



The costs and benefits of entrepreneurial networks - an empirical study

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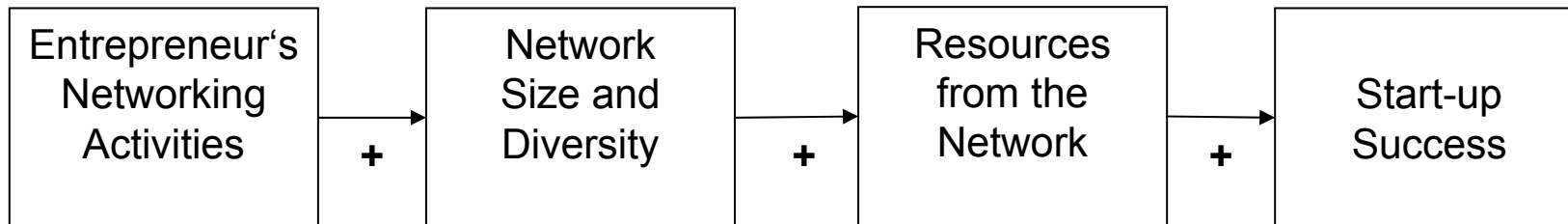


Outline:

1. Theories and empirical evidence on entrepreneurial networks
2. Formulation of hypotheses
3. Design of the empirical study
4. Results of the empirical study
5. Conclusions



