On the Impact of Vocational Training on Entrepreneurship: A Jack-of-all-Trades Explanation

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Introduction

Entrepreneurship is important for innovation and economic growth

- What determines entrepreneurship?
- Which individual characteristics drive becoming an entrepreneur?
- What is the impact of vocational (and general) training?

Introduction - 2

Results so far:

human capital is one important factor
(besides financial capital and characteristics of the environment)

→ standard hypothesis:
the more human capital a person has, the higher is the probability to become an entrepreneur

Sounds reasonable, but doesn‘t do it…

Problems:

- On the one hand:
  - There are entrepreneurs with very low levels of human capital (fish and chips stand at the corner) ☹
- On the other hand:
  - There are employees with very high level of human capital (engineer working for a motorcompany…) ☹

Alternative explanation: „Jack-of-all-Trades“
(Lazear 2005)

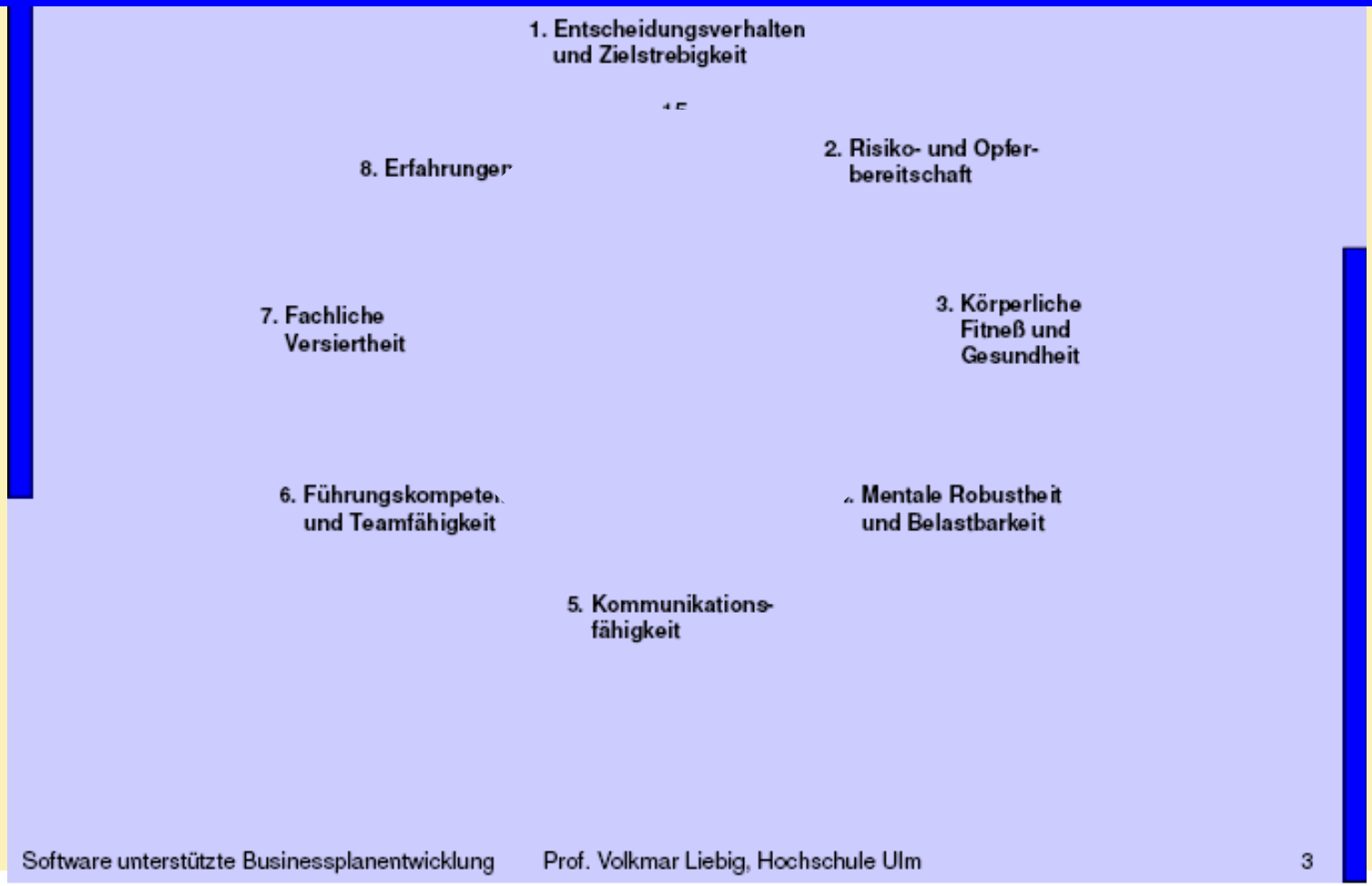
Its not the level of skills that matters, but the balance of different skills

