit the venture's operations within the boundaries of a potential cooperative relationship. The examination of such interdependencies could provide an interesting avenue for future research; however, such an examination was outside the scope of the current study.

Concluding Comments

In summary, in this study, we sought to investigate the impact of effectuation processes on the relationship between product diversification and performance in the context of new ventures. The concept of effectuation offers a framework for explaining new

ventures' strategies that entail substantial uncertainty. We hope that this study will encourage researchers to consider two important issues as they advance their research. The first issue concerns transferring effectuation from the field of new venture creation to other areas of entrepreneurship research, adhering to the original understanding of effectuation, as introduced by Sarasvathy (2001), but applying it to interpret complex entrepreneurial phenomena that may arise during a venture's lifetime, such as the venture's involvement in international markets or radical innovation. The second is to appreciate the important tools for measuring effectuation that have been developed in the literature. Although they constitute original and likely imperfect conceptualizations of a complex concept, these tools may provide an important basis for further quantitative empirical research, which is necessary to move effectuation research from a nascent to a more advanced state.

Appendix

Table A.1

T-tests of Nonresponse Bias

	<i>t</i> -value	df	<i>p</i> -value
Age	1.155	520	.25
Size	.858	520	.39
Product diversification	1.004	520	.32
ROE	-1.127	379	.26

df, degrees of freedom; ROE, return on investment.

Table A.2

Measures and Tests of Unidimensionality

Construct	Effectuation processes	
	Items	First-order factor loadings
	Please indicate the degree to which you agree or disagree with each of the following statements (1=not at all vs. 7=very much):	
Experimentation	We experimented with different product markets till finding product market(s) that worked	.734***
	The product market(s) that we now serve are essentially the same as originally conceptualized	.652

Table A.2

Continued

Construct	Effectuation processes	
	Items	First-order factor loadings
Affordable loss	The product market(s) that we now serve are substantially different than we first imagined (reverse coding)	.571
	We tried a number of different approaches till finding product market(s) that worked	.673
	We were careful not to commit more resources than we could afford to lose	.794***
	We were careful not to risk more money than we were willing to lose	.650
	We were careful not to risk so much money that the venture will be in a real financial problem if things didn't work out	.590
Flexibility	We allowed product market(s) to evolve as opportunities emerged	.710***
	We adapted what we were doing to the resources we had	.589
	We were flexible and took advantage of opportunities as they arose	.714
	We avoided courses of action that restricted our flexibility	.613
Pre-commitments	We used a substantial number of agreements with customer, suppliers, and other organizations and people to reduce the amount of uncertainty	.839***
	We used pre-commitments from customers and suppliers as often as possible	.644
Summary Statistics: N = 143; X ² (59) = 122.509; p <.001; CFI = .911; RMR = .073; RMSEA = .058		
Construct	New Venture Performance	
	Items	First-order factor loadings
Performance	Please rate the performance of your venture over the last three years compared with that of your main competitors in each of the following (1=much inferior vs. 7=much superior):	
	Sales	.631***
	Profitability	.690
	Sales growth	.765
	Profit growth	.821
	Market share growth	.707
Summary Statistics: N = 143; X ² (5) = 8.534; p <.001; CFI = .925; RMR = .063; RMSEA = .074		

Construct	Control variable	
	Items	First-order factor loadings
	Please indicate the degree to which you agree or disagree with each of the following statements (1=not at all vs. 7=very much):	
Human capital	Employees have suitable education to fulfil their jobs successfully	.854***
	Employees hold suitable work experience for accomplishing their jobs successfully	.754***
	Employees are well-skilled professionally to accomplish their jobs successfully	.744***
Summary statistics: N = 143; X ² (2) = 5.533; p = .063; CFI = .983; RMR = .064; RMSEA = .061		

Construct	Control variable	
	Items	
	Please rate your venture's skill in the following area relative to your main competitors. In rating your venture's skills please focus on the past three years (1=much inferior vs. 7=much superior):	
Financial resources	Access to financial resources	

