J PROD INNOV MANAG 2008;25:7–27

THE JOURNAL OF
PRODUCT
INNOVATION
MANAGEMENT

Success Factors in New Ventures: A Meta-analysis*

Michael Song, Ksenia Podoynitsyna, Hans van der Bij, and Johannes I. M. Halman

Technology entrepreneurship is key to economic development. New technology ventures (NTVs) can have positive effects on employment and could rejuvenate industries with disruptive technologies. However, NTVs have a limited survival rate. In our most recent empirical study of 11,259 NTVs established between 1991 and 2000 in the United States, we found that after four years only 36 percent, or 4,062, of companies with more than five full-time employees, had survived. After five years, the survival rate fell to 21.9 percent, leaving only 2,471 firms still in operation with more than five full-time employees. Thus, it is important to examine how new technology ventures can better survive. In the academic literature, a number of studies focus on success factors for NTVs. Unfortunately, empirical results are often controversial and fragmented. To get a more integrated picture of what factors lead to the success or failure of new technology ventures, we conducted a meta-analysis to examine the success factors in NTVs. We culled the academic literature to collect data from existing empirical studies. Using Pearson correlations as effect size statistics, we conducted a meta-analysis to analyze the findings of 31 studies and identified the 24 most widely researched success factors for NTVs. After correcting for artifacts and sample size effects, we found that among the 24 possible success factors identified in the literature, 8 are homogeneous significant success factors for NTVs (i.e., they are homogeneous positive significant metafactors that are correlated to venture performance): (1) supply chain integration; (2) market scope; (3) firm age; (4) size of founding team; (5) financial resources; (6) founders' marketing experience; (7) founders' industry experience; and (8) existence of patent protection. Of the original 24 success factors, 5 were not significant: (1) founders' research and development (R&D) experience; (2) founders' experience with startups; (3) environmental dynamism; (4) environmental heterogeneity; and (5) competition intensity. The remaining 11 success factors are heterogeneous. For those heterogeneous success factors, we conducted a moderator analysis. Of this set, three appeared to be success factors, and two were failure factors for subgroups within the NTVs' population. To facilitate the development of a body of knowledge in technology entrepreneurship, this study also identifies high-quality measurement scales for future research. The article concludes with future research directions.

Address correspondence to: Michael Song, 318 Bloch School, University of Missouri–Kansas City, 5100 Rochhill Road, Kansas City, MO 64110-2499. Tel.: (816) 235-5841. Fax: (816) 235-6529. E-mail: songmi@umkc.edu.

* The authors wish to acknowledge the financial supports provided by the Ewing Marion Kauffman Foundation and the Institute for Entrepreneurship and Innovation at the University of Missouri–Kansas City. This manuscript was processed and accepted by Anthony Di Benedetto, editor of the *Journal of Product Innovation Management*.

Introduction

Technology entrepreneurship is key to economic development. New technology ventures (NTVs) can have positive effects on employment and could rejuvenate industries with disruptive

BIOGRAPHICAL SKETCHES

Dr. Michael Song holds the Charles N. Kimball, MRI/Missouri Endowed Chair in Management of Technology and Innovation and is professor of marketing in the Bloch School at the University of Missouri–Kansas City. He also serves as advisory research professor of innovation management and is a research fellow of Eindhoven Centre for Innovation Studies (ECIS) at Eindhoven University of Technology in the Netherlands. Dr. Song received an M.S. from Cornell University and an M.B.A. and Ph.D. in business administration from the Darden School at the University of Virginia. He has conducted research and consulted with more than 300 major multinational companies and government agencies. Dr. Song's current research interests include knowledge management, technology entrepreneurship, valuation of new ventures and emerging technologies, risk assessment, methods for measuring values of technology and research and development (R&D) projects, and technology portfolio management. Based on a dataset consisting of more than 3,000 new technologies development and commercialization, he has developed several global 'benchmark models' of new product development process designs. He has also developed a technology risk assessment model and option approach to evaluate new technologies and start-up companies.

Ksenia Podoynitsyna is a doctoral candidate in the subdepartment of organization science and marketing within the Department of Technology Management at Eindhoven University of Technology in the Netherlands. She received her M.Sc. (cum laude) in financial management at Moscow Aviation Institute (Technical University). Her master's thesis focused on Monte-Carlo simulations in risk evaluation of software implementation projects. Her Ph.D. thesis combines strategic management and entrepreneurial cognition perspectives on risk taking in new technology ventures. Her current research interests include risk and uncertainty management, entrepreneurial cognition, and creativity templates in new product development and business models of technology ventures.

Dr. Hans van der Bij is assistant professor in the subdepartment of organization science and marketing within the Department of Technology Management at Eindhoven University of Technology (TUE) in the Netherlands. He studied applied mathematics at Groningen State University and got his Ph.D. from TUE on the subject of manpower planning. His current research interests include innovation and knowledge management in high-technology firms as well as entrepreneurial cognition in high-tech start-ups. He is fellow of the research institute Eindhoven Centre for Innovation Studies (ECIS) at TUE and was visiting associate professor at the University of Washington in 2001. He has published several books and articles in quality management, knowledge management, and business research methods.

Dr. Johannes I. M. Halman is professor at the University of Twente in the Department of Construction Management and Engineering. He earned an M.Sc. in construction engineering from Delft University of Technology in the Netherlands, an M.B.A. (cum laude) from Rotterdam School of Management at Erasmus University in the Netherlands, and a Ph.D. in technology management from Eindhoven University of Technology in the Netherlands. His research interests are in the field of innovation management with primary focus on program and project management of innovation processes, new product platform development, and high-tech start-ups. He specializes in the area of risk management. He has advised international firms, such as Philips Electronics and Unilever, on the implementation of risk management strategies within their innovation processes.

technologies (Christensen and Bower, 1996). Unfortunately, the survival rate of NTVs is the lowest among new ventures in general. To examine the survival rates of new ventures, we conducted a longitudinal analysis of 11,259 new technology ventures established between 1991 and 2000 in the United States. Our empirical results reveal that after four years only 36 percent (or 4,062) of companies with more than five full-time employees had survived. After five years, the survival rate fell to 21.9 percent, leaving only 2,471 firms with more than five full-time employees still in operation.

Why Is This Research Important?

Given the high failure rate of NTVs, it is important to identify what factors lead to the success and failure of these ventures. Current academic literature, however, does not offer much insight. Numerous studies focus on success factors for new technology ventures, but the empirical results are often controversial and fragmented. For example, the data on research and development (R&D) investments alone yield ambivalent conclusions. Though Zahra and Bogner (2000) found no significant relationship between R&D expenses and NTV performance, Bloodgood, Sapienza, and Almeida (1996) found a negative relationship, and Dowling and McGee (1994) found a positive relationship between R&D investments and NTV performance. Similarly, although NTVs often develop knowledge-intensive products and services (OECD, 1997), the research results on product innovativeness have been ambiguous. More than two thirds of the empirical studies have found a positive relationship between product innovation and firm performance, whereas the remaining studies have found a negative relationship or none at all (Capon, Farley, and Hoenig, 1990; Li and Atuahene-Gima, 2001).

The inconsistent and often contradictory results can stem from methodological problems, different study design, different measurements, omitted variables in the regression models, and noncomparable samples. To help resolve this problem, this study looked for a method that would operate independently of model composition. Meta-analysis provides a solution (Hunter and Schmidt, 1990, 2004) and a lens through which the success factors that contribute to NTVs' performance can be evaluated. The meta-analysis of this study was based on studies that explicitly focus on antecedents of NTV performance.