- **Entrepreneurs** have to be good in many dimensions (production, marketing, finance, personnel) → they need balanced skills
  - some Entrepreneurs have „balanced skills“ on low level (fish and ships stand owner)
  - others have „balanced skills“ on high level (founder of a BioTech-start-up).
- If one dimension is missing (for example marketing) the start-up cannot be successful
- the scarcest ressource determines the success of the entrepreneur

- **Employees** are specialists
  - Their skills are combined with those of other specialists within a company
  - The income of specialists is determined by their proficiency in their specialization, i.e. by their strongest skill (e.g. the level of technical skills of the engineer)

  → A very specialiced person would not be well advised to become entrepreneur
  (because as an entrepreneur his/her income would depend on his/her scarcest and not his/her strongest ressource)

Relevance of „Balance“ from a practitioner‘s perspective



Jack-of-all-trades theory: Empirically testable Hypotheses and extension

Hypothesis:

→individuals with a more balanced set of skills are more likely to become entrepreneurs

→individuals with a balanced set of vocational education and training are more likely to become entrepreneurs
(*and individuals with a specialized education are more likely to become employees*)

Our extension:

Entrepreneurs not only need a balanced set of human capital but also a balanced set of social capital (and financial capital)

Why also social capital?

Many empirical studies on success of start-ups show that success of newly founded firms depends on the social capital of the founder

- *Helliwell/Putnam (1999) or Brush (1992) show that social capital determines early start-up success*
- *Anderson/Miller (2003), Weisz/Vassolo (2002), oder Stuart et al. (1999) show that stock of social capital of founders determine survival and growth rate of start-ups*

Our assumption:
if social capital determines success of newly founded firms, it should also determine probability to found a firm (to become entrepreneur)

- *different types of business or personal contacts can be helpful to collect relevant information, screen ideas, know relevant players, improve access to financial capital, etc.*
  → increase probability to become entrepreneur

But again:
it is not so much the level of one type of social capital but also the **balance** of different types of social capital (*personal, professional, family etc*).

→ all types of contacts are required for a start-up to be successfull

→ entrepreneurs need a balanced portfolio of social contacts

If *balance* matters for human capital and for social capital,
it should also matter across human and social capital
(balance of overall portfolio)

→*Neither the „technic-freaks“ nor the „social butterflies“ can be successful as entrepreneurs*

→*Only those with a balance of human and social capital can be successful entrepreneurs*

Our hypothesis:

→Individuals with a balanced set of human and social capital are more likely to become entrepreneurs

(and individuals with a specialized portfolio are more likely to become employees)

Data

Students from 5 universities in the greater Cologne area (1999/2000)

→ Cologne founder study

N = 2,007 students, representative sample for Cologne and West Germany

Written questionnaire with a broad set of variables

- Different types of education and training (= human capital)
- Different types of labor market relevant social contacts (= social capital)
- Willingness to become entrepreneur
- Degree of risk aversion
- Socio economic characteristics like gender, family status etc.