Construct	Control variable	
	Items	First-order factor loadings
	Please rate your venture's skill in the following area relative to your main competitors. In rating your venture's skills please focus on the past three years (1=much inferior vs. 7=much superior):	
Technological capabilities	Level of investment in applied R&D	.806***
	Skill to develop new products/services	.855***
	Ability to upgrade existing products/services	.793***
Summary statistics: N = 140; X ² (2) = 5.154; p = .076; CFI = 1.000; RMR = .031; RMSEA = .024		

All loadings significant at $p < .01$
 ***Loading fixed to 1 for identification purposes

Table A.3

Reliability and Convergent Validity Tests

	Construct reliability	Cronbach's alpha	Variance extracted
Experimentation	.782	.766	.458
Affordable loss	.801	.792	.467
Flexibility	.768	.747	.489
Pre-commitments	.708	.703	.559
New venture performance	.850	.846	.527
Human capital	.913	.819	.478
Technological capabilities	.778	.857	.439
Environmental uncertainty	.732	.802	.477

REFERENCES

- Agarwal, R. & Gort, M. (2002). Firm product life cycles and firm survival. *American Economic Review*, 92(2), 184–190.
- Aiken, L.S. & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Alvarez, S. & Busenitz, L. (2001). The entrepreneurship of resource based theory. *Journal of Management*, 27, 755–775.
- Ansoff, I. (1957). Strategies for diversification. *Harvard Business Review*, 35(5), 113–124.
- Arend, R., Saroogi, H., & Burkemper, A. (2015). Effectuation as ineffectual? Applying the 3E theory-assessment framework to a proposed new theory of entrepreneurship. *Academy of Management Review*, 40, 630–651.
- Asker, J., Farre-Mensa, J., & Ljungqvist, A. (2012). *Comparing the investment behavior of public and private firms*. Working paper. Cambridge, MA: National Bureau of Economic Research.
- Baysinger, B. & Hoskisson, R.E. (1989). Diversification strategy and R&D intensity in multiproduct firms. *Academy of Management Journal*, 32, 310–332.
- Berry, C.H. (1975). *Corporate growth and diversification*. Princeton, NJ: Princeton University Press.
- Bhidé, A. (2000). *The origin and evolution of new businesses*. New York: Oxford University Press.
- Blake, W. (1788). All religions are one. Copy A: Plate 1. London: Blake.
- Brettel, M., Mauer, R., Engelen, A., & Kupper, D. (2012). Corporate effectuation: Entrepreneurial action and its impact on R&D project performance. *Journal of Business Venturing*, 27(2), 167–184.
- Brinkmann, J., Grichnik, D., & Kapsa, D. (2010). Should entrepreneurs plan or just storm the castle? A meta-analysis on contextual factors impacting the business planning–performance relationship in small firms. *Journal of Business Venturing*, 25, 24–40.
- Carmeli, A. & Tishler, A. (2004). The relationship between intangible organizational elements and organizational performance. *Strategic Management Journal*, 25(13), 1257–1278.