The classical network success hypothesis

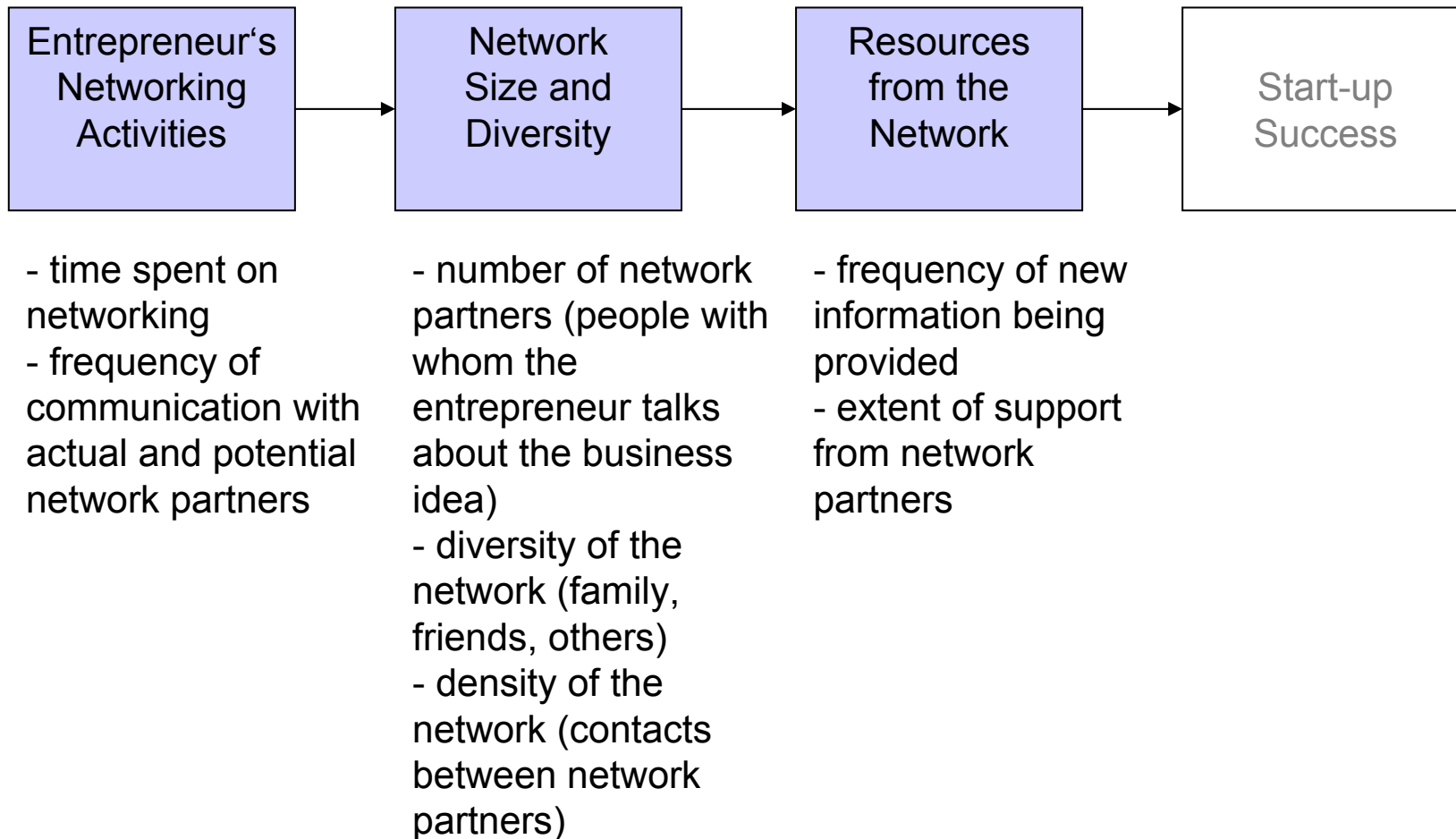


Theories behind the network success hypothesis:

- theories of entrepreneurial resource acquisition (Birley 1985, Johannisson 1988, Aldrich/Rese 1993)
 - getting resources cheaper than they could be obtained on markets
 - getting resources that would not be available on markets at all
- theory of socially embedded ties (Granovetter 1985, Gulati 1995, Uzzi 1997)
- theory of social capital (Adler/Kwon 2002, Florin/Lubatikin/Schulze 2003)

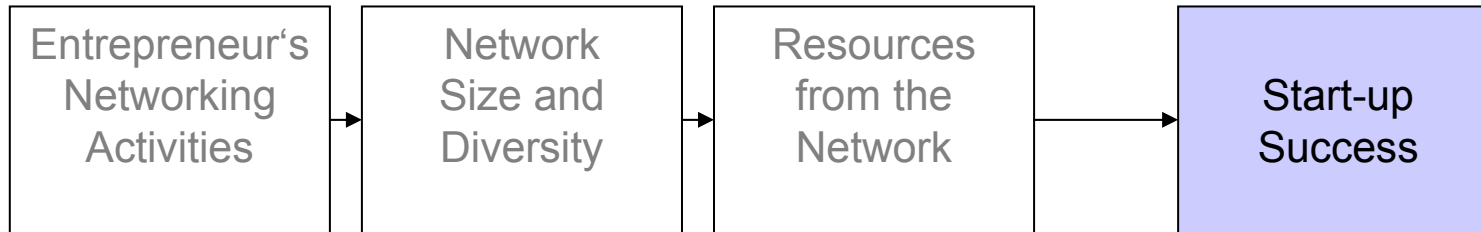


Network variables in prior empirical studies





Success measures in prior empirical studies



- actual foundation
- survival
- profitability
- growth in the number of employees
- growth in sales
- subjective feeling of success



