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THE INNOVATION BEHAVIOUR OF MICRO FIRMS

Innovation is a driving force to use resources efficiently and to increase economy's growth. The present edition emphasizes the abilities and attitudes of micro firms to pick up innovations and presents empirical findings on its effects on firm development in the short term. Micro firms might have some advantages to adopt technological innovations due to their flexible production process, simple organizational structure and better internal communication. Against this, micro firms suffer from diseconomies of scale and internal resource constraints. Existing studies of determinants and effects of innovation have not examined innovation in micro firms sufficiently. These firms account for the overwhelming majority of firms in the Baltic Sea riparian areas, however. The efficient use of resources in these firms due to imple-mentation of innovations is of fundamental importance to strengthen the global competitive-ness of these areas. Given this, it would be appropriate to analyze empirically the determinants of innovations in micro firms and their economic effects in innovating firms.

The first article in this issue provides empirical evidence for micro firms in craft dominated industries in Germany. The second one asks for the role of virtual and non-virtual networks to explain the innovative behavior of entrepreneurs. While public authorities support micro business at several levels, the third article discusses explicitly the success of a specific state aid.

We hope that you will enjoy to read this issue of the Baltic Management Review and that you will benefit from these articles.

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SPECIFIC PATTERNS OF INNOVATION IN GERMAN CRAFT TRADES

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SPECIFIC PATTERNS OF INNOVATION IN GERMAN CRAFT TRADES

Abstract

While many papers point out a size-specific pattern of innovation activities, heterogeneity within SMEs is almost unconsidered. The paper asks for particularities of craft firms with respect to innovation efforts and its effects on firm growth. We use unique survey data with 524 respondents and apply econometric analysis tool to test on particularities empirically. The potential that sales with new products crowd out sales with old products is significantly higher for large craft than for large industrial firms. In contrast to that, small craft firms show a very similar innovation pattern compared to industrial firms.

1. Introduction

There is an ongoing controversy among scientists, representatives of craft organisations, politicians, and the media about the question whether the German craft "sector" is properly prepared for the challenge of 21th century. The craft sector in Germany encompasses a wide variety of different trades and branches including not also certain manufacturing industries, the construction sector, but also several service branches like installation and repair services. About one sixth of all businesses recorded by the Federal Statistical Office belonged to the craft sector. The sector's share in the labour force was around 9% in 2008 in Germany. Therefore, the wealth of regions might be significant affected by the wealth of the local craft sector base.

European market integration, ICT revolution, and rapidly increasing world trade lead to more competition in the domestic market in general and in regions along the border lines in particular. In the current dispute about possible ways to improve the competitiveness of craft firms, innovation strategies play a very prominent role. While there is ample evidence about innovation behaviour of some specific groups of firm population, only little is known about the innovative behaviour and its effect on firm growth in the craft trades. Firms from these industries are often very small and thus, excluded from innovation surveys and studies in Germany like in other countries. In addition, the few studies on innovation in craft firms provide qualitative information rather than a comprehensive set of quantitative data (e.g. Herdzina et al. 1996, Schmalholz/Vögtle 1999, BMWi/BMWA 2002). On this background, a questionnaire survey

was conducted in the first half of the year 2003 to analyze the innovation activities of firms in craft dominated industries.

Our paper contributes to the general topic that innovation activities, its driving force and effects, are specific at some structural dimensions of firm population. Empirical research has addressed the role of innovation activity along several dimensions, for example sector specific differences (e.g. Pavitt 1984), size-specific differences (e.g. Blechinger/Pfeiffer 1999), differ-ences concerning firm leadership (e.g. Czarnitzki/Kraft 2004a) and market position (e.g. Czarnitzki/Kraft 2004b). In fact, SMEs are heterogeneous regarding industry, mode of production, and concernment of regulation. As we differentiate between craft firms and industrial firms, we address two main features of SMEs heterogeneity. Due to several reasons, we expect that innovation processes encompassing new products and process innovations of craft firms differ remarkably from innovation processes of industrial firms. These assumed differences show up in the potential to crowd out old products as well as process innovations and their potential to achieve cost savings in production. First, we estimate a Probit-Model to test on significant differences in the innovation behaviour between craft and industrial firms. Second, we ask for differences in the effects of innovation activities on firm growth for both groups of firms.