- Caves, R.E., Porter, M.E., & Spence, A.M. (1980). *Competition in the open economy*. Cambridge, MA: Harvard University Press.
- Cesaroni, F. (2004). Technological outsourcing and product diversification: Do markets for technology affect firms' strategies? *Research Policy*, 33(10), 1547–1564.
- Chandler, G.N., DeTienne, D.R., McKelvie, A., & Mumford, T.V. (2011). Causation and effectuation processes: A validation study. *Journal of Business Venturing*, 26(3), 375–390.
- Chandler, G.N., DeTienne, D.R., & Mumford, T.V. (2007). Causation and effectuation: Measurement development and validation. *Frontiers of Entrepreneurship Research*, 27(13), article 3.
- Chandler, G.N. & Hanks, S.H. (1993). Measuring the performance of emerging businesses: A validation study. *Journal of Business Venturing*, 8, 391–408.
- Chandra, Y. & Yang, S. (2011). Managing disruptive innovation: Entrepreneurial strategies and tournaments for corporate longevity. *Journal of General Management*, 37(2), 23–50.
- Chang, S.C. & Wang, C.F. (2007). The effect of product diversification strategies on the relationship between international diversification and firm performance. *Journal of World Business*, 42(1), 61–79.
- Chang, S-J, van Witteloostuijn, A., & Eden, L. (2010). From the editors: Common method variance in international business research. *Journal of International Business Studies*, 47, 178–184.
- Chatterjee, S. & Wernerfelt, B. (1991). The link between resources and type of diversification: Theory and evidence. *Strategic Management Journal*, 12(1), 33–48.
- Chesbrough, H.W. (2010). Business model innovation: It's not just about technology anymore. *Strategy and Leadership*, 35, 12–17.
- Coad, A. & Guenther C. (2013). Diversification patterns and survival as firms mature. *Small Business Economics*, 42, 633–649.
- Corner, P.D. & Ho, M. (2010). How opportunities develop in social entrepreneurship. *Entrepreneurship Theory and Practice*, 34(4), 635–659.
- Darwin, C. (1859). *The origins of species*. London: John Murray, Albemarle Street.
- Delmar, F. & Shane, S. (2003). Does business planning facilitate the development of new ventures? *Strategic Management Journal*, 24(12), 1165–1186.
- Dew, N., Read, S., Sarasvathy, S.D., & Wiltbank, R. (2009). Effectual versus predictive logics in entrepreneurial decision-making: Differences between experts and novices. *Journal of Business Venturing*, 24(4), 287–309.
- Dimov, D. (2010). Nascent entrepreneurs and venture emergence: Opportunity confidence, human capital, and early planning. *Journal of Management Studies*, 47, 1123–1153.
- Fischer, E. & Reuber, A.R. (2011). Social interaction via new social media: (How) can interactions on Twitter affect effectual thinking and behavior? *Journal of Business Venturing*, 26(1), 1–18.
- Goll, I. & Sambharya, R.B. (1998). Rational model of decision-making, strategy and firm performance. *Scandinavian Journal of Management*, 14(4), 479–492.
- Gruber, M., MacMillan, I.C., & Thompson, J.D. (2008). Look before you leap: Market opportunity identification in emerging markets. *Management Science*, 54(9), 1652–1665.
- Hansen, M.T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232–248.