This article attempts to make several contributions to technology entrepreneurship literature:

(1) The study's integrated quantitative evaluation of the success factors of new technology ventures provides one step toward developing an integrated theoretical foundation for technology entrepreneurship.
(2) It identifies universal success factors.
(3) It identifies success factors that are controversial and, by moderator analysis, offers some tentative reasons for those controversies.
(4) It reports existing high-quality scales of constructs that are important for NTV performance.
(5) It proposes and provides a new theoretical framework for studying success factors of technology ventures and a roadmap for future research in technology entrepreneurship.

This article is organized in the following manner. First, the data collection and methodology are explained. Then the results of the research are presented, including the results of the meta-analysis, examples of high-quality scales, and the conclusions and implications. The article concludes with a description of its limitations and future research directions.

Data Collection and Methodology

Meta-analysis is a statistical research integration technique (Hunter and Schmidt, 1990). One aspect that clearly differentiates it from narrative reviews is its quantitative character. Unlike primary research, in a meta-analysis the data analyzed consist of the findings from previous empirical studies (Camisón-Zornoza et al., 2004). Just as empirical research requires the use of statistical techniques to analyze its data, meta-analysis applies statistical procedures that are specifically designed to integrate the results of a set of primary empirical studies. This allows meta-analysis to pool all the existing literature on a given topic, not only the most influential and best-known studies (Stewart and Roth, 2001, 2004). At the same time, meta-analysis compensates for quality differences by correcting for different artifacts and sample sizes (Hunter and Schmidt, 1990, 2004).

There are two main types of meta-analytic studies in the literature. The first focuses on a relationship between two variables or a change in one variable across different groups of respondents. In general, this type of meta-analysis is strongly guided by one or two theories (e.g., Palich, Cardinal, and Miller, 2000; Stewart and Roth, 2001, 2004). The second type of meta-analytic studies examines a large number of metafactors related to one particular focal construct, such as performance. Such meta-analyses aim to integrate all the existing research on that focal construct and are largely atheoretical because the research they combine rests on heterogeneous theoretical grounds (e.g., Gerwin and Barrowman, 2002; Montoya-Weiss and Calantone, 1994). Because the current literature teems with numerous theoretical streams where only the setting (new firms) is the common denominator (Shane and Venkataraman, 2000), the decision was made to focus on the second type of meta-analysis to study the potential success metafactors of NTV performance. Studies were collected that explicitly focused on antecedents of NTVs' performance.

The present study explores—rather than defines—what *new technology venture* means in the literature. Primary studies use such terms as *new*, *adolescent*, *young*, or *emergent* to define the *new* axis and *high technology*, *technology-intensive*, and *technology-based* to describe the *technology* domain. We examined past research studies where the majority of the sample represented such new technology ventures. In general, the primary studies set the maximum age for NTVs at 15 years, yet most primary studies selected cut-off values of 6 and 8 years. Another important selection criterion was the publication of the correlation matrix in the article, because the correlation matrices serve as the main input for the meta-analysis. All the collected studies investigated surviving NTVs; consequently, this meta-analysis does not consider failures.

Meta-analysis allows the comparison of different empirical studies with similar characteristics and thus lets researchers integrate the results. To conduct a meta-analysis it is important to select studies as input for the analysis and to follow a meta-analytical protocol to arrive at those results.

Select Studies as Input for the Analysis

First, the literature was combed for research that discussed the success factors of NTVs, using the ABI-INFORM system and the Internet. Keywords *new*, *adolescent*, *young*, *emerging and high-tech*, *technology*, *technology-intensive*, and *technology-based* were used to limit the sample's age and domain. Finally, to assess the type of firm, the keywords *firm, venture,* and *start-up* were applied. The studies intentionnally

were not limited to those recognized as the best in the field, as usually done in a narrative review: This would have betrayed the spirit of meta-analysis (Hunter and Schmidt, 1990). Instead, there was as much research as possible collected, corrected later for any quality differences, and controlled for missing studies.

After articles were gathered from ABI-INFORM and the Internet, cross-referenced studies were added from them. In total, 106 studies were collected that met the search criteria. Next, an effort was made to ensure that the articles on the list (1) represented the correct level of analysis, (2) significantly reflected NTVs, and (3) reported a correlation matrix with at least one antecedent of performance and one performance measure. This procedure reduced the number of appropriate research studies to 31 due to the absence of correlation matrices. Appendix 1 details the study sample by countries of origin, industries, performance measures, the minimum and maximum ages of the ventures, and their sample sizes. In addition, two other features are provided. First, ''sample type'' indicates the particular characteristics of the sample. This may be NTVs that went through initial public offering (IPO), ventures funded by venture capital (VC), ventures from a general database of NTVs, NTVs involved in a governmental support program, internationalizing NTVs that have activity abroad, or combinations of these types. Second, ''venture origin'' indicates whether the venture was actually independent. Although the study's meta-analysis focused primarily on independent ventures, it also included mixed samples of independent and corporate ventures, where most were independent, and samples where the type of venture was not specified. Appendix 2 lists the journals from which the 31 articles originate.

When coding the studies, care was taken to refer to the scales reported in the primary studies so that dissimilar elements would not be combined inappropriately and so that conceptually similar variables would not be coded separately to compensate for the slightly different labels that authors use to refer to similar constructs (Henard and Szymanski, 2001).

Protocol for Meta-analysis

We used Hunter and Schmidt's (1990) protocol for the study's meta-analysis. The most important consideration was to the ability to make comparisons across research studies. To do this, the research could draw on Pearson correlations between a metafactor and the dependent variable or the regression coefficient between the metafactor and the dependent variable. Because regression coefficients depend on the particular variables included into the model and because the models vary across studies, the suggestions of Hunter and Schmidt (1990) were followed. Hunter and Schmidt strongly encourage using Pearson correlations as the input, because correlations between two variables are independent of the other variables in the model. Other meta-analytic studies have made this choice, including Gerwin and Barrowman (2002) and Montoya-Weiss and Calantone (1994).

Another advantage of Hunter and Schmidt's method (1990) is their use of random effects models instead of fixed effects models (Hunter and Schmidt, 2004, p. 201). The distinction is as follows: Fixed effects models assume that exactly the same ''true'' correlation value between metafactor and dependent variable underlies all studies in the meta-analysis, whereas random effects models allow for the possibility that population parameters vary from study to study. Given the differences in how NTVs were defined in the selected primary studies, the choice for random effects models was appropriate.

Following the procedure of Hunter and Schmidt (1990), the second step was to correct metafactors for dichotomization, sample size differences, and measurement errors.

First, to correct dichotomized metafactors, a conservative correction was made by dividing the observed correlation coefficient of the sample by 0.8, because dichotomization reduces the real correlation coefficient by at least 0.8 (Hunter and Schmidt, 1990, 2004). Thus, individual correction of observed correlations for dichotomization is as follows:

$$r_{o_i} = \frac{r_{oo_i}}{a_d},$$

where a_d is the correction for dichotomization; a_d is 0.8 if variable is dichotomized and a_d is 1 if it is not; and r_{ooi} is the observed correlation of the primary study i.

Second, to correct sampling error, the sample correlation was weighted by sample size (Hunter and Schmidt, 1990, 2004). The formula for the weighted average of correlations corrected for sample size is

$$\overline{r_o} = \frac{\sum_{i=1}^{n} N_i r_{o_i}}{\sum_{i=1}^{n} N_i},$$

where N_i is the sample size of the primary study i.