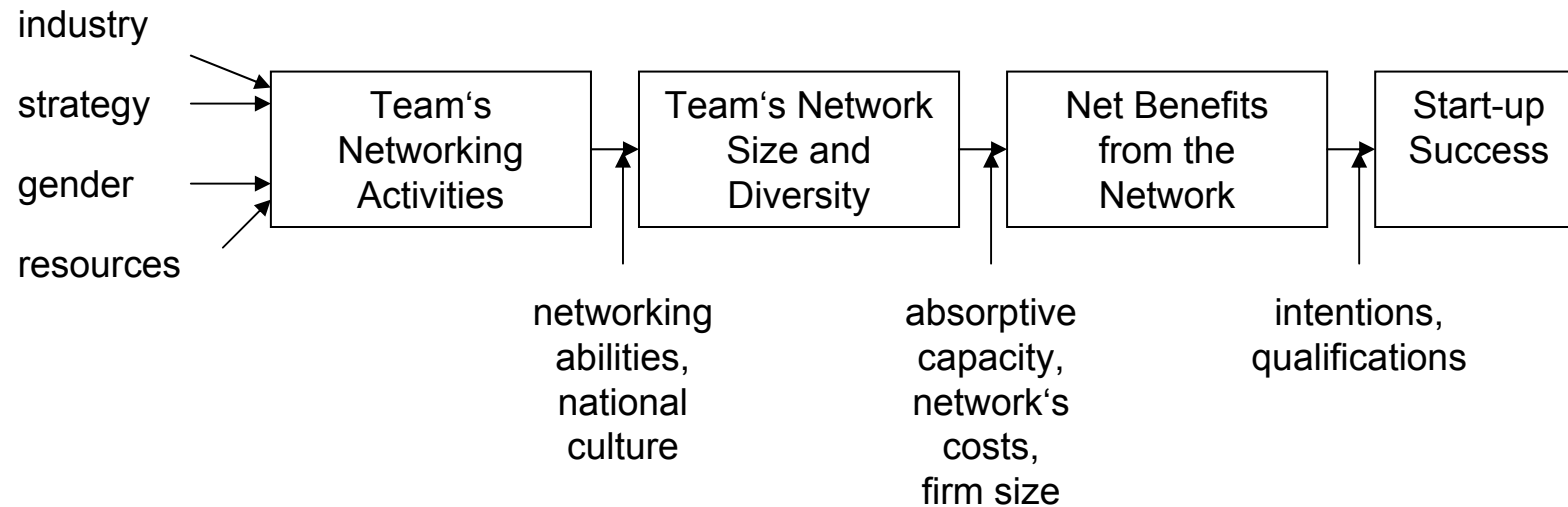
Theories and empirical evidence on entrepreneurial networks

The existing empirical studies came up with very diverse results

<i>Aldrich/Rosen/Woodward (1987)</i>	n = 165, US, 1986 and 1987	Correlation analysis	Positive correlation between network accessibility and actual foundation / profitability Negative correlation between network diversity and profitability
<i>Cooper/Folta/Woo (1991)</i>	n = 2.246, US, 1985 and 1986/87	Correlation analysis	No correlation between intensity of network usage and survival
<i>Aldrich/Reese (1993)</i>	n = 281, US, 1990/91 and 1992/93	Correlation analysis	No correlation between network size / time spend on networking and survival or growth in sales
<i>Hansen (1995)</i>	n = 44, US, no year	Multivariate regression	Positive correlation between network size / network density and growth in wages being paid to employees
<i>Johannisson (1996)</i>	n = 158, Sweden, 1987 and 1993	n.a.	No correlation between network size / time spend on networking and subjective estimates of success
<i>Ostgaard/Birley (1996)</i>	n = 159, UK, 1991	Multivariate regression	Positive correlation between network size / networking activities and growth in the number of employees
<i>Brüderl/Preisendörfer (1998)</i>	n = 1.710, Germany, 1990	Multivariate regression	Positive correlation between support from network partners and survival / growth in sales
<i>Littunen (2000)</i>	n = 128, Finland, 1992 and 1993-1996	Logistic regression	No correlation between the number of network partners / changes in network size and survival