- Harmeling, S., Oberman, S., Venkataraman, S., & Stevenson, H.H. (2004). *That my neighbor's cow might live: Effectuation, entrepreneurship education and economic development in Croatia*. Paper Presented at the Babson Kauffman Entrepreneurship Research Conference, Glasgow, Scotland.
- Hashai, N. (2015). Within-industry diversification and firm performance-an S-shaped hypothesis. *Strategic Management Journal*, 36(9), 1378–1400.
- Hitt, M.A., Hoskisson, R.E., & Ireland, R.D. (1990). Mergers and acquisitions and managerial commitment to innovation in M-form firms. *Strategic Management Journal*, 11 (Special Issue), 29–47.
- Hitt, M.A., Ireland, R.D., Camp, M., & Sexton, D.L. (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal*, 22, 479–491.
- Hitt, M.A., Ireland, R.D., & Lee, H. (2000). Technological learning, knowledge management, firm growth and performance. *Journal of Engineering and Technology Management*, 17, 231–246.
- Hofstede, G., Hofstede, G.J., & Minkov, M. (2010) *Cultures and organizations: Software of the mind* (revised and expanded 3rd ed.). New York: McGraw-Hill.
- Huber, G.P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science*, 2(1), 88–115.
- Iacobucci, D. & Rosa, P. (2005). Growth, diversification, and business group formation in entrepreneurial firms. *Small Business Economics*, 25, 65–82.
- Ireland, R.D. & Webb, J.W. (2007). A multi-theoretic perspective on trust and power in strategic supply chain. *Journal of Operations Management*, 25(2), 482–497.
- Knight, F. (1921). *Risk, uncertainty, and profit*. New York: Harper and Row.
- Kogut, B. (1984). Normative observations on the international value-added chain and strategic groups. *Journal of International Business Studies*, 15(2), 151–167.
- Kogut, B. & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383–397.
- Kumar, M.V.S. (2009). The relationship between product and international diversification: The effects of short-run constraints and endogeneity. *Strategic Management Journal*, 30, 99–116.
- Kumar, N., Stern, L.W., & Anderson, J.C. (1993). Conducting inter-organizational research using key informants. *Academy of Management Journal*, 36(6), 1633–1651.
- Lei, D., Hitt, M.A., & Bettis, R. (1996). Dynamic core competences through meta-learning and strategic context. *Journal of Management*, 22(4), 549–569.
- Levie, J. (1997). Patterns of growth and performance: An empirical study of young, growing ventures in France, Ireland and Scotland. *Frontiers of Entrepreneurship*, 419–443.
- Lichtenstein, B.B., Dooley, K.J., & Lumpkin, G.T. (2006) Measuring emergence in the dynamics of new venture creation. *Journal of Business Venturing*, 21, 153–175.
- Loch, C.H., Solt, M.E., & Bailey, E.M. (2008). Diagnosing unforeseeable uncertainty in a new venture. *Journal of Product Innovation Management*, 25(1), 28–46.
- MacKenzie, S.B., Podsakoff, P.M., & Jarvis, C.B. (2005). The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions. *Journal of Applied Psychology*, 90(4), 710–730.

- Markides, C.C. & Williamson, P.J. (1994). Related diversification, core competences and corporate performance. *Strategic Management Journal*, 15(2), 149–154.
- Matsusaka, J.G. (2001). Corporate diversification, value maximization, and organizational capabilities. *Journal of Business*, 74(3), 409–431.
- Matusik, S.F. & Fitza, M.A. (2012). Diversification in the venture capital industry: Leveraging knowledge under uncertainty. *Strategic Management Journal*, 33(4), 407–426.
- McGrath, R.G. (1995). Advantage from adversity: Learning from disappointment in internal corporate ventures. *Journal of Business Venturing*, 10(2), 121–133.
- Miller, D. & Droge, C. (1986). Psychological and traditional determinants of structure. *Administrative Science Quarterly*, 31, 539–560.
- Minniti, M. & Bygrave, W. (2001). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory and Practice*, 25(3), 5–16.
- Mishina, Y., Pollock, T.G., & Porac, J.F. (2004). Are more resources always better for growth? Resource stickiness in market and product expansion. *Strategic Management Journal*, 25(12), 1179–1197.
- Morse, E., Fowler, S., & Lawrence, T. (2007). The impact of virtual embeddedness on new venture survival: Overcoming the liability of newness. *Entrepreneurship Theory and Practice*, 31, 139–159.
- Mosakowski, E. (1997). Strategy making under causal ambiguity: Conceptual issues and empirical evidence. *Organization Science*, 8(4), 414–442.
- Nayyar, P.R. (1992). On the measurement of corporate diversification strategy: Evidence from large U.S. service companies. *Strategic Management Journal*, 13(3), 219–235.
- Netter, J., Kutner, M.H., Nachtsheim, C.J., & Wasserman, W. (1996). Building the regression model: II. Diagnostics. In J. Irwin (Ed.), *Applied linear statistical models* (pp. 385–392). Chicago, IL: McGraw-Hill.
- Ng, D.W. (2007). A modern resource based approach to unrelated diversification. *Journal of Management Studies*, 44(8), 1481–1502.
- Nicholls-Nixon, C.L., Cooper, A.C., & Woo, C.Y. (2000). Strategic experimentation: Understanding change and performance in new ventures. *Journal of Business Venturing*, 15, 493–521.
- Pehrsson, A. (2006). Strategy antecedents of modes of entry into foreign markets. *Journal of Business Research*, 61(2), 132–140.
- Peng, M.W., Lee, S.-H., & Wang, D.Y.L. (2005). What determines the scope of the firm over time? A focus on institutional relatedness. *Academy of Management Review*, 30(3), 622–633.
- Penrose, E.T. (1959). *The theory of the growth of the firm*. New York: Wiley.
- Perry, J., Chandler, G.N., & Markova, G. (2012). Entrepreneurial effectuation: A review and suggestions for future research. *Entrepreneurship Theory and Practice*, 36, 837–861.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Podsakoff, P.M., MacKenzie, S.B., & Podsakoff, N.P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63(1), 539–569.