Third, to remedy measurement errors, Cronbach's alphas were used. The correlation coefficient was divided by the product of the square root of the reliability of the metafactor and the square root of the reliability of performance. Since reliabilities were not always reported, they were reconstructed by using the reliability distribution (Hunter and Schmidt, 1990, 2004).

Thus, the formula for real population correlation is

$$\rho = \frac{\overline{r_o}}{\overline{A}} = \frac{\overline{r_o}}{\overline{\sqrt{R_{xx}}} * \overline{\sqrt{R_{yy}}}},$$

where $\overline{A}$ is the compound reliability correction factor; $\overline{\sqrt{R_{xx}}}$ is the average of the square roots of reliabilities of independent variables composing a given metafactor; and $\overline{\sqrt{R_{yy}}}$ is the average of the square roots of reliabilities of dependent variables composing a given metafactor.

The third step in the meta-analysis protocol was to determine whether a metafactor was a success factor. To accomplish this, three conditions were assessed. First, the studies should have, in essence, the same correlation. Other meta-analysis procedures often use a chi-square test to reveal this homogeneity. However, Hunter and Schmidt (1990, 2004) argue against it and state that this test will have a bias because of uncorrected artifacts. They suggest a variance-based test. The total variance in the correlation coefficient has three sources: variance due to artifacts (dichotomization and measurement errors), variance due to sampling error, and real variance due to heterogeneity of the metafactor. The metafactor is assumed to be homogeneous, if the real variance is no more than 25 percent of the total variance. According to Hunter and Schmidt (1990, 2004), in that case unknown and uncorrected artifacts account for these 25 percent so that the real variance is actually close to zero. The formulas used are described in Appendix 3.

For homogeneous metafactors, two significance tests were applied. First, it was determined whether the whole confidence interval (based on the real standard deviation) was above zero. Second, if it was above zero, the *p*-value was calculated for the real correlation to estimate the degree of significance. Both of these significance tests are necessary because the *p*-value is misleading when part of the confidence interval of the real correlation is below zero. Only when all three conditions held was a given metafactor considered to be a success metafactor for NTVs.

For those heterogeneous metafactors, a moderator analysis was conducted. The data were divided into subgroups according to various methodological characteristics (Appendix 1). Then, a separate meta-analysis was conducted for each subgroup, with the hope of finding homogeneous metafactors in the subgroup in two steps. First, moderator analysis was conducted to deal with different performance measures. Second, attention was given as to whether country, industry, sample type, venture origin, or maximum age of the NTVs in the sample were possible moderators. Third, moderator analysis was conducted for different metafactor measures.

Finally, the "file drawer" was reviewed in an attempt to assess any publication bias. Because there is a general tendency to publish only significant results, insignificant results are often abandoned in researchers' file drawers (Hunter and Schmidt, 1990; Rosenthal, 1991). This file drawer technique provides a number, X_S, indicating the number of null-result studies that when added would make the total significance of a metafactor exceed the critical level of 0.05. Thus, the higher the value of X_S, the more stable and reliable the results are. If X_S is 0, it indicates that the metafactors are already insignificant according to the *p*-value criterion.

Analysis and Results

Success Factors of Technology Ventures

The study's meta-analysis revealed 24 metafactors related to the performance of NTVs. The definitions of these metafactors are presented in Table 1.

Table 2 reports the meta-analytic results on the antecedents, or the success metafactors of NTVs' performance. To be concise and to limit the sensitivity of the results to studies not included in our meta-analysis, Table 2 presents only the metafactors found in three or more research studies. The table presents ρ, an estimate of the real population correlation; total N, the aggregate sample size; and K, the number of correlations that build a given metafactor. Both N and K are conservative: Each study was counted only once. The spread of the real correlation variance is 95 percent confidence interval. X_S is the critical number of null-results studies.

To make the analysis of the metafactors more transparent and interpretable, appropriate categories grounded in the literature's existing frameworks were generated (Chrisman, Bauerschmidt, and Hofer, 1998; Gartner, 1985; Timmons and Spinelli, 2004): (1) market and opportunity; (2) the entrepreneurial team; and

Table 1. Definitions of the 24 Meta-factors

Meta-factors	Definitions	Selected References
Market and Opportunity		
1. Competition Intensity	Strength of interfirm competition within an industry	Chamanski and Waagø (2001)
2. Environmental Dynamism	High pace of changes in the firm's external environment	Zahra and Bogner (2000)
3. Environmental Heterogeneity	Perceived diversity and complexity of the firm's external environment	Zahra and Bogner (2000)
4. Internationalization	Extent to which a firm is involved in cross-border activities	Bloodgood, Sapienza, and Almeida (1996)
5. Low-Cost Strategy	Extent to which a firm uses cost advantages as a source of competitive advantage	Bloodgood, Sapienza, and Almeida (1996)
6. Market Growth Rate	Extent to which average firm sales in the industry increase	Bloodgood, Sapienza, and Almeida (1996); Lee, Lee, and Pennings (2001)
7. Market Scope	Variety in customers and customer segments, their geographic range, and the number of products	Li (2001); Marino and De Noble (1997)
8. Marketing Intensity[a]	Extent to which a firm is pursuing a strategy based on unique marketing efforts	Li (2001)
9. Product Innovation[a]	Degree to which new ventures develop and introduce new products or services	Li (2001)
Entrepreneurial Team		
10. Industry Experience	Experience of the firm's management team in related industries and markets	Marino and De Noble (1997)
11. Marketing Experience	Experience of the firm's management team in marketing	McGee, Dowling, and Megginson (1995); Marino and De Noble (1997)
12. Prior Start-Up Experience	Experience of the firm's management team in previous start-up situations	Marino and De Noble (1997)
13. R&D Experience	Experience of the firm's management team in R&D	McGee, Dowling, and Megginson (1995); Marino and De Noble (1997)
Resources		
14. Financial Resources	Level of financial assets of the firm	Robinson and McDougall (2001)
15. Firm Age	Number of years a firm has been in existence	Zahra et al. (2003)
16. Firm Size	Number of the firm's employees	Zahra et al. (2003)
17. Firm Type	The type of a firm's ownership (corporate ventures or independent ventures)	Zahra et al. (2003)
18. Nongovernmental Financial Support	Financial sponsorship from commercial institutes	Lee, Lee, and Pennings (2001)
19. Patent Protection	Availability of firm's patents protecting product or process technology	Marino and De Noble (1997)
20. R&D Alliances	The firm's use of R&D cooperative arrangements; for NTVs they also correspond to horizontal alliances	Zahra and Bogner (2000); McGee, Dowling, and Megginson (1995)
21. R&D Investment	Intensity of the firm's investment in internal R&D activities	Zahra and Bogner (2000)
22. Size of Founding Team	Size of the management team of the firm	Chamanski and Waagø (2001)
23. Supply Chain Integration	A firm's cooperation across different levels of the value-added chain (e.g., suppliers, distribution channel agents, or customers)	George et al. (2001); George, Zahra, and Wood (2002); McDougall et al. (1994)
24. University Partnerships	The firm's use of cooperative arrangement with universities	Zahra and Bogner (2000); Chamanski and Waagø (2001)

[a] These two factors are called marketing differentiation and product differentiation in the stream of research stemming from the work of Porter (1980).

(3) resources. After three researchers reviewed those categories for completeness and appropriateness, content analysis was conducted, a classification technique that assigns variables to a particular category. Two researchers independently assigned each variable to a category. The two researchers agreed on variables' categorizations in 91.2 percent of the cases across 306 variables. A third researcher resolved any disagreements, making the final categorization. At the same time, variables were combined to form metafactors.