We organize our paper as follows. In section 2 we discuss differences between craft firms and industrial firms to motivate differences in the innovative behaviour between both groups. The data is described in section 3. The econometric approach and estimation results are presented in section 4. Section 5 concludes.

2. Why craft firms might differ from other SMEs?

In most countries, the terms "handicraft" and "craft" are used as labels for the production of goods and services mainly done by hand. In contrast, the German concept of "Handwerk" is defined by the "Act Regulating the Craft Sector", as encompassing certain categorised occupations including 94 sectors ("Gewerbe") in 7 sector groups (FME 1994: 7).[1] The German craft sector comprises activities in manufacturing industries, construction work, installation/maintenance/repair

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[1] This classification has been valid up to the end of the year 2003. Since the recent change of craft sector law at the beginning of 2004 ("Drittes Gesetz zur Änderung der Handwerksordnung und anderer handwerksrechtlicher Vorschriften"), it has been required to hold a master craftsman's diploma in Germany for 41 of 98 trades only.

services, but also so called health trades (optometrist, dental prosthesis maker, orthopaedic mechanic and shoe maker). A second feature of legislative regulation is the requirement of master craftman's diploma.

All these craft sectors are "old industries" in the respect that most craft trades exist for a long time although new technologies are often being applied by craft firms nowadays. The main attribute of a craft establishment is the particular mode of production: individual manufacturing of goods (customized or produced in small batch production), based on technical and artistic vocational skills according to consumers' needs, partly using modern technology which often increases the flexibility of tailor-made production. In contrast, industrial firms usually aim at a higher level of standardization in production.

Economic and innovation theory have developed a full range of theoretical approaches to deal with different kinds of innovation processes. However, being mainly directed towards high-tech sectors of the economy, most of these approaches do not fit innovation processes in craft sectors very well: This becomes obvious, when different theoretical approaches of sectoral innovation activities are contrasted with innovation processes in the craft sectors.

One important concept explaining the dynamics of sectoral innovation processes is the product life cycle. In industries which follow a life cycle, fierce new product competition at the early stage of an industry leads to a dominant design later on. In later stages of the industry life cycle, market competition is driven by cost savings and economies of scale (Utterback/ Suárez 1993 a,b). However, this concept is only applicable to certain industries (Sutton 1998: 484). In craft sectors, it does not apply: Firms can make use of economies of scale only to a rather small extent. The supply of goods is characterized by different designs and a close relationship between goods and service activities. In contrast, at each period of time, product innovation in industrial production is restricted by the flexibility of the capital stock used for production on a large scale. Thus, innovation activities are more specific and less transferable in craft sector to alternative uses. Consequently, more radical product innovations in craft sector are restricted by insufficient possibilities to exploit economies of scale and scope. This also reduces the possibility to gain future earnings from R&D activities.

An alternative approach to explain market- and branch-specific innovation activities are innovation regimes (Winter 1984,

Malerba/Orsenigo 1995, Audretsch 1997). Branches with a routinized innovation regime are dominated by a small number of larger firms that make use of economies of scale. In this case, innovation activities are directed towards the reduction of production costs. In contrast, entrepreneurial innovation regimes are characterized by open innovation structures and a high degree of uncertainty regarding the technological develop-ment. In these new branches, smaller R&D-intensive high-tech firms usually play an important part in the development of innovative activities. Craft sectors definitely do not fit into both categories. They usually do not perform R&D either to find new products or to reduce production costs. Innovation is incremental with a close relationship between – usually rather flexible – production processes and the supply of new products or new product variants. The needs of individual customers or small customer groups often trigger innovation, while also new machinery opens up new modes of production.

A third approach highlights the relationship between competition and innovation. The large literature on this topic does not show that a clear relationship between competition and inno-vative activities really exists (Cohen/Levin 1989: 1075). However, many studies find that innovation activities may increase with competition (e. g. Aghion et al. 2005). Probably, competition pressure may also imply more radical innovation activities to escape competition pressure successfully. Following from some legislative restrictions in the craft sector, one may expect that the level of competition is modest for craft firms. This could possibly influence the incentives to innovate.