Extensions of the classical network success hypothesis



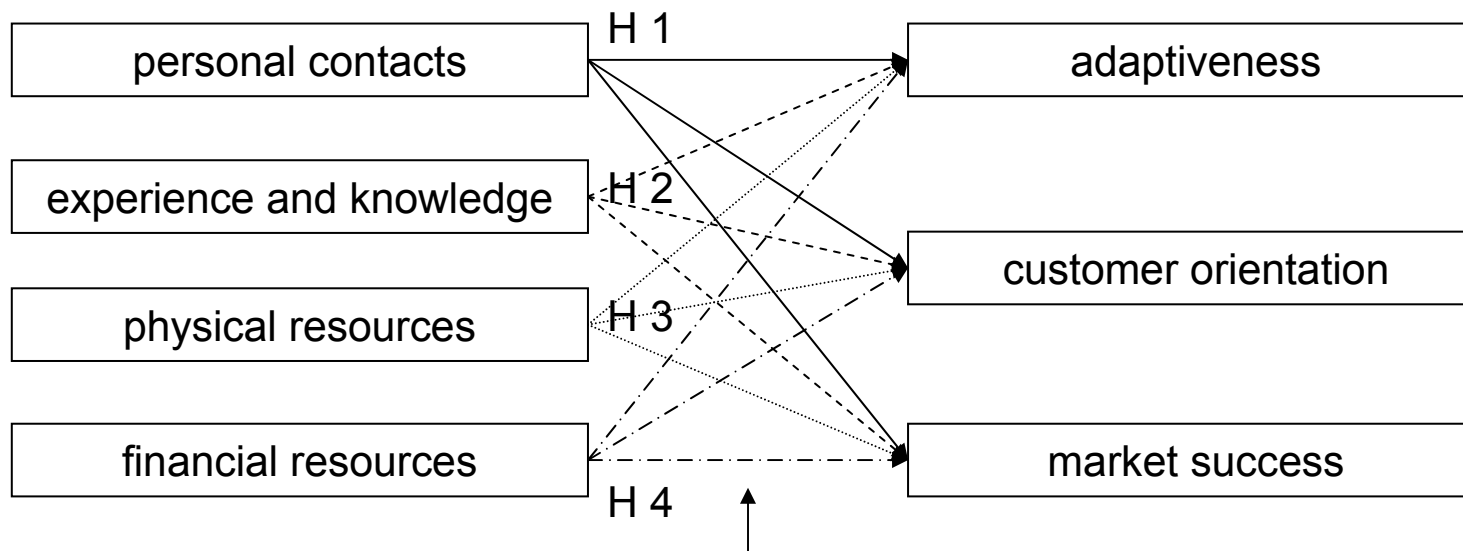


Formulation of hypotheses

An extended model

resources received from the founders' personal networks

start-up success



Control variables

- costs to build and maintain network relations
- experience of the entrepreneurial team
- initial endowment with resources



The hypotheses to be tested empirically

- H 1:** The more personal contacts a start-up receives from the personal networks of its founders, the more successful it is (H 1a: in terms of adaptiveness, H 1b: in terms of customer orientation, H 1c: in terms of market success).
- H 2:** The more experience and knowledge a start-up receives from the personal networks of its founders, the more successful it is (H 2a: in terms of adaptiveness, H 2b: in terms of customer orientation, H 2c: in terms of market success).
- H 3:** The more physical resources a start-up receives from the personal networks of its founders, the more successful it is (H 3a: in terms of adaptiveness, H 3b: in terms of customer orientation, H 3c: in terms of market success).
- H 4:** The more financial resources a start-up receives from the personal networks of its founders, the more successful it is (H 4a: in terms of adaptiveness, H 4b: in terms of customer orientation, H 4c: in terms of market success).



Data collection methods and sample

- **Data collection:** Online-survey of legally independent start-ups registered in Germany, foundation after 1994. Personalized Emails with pre-tested questionnaire to be answered online on a secured server.
- **Sample size:** Survey of 1,182 start-ups between November 2003 and February 2004 (unique data base). 123 usable returned questionnaires, no significant non-response-bias.
- **Sample characteristics:** The sample is representative for all German start-ups in terms of gender of the founders, industry split and start-ups sizes, but not in general.
- **Informants:** founders (100 %).