Operationalization

Dependent Variable: Willingness to become self-employed

- Since our respondents are students and starting a business is very rare at this stage, we ask about WILLINGNESS to become an entrepreneur
  - However, actual entrepreneurs are a sub-sample (*Reynolds and Wight 1997; Reynolds 2000*) → WILLINGNESS is a first approximation

→ ***WILLINGNESS*** (four different degrees)

1. I have never thought about becoming an entrepreneur; it is no good for me.
2. I have thought about it, but have no particular business idea (so far)
3. I have thought about it, have a business idea, but have not taken concrete steps to realize it.
4. I have thought about it, have an idea and have taken first concrete steps towards ist realization (like talking to banks or potential customers); or have already founded

Dependent Variable: *WILLINGNESS*

1.	Never thought about entrepreneurship	35%
2.	Tought about it, but no concrete idea yet	21%
3.	Concrete business idea, but no steps taken yet	28%
4.	Concrete business idea, first steps taken/founded	17%

low *WILLINGNESS*

high *WILLINGNESS*

Explanatory Variables

1. Human Capital

- Typical human capital variables *(formal education in years, etc.)* don't help because all respondents have the same general education status (they are studying).

However:
there are large differences in work experience and knowledge about world of business:

- firstly, we have detailled information on how long (weeks, month) a person spent in:
  - apprenticeship,
  - internship,
  - research assistant,
  - full time worker,
  - freelancer,
  - self-employed.

- secondly, we have information on whether students gained entrepreneurship relevant knowledge while studying (on financing issues, on marketing issues → dummy variables)

→ **In total we can distinguish between seven types of skills/knowledge** (skills x_1, x_2,…)

Explanatory Variables

2. Social Capital

- *Individual* level variable (contacts of the respondents):
- distinguish between two types of contacts:

1. Labor market relevant contacts
   originating from university, family/friends, business-world
   - → *UNIVERSITY_CONTACTS,*
   - → *FAMILY&FRIENDS_CONTACTS,*
   - → *BUSINESS_CONTACTS*

2. Personal contacts to self-employed people (family, friends)
   - → *CON_ENTREPRENEUR_FAMILY,*
   - → *CON_ENTREPRENEUR_FRIENDS*

Measuring BALANCE? → 2 indicators

1. **How specialized vs. how <u>broad</u> is the portfolio of entrepreneurship-relevant ressources?**

   → *indicator BROAD_ → similar to „number of roles“ (Lazear 2005)* →

   - BROAD_HC_PORTFOLIO = # number of skill types (types of work experience)
   - BROAD_SC_PORTFOLIO = # (types of contacts)
   - BROAD_OVERALL_PORTFOLIO = #HC + #SC

   BROAD_XX = n_i / n → ϵ $[0,1]$

H1. The higher is *Broad_XX*, the higher is *Willingness*

2. **How <u>balanced</u> vs. how unbalanced is the portfolio?**

   (not only whether they collected a certain type of experience or contact at all, but also how balanced they were in their collection?

   → *indicator UNBALANCE → similar to „max-mean“ (Lazear 2005)*

   - UNBALANCE_HC,
   - UNBALANCE_SC,
   - UNBALANCE_OVERALL

Example: UNBALANCE_HC

→ takes into consideration different lengths of work experience to find out about specialization

Problem:

- absolute length is not comparable across different types of work experience:
  - e.g.: apprenticeships usually last three years (→2 years is little);
  - e.g.: internships usually last 2-3 month (→ 2 years is much).