Reflecting the primary studies, the market and opportunity category typically described either the

Table 2. Results of the Meta-analysis[a]

Metafactor	Total N	K	ρ	95% Confidence Interval	Explained Variance (%)[b]	Moderators	X_S
Market and Opportunity							
1 Competition Intensity	634	7	0.01		100		0
2 Environmental Dynamism	637	5	0.05		100		0
3 Environmental Heterogeneity	287	3	0.10		100		0
4 Internationalization	523	7	0.08(*)	(−0.21,0.37)	38	Yes	6
5 Low Cost Strategy	286	4	0.18(**)	(−0.13,0.49)	70	Yes	10
6 Market Growth Rate	505	4	0.23(***)	(−0.26,0.72)	16	Yes	12
7 Market Scope	1,046	10	0.21***		100		78
8 Marketing Intensity	622	6	0.42(***)	(−0.19,1.00)	23	Yes	64
9 Product Innovation	702	8	0.04	(−0.48,0.56)	55	Yes[c]	0
Entrepreneurial Team							
10 Industry Experience	423	4	0.11*		100		2
11 Marketing Experience	381	3	0.11*		100		2
12 Prior Start-Up Experience	114	3	0.00		100		0
13 R&D Experience	329	3	0.09		100		0
Resources							
14 Financial Resources	638	6	0.12**		100		14
15 Firm Age	1,890	15	0.16***	(0.08,0.23)	87		157
16 Firm Size	1,360	11	0.26(***)	(−0.31,0.83)	10	Yes	197
17 Firm Type	715	4	0.09	(−0.15,0.33)	31	Yes[c]	0
18 Nongovernmental Financial Support	405	4	0.20(***)	(−0.15,0.55)	31	Yes	16
19 Patent Protection	453	5	0.11*		100		1
20 R&D Alliances	571	5	0.03	(−0.52,0.58)	31	Yes[c]	0
21 R&D Investments	863	9	0.05(*)	(−0.49,0.60)	19	Yes	3
22 Size of Founding Team	332	5	0.13**		100		6
23 Supply Chain Integration	604	6	0.23***	(0.12,0.35)	89		41
24 University Partnerships	330	3	−0.04	(−0.25,0.17)	50	Yes	0

[a] For all p-values, one-tailed test statistic; direction depends on the sign of ρ;
[b] Explained variance lower than 75% means that the metafactor has moderators.
[c] See Table 3 for suggested moderators.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

market characteristics, such as environmental dynamism, environmental heterogeneity, and competitive strategies based on Porter's (1980) typology. The entrepreneurial team category encompassed characteristics of the NTV team, including experience and capabilities, both as individuals and as a team. The resources category united a broad scope of factors, comprising resources, capabilities, and characteristics of the NTVs as firms. Such resources included financial resources, firm size, patents, and university partnerships.

The metafactors were unevenly distributed across the three categories. The majority fell into the resources category and the smallest number into the entrepreneurial team category. The resources category consisted of heterogeneous metafactors for 55 percent and the market and opportunity category for 56 percent. Only the entrepreneurial team category was completely homogeneous.

Results in Table 2 reveal eight universal success factors (i.e., they are homogeneous positive significant metafactors that are correlated to venture performance):

(1) Supply chain integration ($\rho = 0.23$, $p < .001$)
(2) Market scope ($\rho = 0.21$, $p < .001$)
(3) Firm age ($\rho = 0.16$, $p < .001$)
(4) Size of founding team ($\rho = 0.13$, $p < .01$)
(5) Financial resources ($\rho = 0.12$, $p < .01$)
(6) Marketing experience ($\rho = 0.11$, $p < .05$)
(7) Industry experience ($\rho = 0.11$, $p < .05$)
(8) Patent protection ($\rho = 0.11$, $p < .05$)

One success factor represented market and opportunity, five success factors represented resources, and two success factors were part of the entrepreneurial team category.

Results in Table 2 also suggest that the following five factors have no significant effects on technology venture performance: (1) R&D experience; (2) prior

start-up experience; (3) environmental dynamism; (4) environmental heterogeneity; and (5) competition intensity. Three of these metafactors represented market and opportunity and two represented the entrepreneurial team category.

Moderators

As Table 2 indicates, 11 of the 24 metafactors had heterogeneous correlations (i.e., the importance of the factors depend on situations). Therefore, moderator or subgroup analysis was conducted for differences in performance measures, metafactor measures, venture origin, maximum age of venture in the sample, sample type, country, and industry.

Table 3 presents those results from the moderator analysis, including ρ, an estimate of the real population correlation; total N, the aggregate sample size; K, the number of correlations that build a given metafactor; the 95 percent confidence interval of the real variance; and X_S, the critical number of null-results studies. Since some studies used multiple measures of performance, sum of performance moderator subgroups sample sizes may be greater than total N of a metafactor.

Table 3 also presents the variance explained by dichotomization of metafactors, measurement, and sampling error. This variance must be more than 75 percent to yield a homogeneous factor. In that case, the real variance is less than 25 percent of the total variance of correlations from the primary studies. The remaining variance is likely due to other unknown and uncorrected artifacts, and therefore it can be neglected (Hunter and Schmidt, 1990, 2004). To keep overview, for the moderator, or subgroup analysis, only the metafactors with at least two subgroups that have no overlapping confidence intervals are reported; each subgroup consists of at least two studies.

The results reported in Table 3 suggest that of the 11 heterogeneous factors, 3 metafactors (firm type, R&D alliances, and product innovation) had distinct moderator subgroups (i.e., the effect of these factors on venture performance depends on situation). The relationship between firm type and performance depended on the way performance was measured. Firm type was insignificantly related to the profits of NTVs but was significantly and positively related to the sales of NTVs. No other methodologically oriented moderators affected the firm type. R&D alliances were negatively associated with performance for independent ventures. However, for ventures of a mixed origin, R&D alliances were positively associated with performance. Product innovation was moderated by venture origin. For independent NTVs, product innovation has a significantly negative association with performance. However, for samples with mixed firm type, product innovation has a significantly positive association with performance.

By examining the results in Table 2, eight metafactors proved inconclusive: internationalization, low-cost strategy, market growth rate, marketing

Table 3. Suggested Moderators[a]

Metafactor	Moderator[b]	ρ	Total N	K	95 % Confidence Interval	Explained Variance (%)[b]	X_S
Resources		0.09	715	4	(−0.15,0.33)	31	0
Firm Type							
	Performance Operationalization						
	Profit Based	−0.01	572	3	(−0.03,0.01)	98	0
	Sales Based	0.27***	464	2		100	18
R&D Alliances		0.03*	571	5	(−0.52,0.58)	31	0
	Venture Origin						
	Independent Ventures	−0.36***	262	2		100	10
	Mixed Origin	0.37***	309	3		100	28
Market and Opportunity							
Product Innovation		0.04	702	8	(−0.71,0.79)	12%	0
	Venture Origin						
	Independent Ventures	−0.39***	263	3	(−0.52, −0.27)	80%	23
	Mixed Origin	0.44***	300	2	(0.23,0.65)	43%	23

[a] For all p-values, one-tailed test statistic; direction depends on the sign of ρ.
[b] Explained variance lower than 75% means that the metafactor has moderators.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

intensity, R&D investments, firm size, nongovernmental financial support, and university partnerships. Of these eight metafactors, market growth rate and nongovernmental financial support have only one subgroup with two or more studies when differences in metafactor measurements are considered. The study also found only one suitable subgroup for internationalization when looking at sample type, for marketing differentiation when looking at the country, and for university partnerships when either looking at the sample type or the industry. Further research is needed to validate or disprove these potential moderators. Finally, no methodological moderators were found for R&D investments, low-cost strategy, and firm size.