- Podsakoff, P.M. & Organ, D.W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12, 69–82.
- Qian, G. (2002). Multinationality, product diversification, and profitability of emerging U.S. small- and mediumsized enterprises. *Journal of Business Venturing*, 17, 611–633.
- Read, S., Song, M., & Smit, W. (2009). A meta-analytic review of effectuation and venture performance. *Journal of Business Venturing*, 24(6), 573–587.
- Richardson, H.A., Simmering, M.J., & Sturman, M.C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, 12(4), 762–800.
- Robertson, P.L. & Langlois, R.N. (1995). Innovation, networks, and vertical integration. *Research Policy*, 24(4), 543–562.
- Rosa, P. (1998). Entrepreneurial processes of business cluster formation and growth by “habitual” entrepreneurs. *Entrepreneurship Theory and Practice*, 22(4), 43–61.
- Rosenkopf, L. & Nerkar, A. (2001). Beyond local search: Boundary-spanning, exploration and impact in the optical disk industry. *Strategic Management Journal*, 22(4), 287–306.
- Sanchez, R. (1995). Strategic flexibility in product competition. *Strategic Management Journal*, 16(1, Special Issue), 135–159.
- Sanchez, R. (1997). Preparing for an uncertain future: Managing organizations for strategic flexibility. *International Studies of Management and Organization*, 27(2), 71–94.
- Sapienza, H.J., Autio, E., George, G., & Zahra, S.A. (2004). A capabilities perspective on the effects of early internationalization on firm survival and growth. *Academy of Management Review*, 31(4), 914–933.
- Sarasvathy, S. (2008). *Effectuation: Elements of entrepreneurial expertise*. Northampton, MA: Edward Elgar Publishing.
- Sarasvathy, S., Kumar, K., York, J.G., & Bhagavatula, S. (2014). An effectual approach to international entrepreneurship: Overlaps, challenges and provocative possibilities. *Entrepreneurship Theory and Practice*, 38(1), 71–93.
- Sarasvathy, S.D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243–288.
- Sarasvathy, S.D. (2014). Making it happen: Beyond theories of the firm to theories of firm design. *Entrepreneurship Theory and Practice*, 28(6), 519–531.
- Sarasvathy, S.D. & Dew, N. (2005). Entrepreneurial logics for a technology of foolishness. *Scandinavian Journal of Management*, 21, 385–406.
- Sarasvathy, S.D. & Kotha, S. (2001). Dealing with Knightian uncertainty in the new economy: The real networks case. In J. Butler (Ed.), *Research on management and entrepreneurship* (pp. 31–62). Greenwich, CT: IAP Inc.
- Schumpeter, J. (1934). *Capitalism, socialism, and democracy*. New York: Harper and Row.
- Schwenk, C.R. (1988). The cognitive perspective on strategic decision making. *Journal of Management Studies*, 25(1), 41–55.
- Shepherd, D.A., Williams, T.A., & Patzelt H. (2015). Thinking about entrepreneurial decision making: Review and research agenda. *Journal of Management*, 41(1), 11–46.