Solution:

Z-transformation of all variables → *all types of work experience are standardized with sample mean and variance*

→shows whether a person is above or below average in any or in all of the categories

→use Z-variables to build balance indicator *(→* ***max-mean indicator****; Lazear 2005)*

$$UnBalance_i = \max\left[Z_{i1}, Z_{i2}, Z_{i3}, \ldots, Z_{im}\right] - \overline{Z_i}$$

UNBALANCE= 0 if max = mean; i.e. if all skills are on the same level (could be high or low)

→*UnBalance = Distance of strongest skill to average skill level of individual i*

Descriptive statistics:

UnBalance_HC: minimum = 0.15 (very balanced);
UnBalance_HC: maximum = 10.8 (very unbalanced)

Unbalance_SC: = 0.5
Unbalance_SC: = 11.2

Unbalance_OC: = 0.61
Unbalance_OC: =11.2

H2. The higher is *Unbalance_XX*, the lower is *Willingness*

→Use similar procedure for:
UnBalance_*Social Capital (SC)* and UnBalance_*Overall Capital (OC)*

→ 6 Hypotheses

H1. The higher is *Broad_XX*, the higher is *Willingness*

→ H1-a: The higher is Broad_HC, the higher is Willingness
→H1-b: ……Broad_SC,……..
→H1-c: ……Broad_OC,……..

H2. The higher is *Unbalance_XX*, the lower is *Willingness*

→H2-a: The higher is Unbalance_HC, the lower is Willingness
→H2-b: ……Unbalance_SC,……..
→H2-c: ……Unbalance_OC,……..

Control variables

- Degree of risk aversion
  - How important is for you ……. in your future employment relationship
    - … employment security *(1=very unimportant; 5=very important)*
    - … foreseeable income *(1=very unimportant; 5=very important)*
    - … foreseeable career options *(1=very unimportant; 5=very important)*
- Importance of realizing your own ideas in your work life
- age, age^2
- gender
- Study field dummies

Method and empirical results

Dependent variable WILLINGNESS = ordinal → ordered probit estimations

Five models:

- Model I, *replicates traditional studies on human capital (effect of level of HC)*
  - → Results are in line with what previous studies found: (if at all, human capital is positively correlated with WILLINGNESS)

→ introduce Jack-of-all-trades variables in 2 specifications:

1. BROAD_XX

Modell II: includes HC and SC separately
- → Broad portfolio (HC, SC)
- → Broad_HC = *comparable with Lazear (2005) "number of roles"*

Modell III: includes overall portfolio:
- → Broad portfolio Overall

2. UNBALANCE_XX

Modell IV: includes HC and SC separately
- → UNBALANCED (HC, SC)
- → UNBALANCED HC

Modell V: includes overall portfolio:
- → UNBALANCE_Overall

Empirical results – Model II

Willingness	Coef.	Std. Err.	P>|z|
BROADHCPORTFOLIO	1.162133	.2202174	
Apprenticeship	-.007349	.0021183	
Internship	.0001834	.0043009	
Teaching-Assistant	-.0137172	.0028984	
Employee	-.0006267	.0011016	
Free Lancer	.0046682	.0021599	
Self-Employed	.0174649	.0022454	
Academic Skills	-.1389112	.1411114	
BROADSCPORTFOLIO	.2437528	.1021161	
UniversityContacts	-.0096403	.0089037	
Family&friendsContacts	.0059641	.0063407	
BusinessContacts	.0281618	.0072758	
Con_Entrepreneur_family_D	.1904696	.0741326	0.010
Con_Entrepreneur_friend_D	.2472306	.0763559	0.001

Own data, 2007

BROAD_HC
+
similar to Lazear's „number of roles"

H1-a: The higher is BROAD_HC, the higher is WILLINGNESS

Same for Social Capital
+

H1-b: The higher is BROAD_SC, the higher is WILLINGNESS

Empirical results – Model III

Willingness	Coef.	Std. Err.	P>|z|
BROADOVERALLPORTFOLIO	1.472016	.2814574	
Apprenticeship	-.006727	.0020597	0
Internship	.0004645	.0041535	
Teaching-Assistant	-.0121288	.0028477	0.000
Employee	-.000634	.0010783	0.557
Free Lancer	.0053615	.0020759	0.010
Self-Employed	.0182046	.0022096	0.000
Academic-Skills	-.1724112	.1285206	0.180
UniversityContacts	-.0134392	.008797	0.127
Family&friendsContacts	.0048997	.0062379	0.432
BusinessContacts	.0271177	.0070496	0.000
Con_Entrepreneur_family_D	.0963501	.0652399	0.140
Con_Entrepreneur_friend_D	.1781677	.0666788	0.008