Identification of High-Quality Measurement Scales

The study's high-quality scale is either a ratio–interval measure or a Likert-type scale with a Cronbach's alpha of at least 0.7 (Nunnally, 1978) that consists of at least three items. The last condition ensures that Likert-type scales will be reliable and that they will still hold a certain reserve for future studies in case one of the items does not load. Identification of such scales can assist the work of future researchers in the technology entrepreneurship and alert them to poor operationalization practices. Consequently, one of this study's goals was to report on scales from metafactors that were stable and reliable success factors for NTVs.

Only significant homogeneous (unmoderated) metafactors from Table 2 or homogeneous subgroups from Table 3 were selected. This selection resulted in 11 strongly supported NTV success factors. To ensure that individual scales would perform well in further studies, within each metafactor, only scales with an observed correlation significant at the 0.05 level were selected. Marketing experience did not have a significant high-quality scale in the previous studies. Therefore, high-quality scales found for 10 NTV success factors are reported in Appendix 4. Further research should be conducted on other potentially significant success factors (see moderated metafactors from Table 2) before valid conclusions can be drawn.

Conclusions and Implications

Major Research Results

To the best of these authors' knowledge, this is the first systematic, quantitative effort to integrate research on antecedents of NTVs. The results of the present study are summarized in Figure 1. In the spirit of meta-analysis, the results are presented in four main blocks: significant and insignificant homogeneous factors, heterogeneous factors with moderators and heterogeneous factors without moderators. The latter two blocks are shown by the dotted lines. The figure also shows within each block from which category a given metafactor originates.

The results of this study's meta-analysis are compelling: only eight of the 24 metafactors are homogeneous and significant, suggesting that they are the only universal success factors for the performance of NTVs. The majority (five) of them belong to the resources group, two to the entrepreneurial team category, and one belongs to the market and opportunity category. Of the 24 metafactors, 5 were homogeneous but not significant. Two metafactors are success factors for subgroups in the population of NTVs, and one works only for sales and not for profit-based performance. Of the 24 metafactors, 8 remain heterogeneous even after searching for methodological moderators. They are evenly distributed across the market and opportunity and resources categories. Therefore, more research is necessary on the heterogeneous, moderated metafactors listed in Table 2.

Theoretical and Managerial Implications

An essential implication from the meta-analysis for future regression studies is that when results are contradicting or nonsignificant it may be due to the study's heterogeneous factors. In that case, a detailed study to significant differences in correlation coefficients for various subsamples between factor and dependent variable may explain the deviating results.

In the market and opportunity category nine success factors were represented in the meta-analysis. Market scope clearly enhances NTV performance, as well as product innovation for corporate ventures. However, product innovation is detrimental for independent NTVs. Apparently, a radical innovation strategy is too risky for independent ventures, whereas corporate ventures can share risks with their parent companies. Entrepreneurs may keep these findings into consideration.

Five success factors were heterogeneous in this category, whereas three were insignificant. Examining the number of heterogeneous metafactors, one might conclude that the NTV population is generally too

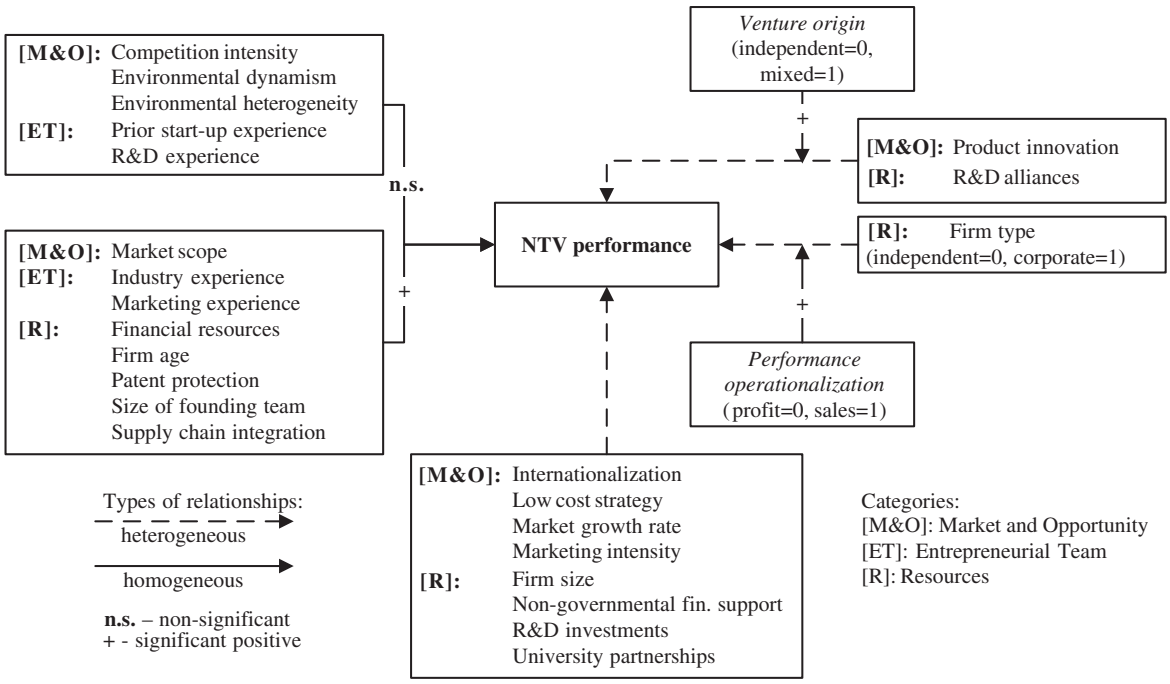

Figure 1. Summary of Success Factors in Technology Ventures

heterogeneous to examine its success factors. This idea was supported by the fact that for most of these factors no clear methodological moderators were found, suggesting that there may be other moderators that have not been reported in published research studies (e.g., educational background of the entrepreneur).

Until now, in contingency research scholars have focused on product differentiation strategy and its interactions with different environmental characteristics, such as competition intensity and environmental dynamism (Li, 2001; Li and Atuahene-Gima, 2001; Zahra and Bogner, 2000). Other competitive strategies have received considerably less attention in studies of environmental contingencies.

Finally, existing metafactors in this category describe opportunity in a rather indirect way. A direct focus on the opportunity concept—the key concept of entrepreneurship (Shane and Venkataraman, 2000)—is missing. A range of opportunity dimensions may be considered—for example, the source of an opportunity—sources vary in the amount of uncertainty and thus have different degrees of success predictability (Drucker, 1985; Eckhardt and Shane, 2003).

In the entrepreneurial team category, the characteristics of the entrepreneurial team were described by four types of experience: marketing, R&D, industry, and start-up experience. Experience in marketing and industry were homogeneous, significant success factors. Both prior start-up experience and R&D experience were insignificant at the 0.05 level. The former finding may be further evidence of overestimation of the role of prior start-up experience, ironically one of the most profound venture capitalist evaluation criteria (Baum and Silverman, 2004). It should be noted that the latter finding might have been caused by lack of variance in the samples of NTVs, since NTVs are often defined by having a certain amount of R&D expenses. The study's findings suggest that acquiring more experience in marketing and industry may lead to higher NTV performance.