Measurement of variables

- **Focus on the „action set“ of direct network partners** (first-tier network) whom founders have contacted in the last six months prior to the survey. Assumption: key network partners stay the same over time (Franklin/Wright/Lockett 2001, Lechner/Dowling/Welpe 2006).
- **Independent variables** (resources received from the network) measured by four factors, derived from exploratory factor analysis: personal contacts, experience and knowledge, physical resources, financial resources (2 -7 indicators per factor).
- **Dependent variable** (start-up success) measured by three factors , derived from exploratory factor analysis: adaptiveness, customer orientation, market success (2-4 indicators per factor).
- **Control variables** are the entrepreneurs‘ networking costs (6 measures), the experience of the entrepreneurial team (4 measures), and the initial resource endowment of the start-up (3 measures).



Empirical methodology

- **Confirmatory factor analysis** to test the validity and reliability of all factors (Cronbach α , corrected item-to-total correlation, indicator reliability, factor reliability, AVE, GFI, AGFI, CFI, RMSEA), details in the appendix.
- **Multivariate analysis**: correlation analysis, multivariate hierarchical regression analysis (OLS estimates), and non-linear correlation analysis (scatter plots, regressions with logarithms of independent variables), details in the appendix.
- **Software**: AMOS and SPSS for Windows, manual calculus for AVE and factor reliabilities.



Descriptive results

- **Age of the founders:** average age 37 years, the youngest founder is 23, the oldest is 54.
- **Gender of the founders:** 17 % female, 83 % male.
- **Education and experience of the founders:** 60 % have a university degree, 26 % a Ph.D. degree, average management experience of 8 years, average technical experience of 7 years, average entrepreneurial experience of 5 years (all per person).
- **Venture characteristics:** average start-up age of 3.7 years, on average 20.3 employees (median 5, smallest 2, largest 120), average starting number of 1.8 employees (median 1).



Results of the empirical study

Results of hypotheses testing

	Dependent variable	Independent variable	Expected correlation	result
H1	Start-up success	Personal contacts received from the network	+	accepted for market success, otherwise rejected
H2	Start-up success	Experience and knowledge received from the network	+	rejected
H3	Start-up success	Physical resources received from the network	+	rejected
H4	Start-up success	Financial resources received from the network	+	rejected



Results for control variables

- **Cost of networking:** significantly positive, non-linear correlation with some resources received from the network (personal contacts, experience and knowledge), but not with other resources, no significant correlation with the founders' networking activities or with start-up success.
- **Experience of the founders:** no significant correlation with networking activities, the amount of resources received from the network or start-up success, neither in a linear nor in a non-linear form.
- **Initial endowment with resources:** no significant correlation with the founders' networking activities or the amount of resources received from the network, significantly positive correlation with the adaptiveness and the market success of the start-up.



Entrepreneurial networks do not matter much

- The network success hypothesis (in an extended form) gets no support in our sample. **Networks seem to matter much less in entrepreneurship than existing theories suggest.** At least for German founders, resources received from personal networks do not make start-ups more successful.
- **Transactions over network ties are pretty similar to transactions on markets.** They do not come without a cost, reciprocity matters (Fehr/Gächter 1998).
- **Entrepreneurial networks and their effects on start-up success may be very culture specific.** Therefore, studies in different countries may come to very different conclusions (Drakopoulo Dodd/Patra 2002).
- **Experience does not help founders to create successful start-ups.** Experienced entrepreneurs receive similar amounts of resources from their network and are as successful with their ventures as inexperienced ones.



Appendix

Results of the correlation analyses

Variable	1	2	3	4	5	6	7
Personal contacts (1)	1.000						
Experience and knowledge (2)	0.417***	1.000					
Physical resources (3)	0.252***	0.328***	1.000				
Financial resources (4)	0.121	0.086	0.120	1.000			
Market success (5)	0.156**	0.101	0,010	0.017	1.000		
customer orientation (6)	0.086	0.090	-0.003	0.074	0.295***	1.000	
adaptiveness (7)	0.098	0.088	0.033	0.091	0.385***	0.389***	1.000