Same for Overall_Portfolio
+

H1-c: The higher is BROAD-OC, the higher is WILLINGNESS

Own data, 2007

Empirical results – Model IV; UNBALANC

Willingness	Coef.	Std. Err.	P>|z|
UNBALANCEDHC	-.1380832		
Apprenticeship	-.0029831		
Internship	.0117868	.0045185	0.009
Teaching-Assistant	-.003277	.0030912	0.289
Employee	.0009821	.0010162	
Free Lancer	.0108407	.0020137	
Self-Employed	.0217493	.0022326	
Study-Skills	-.1089679	.122071	
UNBALANCEDSC	-.1419321		
UniversityContacts	.005131		
Family&friendsContacts	.0185236		
BusinessContacts	.0415683	.007981	0.000
Con_Entrepreneur_family_D	.2514653	.060866	0.000
Con_Entrepreneur_friend_D	.2855092	.0565007	0.000

Own data, 2007

UnBalance_HC as expected

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H2-a: The higher is UnBalance_HC, the lower is WILLINGNESS

UnBalance_SC as expected

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H2-b: The higher is UnBalance_SC, the lower is WILLINGNESS

UnBalance_Overall as expected

Empirical results – Model V

Willingness	Coef.		
UNBALANCEDOVERALL|	-.1644784		
Apprenticeship	-.0033706		
Internship	.0117301	.0042735	0.006
Teaching-Assistant	-.0032518	.0029056	0.263
Employee	.0009062	.0010024	0.366
Free Lancer	.0108033	.0019685	0.000
Self-Employed	.0218048	.0021675	0.000
Study-Skills	-.1243728	.1220068	0.308
UniversityContacts	.0044258	.0089449	0.621
Family&friendsContacts	.0183964	.0064822	0.005
BusinessContacts	.040418	.0071195	0.000
Con_Entrepreneur_family_D	.2302538	.0577109	0.000
Con_Entrepreneur_friend_D	.2889543	.0558816	0.000

H2-c: The higher is UnBalance_OC, the lower is WILLINGNESS

Own data, 2007

What is the particular impact of vocational training?

→ look at Model II again

Willingness	Coef.	Std. Err.	P>|z|
BROADHCPORTFOLIO	1.162133	.2202174	0.000
Apprenticeship	-.007349	.0021183	0.001
Internship	.0001834	.0043009	0.966
Teaching-Assistant	-.0137172	.0028984	0.000
Employee	-.0006267	.0011016	0.569
Free Lancer	.0046682	.0021599	0.031
Self-Employed	.0174649	.002	
Academic Skills	-.1389112	.141	
BROADSCPORTFOLIO	.2437528	.102	
UniversityContacts	-.0096405	.008	
Family&friendsContacts	.0059641	.006	
BusinessContacts	.0281618	.007	
Con_Entrepreneur_family_D	.1904696	.074	
Con_Entrepreneur_friend_D	.2472306	.076	

Apprenticeship **training alone has a negative effect on WILLINGNESS;**

→ Look at Model III – Broad **Overall** Portfolio

Willingness	Coef.	Std. Err.	P>|z|
BROADOVERALLPORTFOLIO	1.472016	.2814574	0.000
Apprenticeship	-.006727	.0020597	0.001
Internship	.0004645	.0041535	0.911
Teaching-Assistant	-.0121288	.0028477	0.000
Employee	-.000634	.0010783	0.557
Free Lancer	.0053615	.0020759	0.010
Self-Employed	.0182046	.0022096	0.000
Academic-Skills	-.1724112	.1285206	
UniversityContacts	-.0134392	.008797	
Family&friendsContacts	.0048997	.0062379	
BusinessContacts	.0271177	.0070496	0.000
Con_Entrepreneur_family_D	.0963501	.0652399	0.140
Con_Entrepreneur_friend_D	.1781677	.0666788	0.008