- Silverman, B.S. (1999). Technological resources and the direction of corporate diversification: Toward an integration of the resource-based view and transaction-cost economics. *Management Science*, 45(8), 1109–1124.
- Spanos, Y. & Lioukas, S. (2001). An examination into the causal logic of rent generation: Contrasting Porter's competitive strategy framework and the resource-based view perspective. *Strategic Management Journal*, 22(10), 907–934.
- Stinchcombe, A.L. (1965). Social structure and organizations. In: J.G. March (Ed.), *Handbook of organizations* (pp. 142–193). Chicago, IL: Rand McNally & Company.
- Stuart, T.E., Hoang, H., & Hybels, R.C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*, 44(2), 315–349.
- Tallman, S. & Li, J. (1996). Effects of international diversity and product diversity on the performance of multinational firms. *Academy of Management Journal*, 39(1), 179–196.
- Tanriverdi, H. & Venkatraman, N. (2005). Knowledge relatedness and the performance of multibusiness firms. *Strategic Management Journal*, 26, 97–119.
- Thomke, S. (2002). *Experimentation matters*. Boston: Harvard Business School Press.
- Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal*, 44(5), 996–1004.
- Tsai, W.M.H., MacMillan, I.C., & Low, M.B. (1991). Effects of strategy and environment on corporate venture success in industrial markets. *Journal of Business Venturing*, 6(1), 9–28.
- Van Mieghem, J.A. (2007). Risk mitigation in newsvendor networks: Resource diversification, flexibility, sharing and hedging. *Management Science*, 53(8), 1269–1288.
- Vera, D. & Crossan, M. (2005). Improvisation and innovative performance in teams. *Organization Science*, 16, 203–224.
- Wan, W.P. (2005). Country resource environments, firm capabilities, and corporate diversification strategies. *Journal of Management Studies*, 42(1), 161–182.
- Wang, H.C. & Barney, J.B. 2006. Employee incentives to make firm—Specific investments: Implications for resource-based theories of corporate diversification. *Academy of Management Review*, 31, 466–476.
- Wernerfelt, B. & Karnani, A. (1987). Competitive strategy under uncertainty. *Strategic Management Journal*, 8, 187–194.
- Wiltbank, R., Dew, N., Read, S., & Sarasvathy, S.D. (2006). What to do next? The case for non-predictive strategy. *Strategic Management Journal*, 27(10), 981–998.
- Wiltbank, R., Read, S., Dew, N., & Sarasvathy, S.D. (2009). Prediction and control under uncertainty: Outcomes in angel investing. *Journal of Business Venturing*, 24, 116–133.
- Wiltbank, R.E. & Sarasvathy, S.D. (2010). *What effectuation is not: Further development of an alternative to rational choice*. Academy of Management Conference, Montreal Canada.
- Xie, X. & O'Neill, H.M. (2015). Learning and product entry: How diversification patterns differ over firm age and knowledge domains in U.S. generic drug industry. *Strategic Management Journal*, 35(3), 440–449.

Zahra, S., Ireland, R., & Hitt, M.A. (2000). International expansion by new venture firms: International diversity, mode of market entry, technological learning, and performance. *Academy of Management Journal*, 43, 925–950.

Zahra, S.A., Neubaum, D.O., & El-Hagrassey, G.M. (2002). Competitive analysis and new venture performance: Understanding the impact of strategic uncertainty and new venture origin. *Entrepreneurship Theory and Practice*, 27(1), 1–28.

Zahra, S.A., Neubaum, D.O., & Larraneta, B. (2007). Knowledge sharing and technological capabilities: The moderating role of family involvement. *Journal of Business Research*, 60(10), 1070–1079.

Ioanna Deligianni is a postdoctoral researcher of strategy and entrepreneurship at the Athens University of Economics and Business, Athens, Greece.

Irini Voudouris is an associate professor of strategy and entrepreneurship at the Athens University of Economics and Business, Athens, Greece.

Spyros Lioukas is an emeritus professor of strategy at the Athens University of Economics and Business, Athens, Greece.