The weak results of the entrepreneurial team factors can be explained in several ways. First, findings may be due to the tendency to limit experience to the number of years the founders spent in a certain area, without measuring the quality, variety, and complementarity of both joint and individual experiences (Eisenhardt and Schoonhoven, 1990; Lazear, 2004). Moreover, certain aspects of the entrepreneurial team category may have been overlooked in the literature on NTVs. In particular, researchers have identified a variety of cognitive characteristics that make entrepreneurs distinctive, such as psychological traits (Gartner, 1985; Stewart and Roth, 2004), cognitive biases, and thinking styles (Baron, 1998, 2004).

Another explanation is that the influence of the metafactors in this category manifests itself through a more subtle, indirect mechanism. Researchers have

concentrated their efforts on direct links between personality characteristics of entrepreneurs and the performance of NTVs. However, recent research has found support for their indirect influence on the performance of ventures (Baum, Locke, and Kirkpatrick, 1998); for example, human capital factors influence performance by directing the competitive strategies entrepreneurs choose (Baum, Locke, and Smith, 2001) or channeling the opportunities they recognize (Shane, 2000). Future research should investigate these alternative explanations.

The resource category consists of more than half of the identified success factors in the meta-analysis. Although a significant amount of research has been conducted within this category, results have not been conclusive. We found five success factors within this category: supply chain integration, firm age, size of founding team, financial resources, and patent protection. So investing in supply chain integration seems to yield higher returns. However, except for supply chain integration, most factors may not be fully controllable ones. One may control the size of the founding team and collect more experience in the team (indicating that this factor is close to the entrepreneurial team factors) while enlarging communication requirements and facing power problems. In any case, the meta-analysis results indicated that enlarging the team may improve NTV performance. The financial resources, however, may be more difficult to control. Even though the study results suggest that more financial resources may improve performance, not all firms can absolutely control their financial resources. Nevertheless, setting up NTVs may need to wait until required financial resources have become available. Finally, when a possibility of patent protection exists firms should take the opportunity.

This analysis also found six heterogeneous metafactors within this category. In the moderator analysis, the study showed that firm type has a positive influence on sales performance. Moreover, in ventures of mixed origin, R&D alliances improved performance, whereas for independent ventures these alliances worsened performance. Perhaps equity conditions could better be negotiated in corporate ventures, having more power than independent ventures.

A remarkable finding of this study was that the R&D investments were not a success factor (much like product innovation, mentioned earlier). Generally, when looking at all resource factors, no particularly technological resource factors were found. Within the population of NTVs, these factors generally have a high level, and there was insufficient variation in these factors. However, in line with a resource-based view of the firm, the focus may need to be on the quality of the resources rather than the quantity. Barney (1991) posited that the value, rareness, non-imitability, and non-substitutability of resources—instead of the amount of resources—led to competitive advantage. We advise future research consider that direction.

Limitations

As with all research, this meta-analysis had several limitations. First, the Pearson correlations used for the study are primarily intended for measurement of the strength of a linear relationship between two variables. In the case of zero correlation, a chance existed of observing a vivid curvilinear relationship between variables. Second, the primary studies used in the meta-analysis based their samples on surviving NTVs because of the difficulties in accessing NTVs that failed. Therefore, any meta-analysis in this topical area must be inherently biased toward more successful, surviving firms. This bias has two implications: (1) Meta-factors that influence the success and mortality of a NTV could conceivably be substantially different (Shane and Stuart, 2002); and (2) strategies (metafactors) that seem to deliver the best performance can be misleading. The greater the potential a particular strategy has, the greater the risks associated with it. Finally, the last limitation of the study was the sample size of the meta-analysis itself, which included 31 studies reflecting the emerging nature of this research domain as well as the generally poor standards of descriptive statistics publication. However, the 31 studies provided a sufficient sample size for a preliminary meta-analysis (Gerwin and Barrowman, 2002; Montoya-Weiss and Calantone, 1994).

Future Research Directions

The meta-analysis of this study should not and must not preclude future research but rather should stimulate and direct it. Based on the study's results and implications and current literature (e.g., Gartner, 1985; Timmons and Spinelli, 2004), the theoretical framework shown in Figure 2 is suggested for future research.

The theoretical framework consists of five elements: entrepreneurial opportunities, entrepreneurial team, entrepreneurial resources, strategic and organizational fit, and performance. The dotted lines

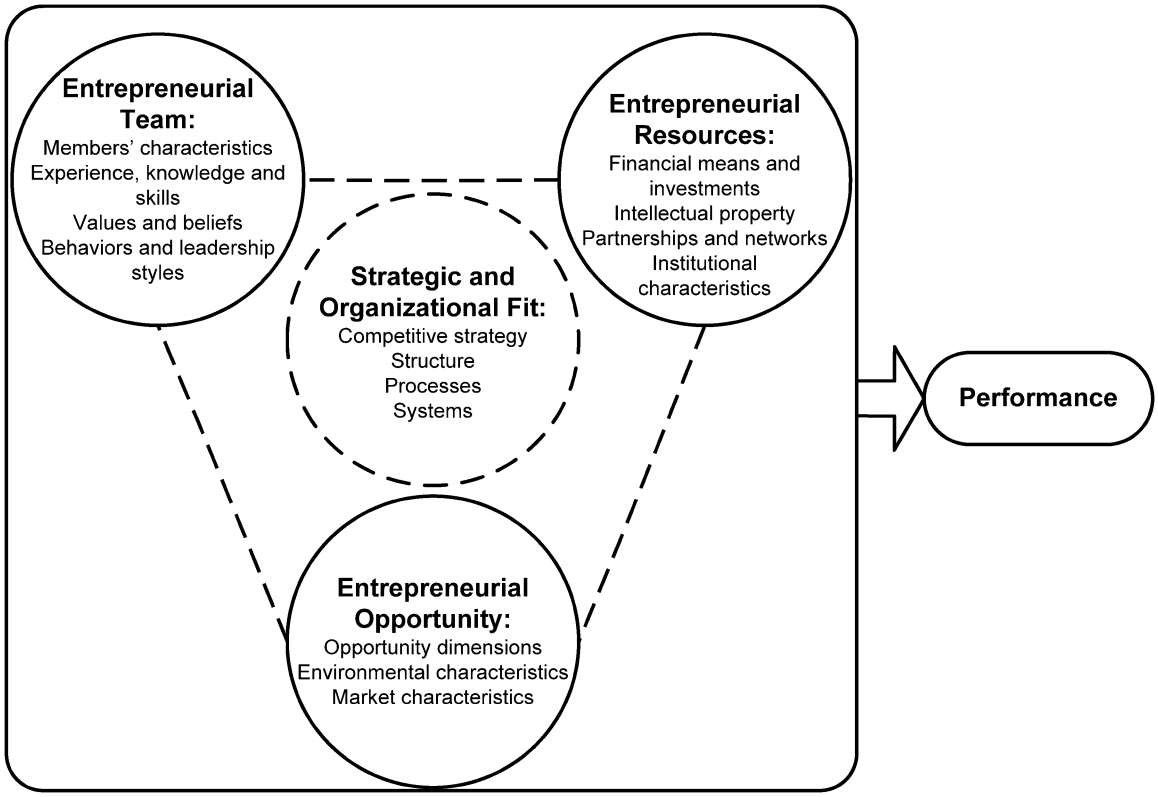

Figure 2. The Integrated Framework of New Entrepreneurial Firm Performance

represent the fit. In general, this study suggests taking this framework as a basis for future research and examining its factors and, in particular, the linkages into more detail in future research. Next, definitions are given for the categories in the framework, some factors are listed, and future research directions are given following from the study's meta-analysis.