Same for Overall_Portfolio

Own data, 2007

→ Look at Model IV – **UnBalanced indicator**

Willingness	Coef.	Std. Err.	P>|z
UNBALANCEDHC	-.1380832	.0407801	0.001
Apprenticeship	-.0029831	.0019017	0.117
Internship	.0117868	.0045185	0.009
Teaching-Assistant	-.003277	.0030912	0.289
Employee	.0009821	.0010162	0.334
Free Lancer	.0108407	.0020137	0.000
Self-Employed	.0217493	.0022326	0.000
Study-Skills	-.1089679	.122071	0.372
UNBALANCEDSC	-		0.012
UniversityContacts			0.600
Family&friendsContacts			0.009
BusinessContacts			0.000
Con_Entrepreneur_family_D			0.000
			0.000

If balance of portfolio is better controlled for, there is no effect of apprenticeship alone;

The only thing that matters is balance!

… and entrepreneurial experience

Summary

Base model I replicates results of traditional studies

Model II replicates Lazear's results concerning different types of work experience

Our innovation 1:

- introducing **Social Capital** (no. of contacts)
  → the more types of contacts a person has, the higher is WILLINGNESS to become self-employed
  → the argument also holds for Overall-Portfolio (human and social capital)

Our innovation 2:

- Introducing **more precise measurement of balance** of human capital portfolio (taking into account the length of time spend on different types of work experience) → **UNBALANCE**
  → the higher is UNBALANCE, the lower is WILLINGNESS (HC, SC, OC)

Vocational training:

… is important as part of a balanced overall portfolio of entrepreneurship-related ressources

(→ specialization in vocational training increases probability of becoming an employee)

Thank you for your attention!

Descriptives

Variables	Mean	Std. Dev.	Min	Max	Meaning
BROADHCPORTFOLIO	.4976	.1647	0	1	Number of skill types
BROADSCPORTFOLIO	.6067	.2196	0	1	Number of contact types
BROADOVERALLPORTFOLIO	.4636	.1447	0	1	Number of skill and contact types
UNBALANCED HC	1.4510	.9812	.1516	10.7894	max(z-length) Ğ mean(z-length)
UNBALANCED SC	1.1727	.7546	.4891	11.1878	max(z-contacts) Ğ mean(z-contacts)
UNBALANCED OVERALL	1.7221	1.0465	.6098	11.1878	max(z-length_contacts) Ğ mean(z-length_contacts)
Apprenticeship	11.65895	16.1023	0	72	Length of apprenticeship in months
Internship	4.843488	6.555575	0	72	Length of internship in months
Teaching-Assistant	4.6685	10.6105	0	72	Length of working as teaching assistant in months
Employee	20.1589	31.4840	0	480	Length in months
Free Lancer	5.7752	13.9444	0	120	Length of working as free lancer in months
Self-Employed	4.0615	15.6080	0	240	Length of being self-employed in months
Academic Skills	1.8352	1.2651	0	4	Number of academic skills
UniversityContacts	1.6864	3.2820	0	50	Number of contact persons
Family&friendsContacts	3.0325	4.5330	0	50	Number of contact persons
BusinessContacts	2.5665	4.2684	0	50	Number of contact persons
Con_Entrepreneur_family_D	3.0325	4.5330	0	1	Entrepreneur in family? Dummy, (no = 0, yes = 1)
Con_Entrepreneur_friend_D	.6666	.4715	0	1	Entrepreneur among friends? Dummy (no = 0, yes = 1)

Own data, 2007