In this paper, we compare innovation activities in craft firms not with industrial high-tech branches but with industrial firms that operate in the very same industries. Therefore, differences in innovation behaviour should have their roots in the characteristics and limitations which are associated with a more craft-based versus industrialized way of production. Against this background, we expect that there should be similarities in some respects of innovation processes, differences in others. Due to the higher flexibility in producing customized goods, we test the hypothesis that product innovations of craft firms have a higher potential to substitute sales with old products than those of industrial firms. For adapting products to individual needs of customers or smaller customer groups, changing production processes and, therefore, process innovations should also be more important for craft firms than for industrial firms. However, this should not be associated with pronounced cost savings.

Of course, as we have already seen from the definition of craft firms, the distinction between craft and non-craft firms will always be blurred to some extent. Many firms do combine craft and non-craft activities to some degree. In addition, very small non-craft firms operating in the same market segments will usually not be able to realize economies of scale due to a lack of size. It is likely that very large craft firms do rely on economies of scale in some part of their production activities. Therefore, we expect the differences in innovation activities to become obvious by comparing medium-sized craft and non-craft firms.

3. Database and some descriptive results

3.1 Database

Our analysis is based on a firm survey which was conducted by RWI Essen in 2003. In this survey, we adopt the concept of innovations from the OECD Oslo-Manual (OECD/Eurostat 1997). It defines all new products and services as product innovations which are based on new technological knowledge. This also applies if the product or service has already been offered somewhere else. This firm-focused definition has advantages, but also disadvantages in some respects. It is suited to capture the innovative behaviour in all facets – independent from the degree of novelty. Innovations from the perspective of the single firm are not automatically novelties from the viewpoint of the economy – in fact, in most cases they represent the distribution of new products and processes that have been developed somewhere else. Thus, both the success with new products and the context of new product launch play an important role in interpreting the results that are discussed below.

Based on the craft census 1995, a sample of 4,000 craft firms was drawn from the largest database on craft businesses in Germany, which is provided by internet portal handwerk. de. The sectoral and regional distribution of firms and their employees is reflected in the database. Since the response rate was about 15 per cent, the sample finally consists of 619 respondents. This is reasonably high compared to similar firm surveys. Additionally, 171 of them are registered by the Chamber of Industry & Commerce. This is possibly the case if (i) non-craft business activities are performed or (ii) employees are trained in non-craft professions (e.g. sales-persons, commercial apprentices). 38 of the 171 firms report to have commercial apprentices. Therefore, business enlargement into non-craft business seems to be the main reason for the double membership.

Having a significant number of industrial firms with business emphasis on craft-dominated industries, we selected additional 1,000 firms from the Pro Business database 2001 from the firm databyte. These companies are not members of the craft sector in the legal sense, i.e. they are not registered as a member of the Chamber of Skilled Crafts, but they operate in the same industries as the selected craft firms. The selection of firms was organized as follows: We drew a sample of companies with affiliation to a Chamber of Industry & Commerce with activities in five craft-dominated industries: the construction sector and the foodstuff industry, manufacturers of optical and medical instruments, companies operating in the business field of facility management and car service. There is a general difficulty in drawing non-craft firms. Nearly all craft dominated branches in Germany comprise only a very limited number of non-craft firms, mainly of bigger size. Hence, almost all identified companies suited to our purpose were invited to join the questionnaire survey.[2] Since the response rate was about 10 percent, 99 answered questionnaires are available. 44 of respondents are registered by both Chamber of Industry & Commerce and the Chamber of Skilled Crafts. 55 respondents are industrial firms operating in craft-dominated sectors.

Different from the Community Innovation Survey, which is carried out by the ZEW in Germany, we decided to abstain from information regarding the innovation expenditures and growth in detail. Most firms are very small and we expected a high rate of non-response when asking about quantitative data. The relative low number of missing values in our ordinal scaled variables may support this expectation.

We restrict our analysis to small and medium-sized firms with less than 250 employees. Thus, information from 35 respondents of the questionnaire is not used. Further 159 observations are excluded since certain answers could not be completely provided by all respondents. Ultimately, information of 524 respondents are used. 333 of them are "pure" craft firms, 41 are "pure" industrial firms and 150 are registered by both the Chamber of Industry & Commerce as well as the Chamber of Skilled Crafts. Following from the low number of "pure" industrial firms we combine the last two mentioned groups (called "industrial firms") with 191 observations. This group includes firms that do perform industrial activities in a more

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2   A few of them could not be considered, since we identified them as a member of the Chamber of Skilled Crafts subsequently.

or less pronounced manner. Due to lack of information about main characteristics of our both groups in the basic population, we do not weight the answers of each respondent. Therefore, our findings are valid for our final sample only.