Entrepreneurial team. Entrepreneurial team is defined as the management team of the new venture (Timmons and Spinelli, 2004). Entrepreneurial team is a core element of the entrepreneurship phenomenon. Shane and Venkataraman (2000) characterize entrepreneurship as the nexus between the individual and the opportunity. Researchers identified the following factors in this category:

- Members' characteristics (e.g., age, attributes, biases, thinking styles)
- Experience, knowledge, and skills
- Values and beliefs
- Behaviors and leadership styles

According to this study's meta-analysis, future research should include cognitive biases and thinking styles, the quality, variety, and complementarity of team member experiences, as well as the mediating and moderating influences of the team factors on other antecedent performance relationships. In this research, industry and marketing experience may be considered as control variables.

Entrepreneurial opportunity. Entrepreneurial opportunities are situations in which new goods, services, raw materials, and organizing methods may be introduced and sold at greater price than their cost of production (Shane and Venkataraman, 2000). The contemporary definitions of entrepreneurship emphasize that it is opportunity driven; therefore, entrepreneurial opportunity is an essential part of the entrepreneurship framework (Eckhardt and Shane, 2003; Shane and Venkataraman, 2000; Timmons and Spinelli, 2004). Researchers distinguish the following factors in this category:

- Opportunity dimensions (e.g., type of opportunity, form of opportunity, source of opportunity)
- Environmental characteristics (e.g., environmental dynamism, environmental heterogeneity), internationalization)

- Market characteristics (e.g., market growth rate, competition intensity, entry barriers, buyer and supplier power)

Based on the study's meta-analysis, future research may include the direct examination of opportunity dimensions as well as search for moderators of the internationalization performance and the market growth rate performance relationship. In this future research, market scope may be considered as a control variable.

Entrepreneurial resources. Entrepreneurial resources include all tangible and intangible assets that a firm may possess and control (Chrisman, Bauerschmidt, and Hofer, 1998; Timmons and Spinelli, 2004). Gartner (1985) identifies the resources accumulation process as an essential part of the entrepreneurial functions, whereas Timmons and Spinelli (2004) consider entrepreneurial resources as an important building block of their venture creation framework. Important factors within this category are as follows:

- Financial means and investments (e.g., financial resources, nongovernmental financial support, R&D investments)
- Intellectual property (e.g., patent protection, licensing)
- Partnerships and networks (e.g., R&D alliances, supply chain integration, university partnerships)
- Institutional characteristics (e.g., firm age, firm size, firm type, size of the founding team)

From the study's meta-analysis the suggestion is made to include more qualitative measures of resources into future research, like the value, rareness, nonimitability, and nonsubstitutability of resources (Barney, 1991). Moreover, it is advisable to conduct more moderator research on the nongovernmental financial support performance and the R&D investment performance relationship as well as the relationships between university partnerships and performance and firm size and performance. In future research financial resources, patent protection, supply chain integration, firm age, and size of the founding team may be considered as control variables.

Strategic and organizational fit. Strategic and organizational fit is defined as the congruence between strategy and organization of the new venture and the driving forces entrepreneurial team, entrepreneurial opportunity, and entrepreneurial resources (Chrisman, Bauerschmidt, and Hofer, 1998; Timmons and Spinelli, 2004). Fit regards an important uniting aspect of the various elements of the framework. Gartner (1985) refers to a new venture as a gestalt of individuals, environment, organization, and process dimensions, indicating that all elements in a new venture must be balanced. The following factors are considered in this category:

- Competitive strategy (e.g., low cost strategy, market scope, marketing intensity, product innovation)
- Structure
- Processes
- Systems

The study's meta-analysis suggests more interaction research between competitive strategies and environmental characteristics, such as environmental dynamism and competition intensity. In particular, other competitive strategies than product innovation may be examined.

Performance. The study's framework suggests that the better the fit between the driving forces and the strategy and organization of the venture, the better the performance. In the meta-analysis a broad scope of performance measures was found. Once, the difference in performance measures was found to be a moderator of the antecedent performance relationship. Therefore, the suggestion is given here to have a broad set of performance measures in future new venture research and to experiment with different subsets of performance measures.

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Appendix 1. Methodological Characteristics of the Articles Included in This Meta-analysis[a]

#	Article	Country	Industry	Performance Measure	Sample Type	Venture Origin	Minimum Age	Maximum Age	*N*
1	Bamberger, Bacharach, and Dyer (1989)	Israel	Electronics, computer, biotechnology, and related	Financial	VC-backed and other DBs	Not indicated	0	10	35
2	Bantel (1997)	United States	Semiconductors, magnetic media, measuring and controlling devices, optical instruments, etc.	General	General DBs	Not indicated	5	12	166
3	Bloodgood, Sapienza, and Almeida (1996)	United States	Medical products, commercial research, computers, etc.	Financial	IPO and VC-backed	Not indicated	0	5	61
4	Carpenter, Pollock, and Leary (2003)	United States	Electrical and electronic equipment	Financial	IPO	Independent	0	10	97
5	Chamanski and Waagø (2001)	Norway	IT, electronics, mechanical engineering, biotechnology, high-tech consultancy	Financial	General DBs	Not indicated	0	10	55
6	Doutriaux (1991)	Canada	Electronics, telecom, and related	Financial	Government support programs	Both	0	8	73
7	Doutriaux (1992)	Canada	Electronics, telecom, and related	Financial	Government support programs	Both	0	8	73
8	Dowling and McGee (1994)	United States	Telecom equipment	Financial	IPO	Independent	0	[b]	52
9	Eisenhardt and Schoonhoven (1990)	United States	Semiconductors	Financial	General DBs	Independent	4	4[c]	66
10	George et al. (2001)	United States	Biotechnology	Financial	IPO	Both	0	[b]	143
11	George, Zahra, and Wood (2002)	United States	Biotechnology	Financial	IPO	Both	0	[b]	147
12	Kazanjian and Drazin (1990)	United States	Electronics, computer, and related	Financial	VC-backed	Independent	0	15	105

13	Kazanjian and Rao (1999)	United States	Computer hardware and related equipment	Financial	VC-backed	Independent	0	15	71
14	Lee, Lee, and Pennings (2001)	Korea	Electrical and electronic products, biotechnology, software	Financial	General DBs	Independent	0	[b]	137
15	Li (2001)	China	IT, telecom, computing, electronics, optic-mechanic and electric products, new energy and materials, biotechnology, etc.	Financial and market	General DBs	Both	0	8	184
16	Li and Atuahene-Gima (2002)	China	IT, telecom, computing, electronics, optic-mechanic and electric products, new energy and materials, biotechnology, etc.	General	General DBs	Both	0	8	184
17	Li and Atuahene-Gima (2001)	China	IT, telecom, computing, electronics, optic-mechanic and electric products, new energy and materials, biotechnology, etc.	Financial and market	General DBs	Both	0	8	184
18	Lumme (1998)	Finland	Telecom, electronic and industrial equipment, chemicals, etc.	Financial	General DBs	Independent	0	5	88
19	Marino and De Noble (1997)	United States	Medical and navigation equipment and instruments	Financial	IPO	Not indicated	1	16	28
20	McDougall and Oviatt (1996)	United States	Computer and telecom equipment	Financial and market	General DBs	Both	0	8	62
21	McDougall et al. (1994)	United States	Computer and telecom equipment	Financial	General DBs	Independent	0	8	123
22	McGee and Dowling (1994)	United States	Electronics, computing, telecom and related	Financial	IPO	Independent	0	8	210
23	McGee, Dowling, and Megginson (1995)	United States	Telecom and computing equipment, professional and scientific instruments	Financial	IPO	Independent	0	8	210

Appendix 1. (Contd.)