** : significant on the 5% level, *** : significant on the 1% level.



Appendix

Goodness values for the factor „personal contacts“				
Cronbach's alpha	0.82			
Variance explained	65.36%			
χ^2 / df	1.54			
GFI	0.99			
AGFI	0.94			
CFI	0.99			
RMSEA	0.067			
Factor reliability	0.74			
DEV	0.42			
Goodness values for the individual indicators				
Indicators*	1	2	3	4
Indicator reliability	0.53	0.70	0.52	0.42
Item to total correlation	0.66	0.71	0.63	0.59

**1: help to establish contacts to potential customers, 2: direct orders for products or services from the start-up, 3: provision of reputation for the start-up, 4: direct work for the start-up; three other indicators were eliminated due to low indicator reliability values.*



Appendix

Goodness values for the factor „experience and knowledge“				
Cronbach's alpha	0.87			
Variance explained	72.73%			
χ^2 / df	2.84			
GFI	0.98			
AGFI	0.89			
CFI	0.99			
RMSEA	0.123			
Factor reliability	0.83			
DEV	0.55			
Goodness values for the individual indicators				
Indicators*	1	2	3	4
Indicator reliability	0.45	0.65	0.76	0.72
Item to total correlation	0.62	0.72	0.77	0.80

**1: consulting services with respect to immaterial resources, 2: help in designing the organizational structure of the start-up, 3: consulting services in organizational issues, 4: help in writing the business plan and in strategy formulation; one other indicator was eliminated due to a low indicator reliability value.*



Appendix

Goodness values for the factor „physical resources“				
Cronbach's alpha	0.72			
Variance explained	64,70%			
χ^2 / df	-			
GFI	-			
AGFI	-			
CFI	-			
RMSEA	-			
Factor reliability	-			
DEV	-			
Goodness values for the individual indicators				
Indicators*	1	2	3	
Indicator reliability	-	-	-	
Item to total correlation	0.54	0.60	0.50	

**1: help in getting real estate and office room, 2: help in getting raw material and equipment, 3: consulting services to procure physical resources.*



Appendix

Goodness values for the factor „financial resources“				
Cronbach's alpha	0.76			
Variance explained	81,07%			
χ^2 / df	-			
GFI	-			
AGFI	-			
CFI	-			
RMSEA	-			
Factor reliability	-			
DEV	-			
Goodness values for the individual indicators				
Indicators*	1	2		
Indicator reliability	-	-		
Item to total correlation	0.62	0.62		

*1: help in securing banks loans or other forms of credit, 2: provision of collateral or security.



Appendix

Goodness values for the factor „market success“				
Cronbach's alpha	0.85			
Variance explained	69,25%			
χ^2 / df	1.52			
GFI	0.99			
AGFI	0.94			
CFI	0.99			
RMSEA	0.065			
Factor reliability	0.83			
DEV	0.55			
Goodness values for the individual indicators				
Indicators*	1	2	3	4
Indicator reliability	0.43	0.70	0.69	0.57
Item to total correlation	0.75	0.75	0.67	0.60

**1: reaching the desired market share, 2: reaching the desired sales growth, 3: profit in the last three years, 4: ability to get new customers.*



Appendix

Goodness values for the factor „customer orientation“				
Cronbach's alpha	0.85			
Variance explained	86,87%			
χ^2 / df	-			
GFI	-			
AGFI	-			
CFI	-			
RMSEA	-			
Factor reliability	-			
DEV	-			
Goodness values for the individual indicators				
Indicators*	1	2		
Indicator reliability	-	-		
Item to total correlation	0.74	0.74		

*1: creation of customer satisfaction, 2: ability to keep existing customers.



Appendix

Goodness values for the factor „adaptiveness“				
Cronbach's alpha	0.68			
Variance explained	60.68%			
χ^2 / df	-			
GFI	-			
AGFI	-			
CFI	-			
RMSEA	-			
Factor reliability	-			
DEV	-			
Goodness values for the individual indicators				
Indicators*	1	2	3	
Indicator reliability	-	-	-	
Item to total correlation	0.48	0.45	0.54	

*1: ability to find innovative solutions for changing customer needs, 2: quick reaction to new market threats, 3: ability to utilize new market chances.