3.2 Some descriptive findings

Table 1 shows some descriptive results for the final sample of craft and industrial firms. Craft firms in the sample have on average about ten employees and are on average fifteen years old. Industrial firms are larger and older. Probably, these differences may also affect innovation activities for example. Thus, it is important to control for firm heterogeneity to derive the empirical test on significant differences in innovation activities and its effects in firm growth.

TABLE 1

Descriptive statistics

	Sample of craft firms (N=333)		Sample of industrial firms (N=191)	
Innovation & cooperation	Mean	SD	Mean	SD
Process innovation	0.456	0.499	0.487	0.501
Product Innovation	0.562	0.497	0.571	0.496
Sales share new/impr. products	0.096	0.164	0.101	0.159
Continuous R&D	0.102	0.303	0.236	0.425
Occasional R&D	0.580	0.494	0.503	0.501
Cooperation with firms	0.495	0.501	0.529	0.500
Cooperation with public R&D institutes	0.042	0.201	0.168	0.374
Factors affecting the process innovations				
(firms with answers „most important")				
Cost reduction	0.276	0.448	0.346	0.477
Employment reduction	0.078	0.269	0.073	0.261
Improvement of product quality	0.372	0.484	0.424	0.496
Addition to capacity	0.216	0.412	0.267	0.444
Characteristics of product innovations				
No new components	0.264	0.442	0.183	0.388
Services for firm's commodities	0.126	0.332	0.110	0.314
Additional business	0.195	0.397	0.110	0.314
Factors affecting the product innovations				
(firms with answers „most important")				
Customer demands	0.495	0.501	0.503	0.501
Opening up new markets	0.375	0.485	0.424	0.496
General firm characteristics				
Firms with 1…9 employees	0.709	0.455	0.319	0.467
Firms with 10…249 employees	0.291	0.455	0.681	0.467
Employment	10.577	19.053	47.115	59.866
Firm age	14.754	13.023	24.618	27.885
Export share	0.010	0.052	0.079	0.194
East Germany	0.246	0.431	0.079	0.270

Notes: Final sample includes firms with valid values in all listed variables. Mean: mean of variable, SD: standard deviation.

Table 2 gives a first impression about performance differences between innovative and non-innovative firms. More than half of the firms reported product innovation activities between 2000 and 2002. About one third of them could employ additional employees in the same pe-riod, while around 17 per cent of the non-product innovators reported positive employment change. On the other hand, 37 per cent of non-product innovators faced a decline in employ-ment compared with only 30 per cent of the product innovators. Nearly 43 per cent of the innovating respondents marked growing sales between the years 2000 and 2002. The share of non-product innovators with an incre-ase in sales is comparably low (29 per cent). The Chi2-test statistic emphasizes clearly the rejection of the hypothesis that the differences are random. Descriptive statistics show significant growth differences between product innovators and non-product innovators. The results displayed in the table, however, do not indicate whether innovative behaviour is the reason for the difference.

TABLE 2

Change in employment and sales for product innovators and non-product innovators in the last three years (2000-2002)

	Non-product innovators (N=228)	Product innovators (N=296)	Total (N=524)
Employment			
Decline	37.3	30.1	33.2
Unaltered	45.2	36.8	40.5
Growth	17.5	33.1	26.3
Total	100.0	100.0	100.0
Chi2-Test (H0: share is equivalent in both groups): chi2(4)= 16.09, p-value=0.000.			
Sales			
Decline	45.6	34.1	39.1
Unaltered	25.9	23.3	24.4
Growth	28.5	42.6	36.5
Total	100.0	100.0	100.0
Chi2-Test (H0: share is equivalent in both groups): chi2(4)= 11.68, p-value=0.003.			