#	Article	Country	Industry	Performance Measure	Sample Type	Venture Origin	Minimum Age	Maximum Age	*N*
24	Miles, Preece, and Baetz (1999)	Canada	Electrical and electronic products, software	General	Government support programs	Not indicated	0	[b]	112
25	Qian and Li (2003)	United States	Biotechnology	Financial	General DBs	Independent	5	[b]	67
26	Robinson and McDougall (2001)	United States	Electronics, computer, biotechnology, and related	Financial	IPO	Independent	0	6	115
27	Seiders and Riley (1999)	United States	Internet	Financial	IPO	Not indicated	0	[b]	38
28	Zahra and Bogner (2000)	United States	Software	Financial and market	General DBs	Both	0	8	116
29	Zahra, Ireland, and Hitt (2000)	United States	Medical products, software, telecom, semiconductors, etc.	Financial	International	Both	0	6	321
30	Zahra, Matherne, and Carleton (2003)	United States	Software	Financial	International	Both	0	8	67
31	Zahra, Neubaum, and Huse (1997)	United States	Telecom equipment	Financial	General DBs	Not indicated	0	8	121

[a] IT, information technology; VC, venture capital; DB, database; IPO, initial public offering.
[b] No information was reported in the study; study included on the basis of means and standard deviations.
[c] Correlation matrix was given for the companies in their fourth year.

Appendix 2. Publication Sources of the Articles Included in This Meta-analysis

Publication Source	Number of Studies in Analysis
Academy of Management Journal	2
Administrative Science Quarterly	1
Doctoral dissertation	1
Entrepreneurship Theory and Practice	2
Frontiers of Entrepreneurship Research Conference papers	1
Human Resource Management	1
IEEE Transactions on Engineering Management	1
Internal report/working paper	1
Journal of Business Venturing	6
Journal of High Technology Management Research	4
Journal of International Entrepreneurship	1
Journal of Small Business Management	1
Management Science	1
Organization Studies	1
Strategic Management Journal	7
Total	31

Appendix 3. Formulas for Variances Calculations

$$Var_{total} = Var_{real} + Var_{artif} + Var_{s.e.},$$

where

Var_{total} = total variance of observed correlations from primary studies;
Var_{real} = real variance of the population correlation;
Var_{artif} = variance due to artifacts (dichotomization and reliabilities);
$Var_{s.e.}$ = variance due to sampling error.

$$Var_{real} = Var_{total} - Var_{artif} - Var_{s.e.}$$

95% confidence interval of the real population correlation is $1.96\sqrt{Var_{real}}$
Metafactor is heterogeneous (moderated) if $Var_{real} > 25\%\ Var_{total}$

$$Var_{total} = \frac{\sum_{i=1}^{n}[N_i(r_{oo_i} - \overline{r_{oo}})^2]}{\sum_{i=1}^{n} N_i},$$

where

r_{oo_i} = observed correlation of the primary study i;
$\overline{r_{oo}}$ = weighted average of the observed correlations of the primary studies, so that

$$\overline{r_{oo}} = \frac{\sum_{i=1}^{n} N_i r_{oo_i}}{\sum_{i=1}^{n} N_i}.$$

$$Var_{artif} = \rho^2 \overline{A}^2 V = \overline{r_o}^2 V = \overline{r_o}^2 \left(\frac{Var(\sqrt{R_{xx}})}{\overline{\sqrt{R_{xx}}}} + \frac{Var(\sqrt{R_{yy}})}{\overline{\sqrt{R_{yy}}}} \right)$$

$$Var_{s.e.} = \frac{\left(1 - \overline{r_{oo}}^2\right)^2}{\overline{N} - 1} + \sum_{di=1}^{D} \left[\left[\left(\frac{1}{ad} \right)^2 - 1 \right] \frac{\left(1 - \overline{r_{oo}}^2\right)^2}{N_{di} - 1} \right] = \frac{\left(1 - \overline{r_{oo}}^2\right)^2}{\overline{N} - 1} + \sum_{di=1}^{D} \left[0.5625 \frac{\left(1 - \overline{r_{oo}}^2\right)^2}{N_{di} - 1} \right]$$

where

$\overline{N}$ = average samples size of the primary studies;
d_i = the i^{th} study with a dichotomized variable.

Appendix 4. Scales of the Most Important Metafactors

Metafactor	Study	Original Construct	Sources	Scales	α
Market and Opportunity					
Market Scope	10,11	—	—	Number of products in market	—
Product Innovation	15,16, 17	Product innovation strategy	Covin and Slevin (1989); Zahra and Covin (1993)	Rate your firm relative to your competitors over the last three years on the extent to which it has: –Placed emphasis on developing new products through allocation of substantial financial resources –Developed a large variety of new product lines –Increased the rate of new product introductions to the market –Increased it overall commitment to develop and market new products	0.83
	18	Exploratiiveness of the entry strategy	Eisenhardt and Schoonhoven (1990); Stuart and Abetti (1986)	Rate on four- (for technology) and five-point scales: –Newness of the core technology of the firm –Newness of the target markets served by the firm –Newness of the competition faced by the firm –Newness of the users of the offering	0.72
	28	Product upgrades	Cooper (1984); Lefebvre et al. (1992); Zahra and Covin (1993)	Rate on a five-point scale if the statement is true or not true: –Introduces more new products than the competition –Introduces products to the market faster than competitors –Has reduced the time between the development and market introductions of new products –Introduces many new products to the market	0.71
Entrepreneurial Team					
Industry Experience	22	INDEXP (prior industry experience of management team)	—	Combined number of years that the members of the founding management team spent in previous positions that were in similar industries or markets	—
Resources					
Financial Resources	11	—	—	Venture assets	—
Firm Age	8,14, 22,23,				

Appendix 4. (Contd.)

Metafactor	Study	Original Construct	Sources	Scales	α
29,31	—	—	Year of incorporation or number of years since establishment	—	
Firm Type	10,29	—	—	If the venture was independent or corporate	—
Patent Protection	28	Copyrights	Cooper (1984); Lefebvre et al. (1992); Zahra and Covin (1993)	Rate on a five-point scale if the statement is true or not true: –Holds important patent rights –Has more patents than its key competitors –Uses licensing agreements extensively to sell its products –Has increased its patenting efforts over the past three years	0.71
R&D Alliances	10,11	—	—	Number of joint research and development (R&D), patent swaps, technology transfers, and joint ventures	—
	28	External sources	Cooper (1984); Lefebvre et al. (1992); Zahra and Covin (1993)	Rate on a five-point scale if the statement is true or not true: –Uses joint ventures for R&D –Is heavily engaged in strategic alliances –Collaborates with universities and research centers in R&D –Contracts out a major portion of its R&D activities	0.73
Size of Founding Team	9	Team size	—	Number of founders	—
Supply Chain Integration	5	Cooperation with suppliers	Gemunden, Ritter, and Heydebreck (1996)	Rate on a five-point scale: –Importance of suppliers as discussion partners –Importance of suppliers for generating new product ideas –Importance of suppliers for conventionalizing new products –Importance of suppliers for developing new products –Importance of suppliers for testing new products	0.92
	10,11	—	—	Number of outsourcing and distribution links	—