4. Econometric approach: Implementation and Results

4.1 Innovation behaviour

One approach to address differences in the innovation be-haviour between craft and industrial firms is to apply a t-test on significant differences in the mean value of each variable for both sets of firms. These differences may be determined, however, from many other characteristics. Thus, we apply a multivariate probit model to test on significant differences between craft and industrial firms. The endogenous variable Y takes the value one if a firm is a craft firm and zero otherwise. The binary outcome results from the unobserved propensity to be a craft firm Y^*_i which depends on a vector of firm spe-cific characteristic X_i (characteristics of innovation activities, employment, age etc.)

$$Y_i = \begin{cases} 0 \ f \ Y^*_i = X_i\beta + \varepsilon_i \leq 0 \\ 1 \ f \ Y^*_i = X_i\beta + \varepsilon_i > 0 \end{cases} \quad (1)$$

with the coefficient vector β to be estimated. The error term ε_i is assumed to be normally distributed with mean zero and variance one.

The estimates are presented in Table 3. Controlling for many characteristics simultaneously, we can detect significant differences in three of sixteen innovation activity variables. Significantly more craft firms introduce process innovations than industrial firms. However, craft firms do not report more frequently than industry firms that cost reduction is very impor-tant for the introduction of process innovation. As expected, the potential to reduce production costs is limited for craft firms

due to high level of individualization of production. In line with the assumption of higher degree of individualization and a decline in demand, craft firms also report to a lower extent than industrial firms that an addition in capacity is very important for the introduction of processes. Therefore, the main reason for the high number of process innovations lies in the close relationship between product and process innovation, i.e. a higher degree of flexibility with respect to new products also implies a higher degree of process innovation.

TABLE 3

Differences between craft and industrial firms (Probit-model)

Dependent variable:	1: craft firm only 0: other firms		1: small craft[a)] firm only 0: other small firms	
Independent variables	coeff.	robust st-error	coeff.	robust st-error
Innovation & cooperation				
Process innovation	0.608**	(0.305)	0.306	(0.369)
Product Innovation	-0.055	(0.300)	-0.08	(0.426)
Sales share new/impr. products	0.232	(0.478)	-0.193	(0.667)
Continuous R&D	-0.110	(0.230)	-0.447	(0.316)
Occasional R&D	0.008	(0.153)	-0.195	(0.211)
Cooperation with firms	-0.090	(0.141)	-0.106	(0.193)
Cooperation with public R&D insti-tutes	-0.437*	(0.257)	0.092	(0.38)
Factors affecting the process innovations				
Cost reduction	-0.181	(0.197)	-0.454	(0.285)
Employment reduction	0.013	(0.263)	0.407	(0.352)
Improvement of product quality	-0.206	(0.299)	0.512	(0.373)
Addition to capacity	-0.375*	(0.201)	-0.153	(0.297)
Characteristics of product innovations			0.157	(0.352)
No new components	0.129	(0.224)	-0.161	(0.322)
Services for firm's commodities	0.012	(0.231)	0.122	(0.326)
Additional business	0.217	(0.227)	-0.2	(0.324)
Factors affecting the product innovations				
Customer demands	-0.026	(0.243)	0.351	(0.276)
Opening up new markets	0.119	(0.200)	-0.454	(0.285)
General firm characteristics				
Employment	-0.016***	(0.003)	-0.141***	(0.041)
Firm age	-0.004	(0.004)	-0.002	(0.007)
Export share	-1.718**	(0.726)	-0.843	(2.115)
East Germany	0.616***	(0.184)	0.654**	(0.267)
Constant	0.845***	(0.167)	1.578***	(0.304)
Number of firms	524		297	
Wald chi2(24)	127.36***		34.24*	
Pseudo R^2	0.2444		0.1156	

The regression includes four industry dummies. [a)] Firms with one to nine employees.

* significant at 10%; ** significant at 5%; *** significant at 1%

Craft firms are very similar to industrial firms with respect to some general indicators of innovation processes: No significant differences exist with respect to continuous versus occasional R&D activities, the introduction of product innovations, and the share of sales with new or improved products. Similarities are also observed for the importance of innovation sources "customer preferences" and "tapping a new market" to introduce new products. The last mentioned similarity in responses speaks against the hypothesis that product innovations of craft firms may not have a significant larger potential to substitute sales with old products. We will test this hypothesis in detail in the next section.

Finally, a lower share of craft firms cooperates with public research institutions. This kind of cooperation may result in more radical innovations than cooperation with other firms. The finding may be in line with the expectation that industrial firms have greater economies of scale, which enable them to obtain future revenues from their R&D activities.

The control variables show the expected sign and significance. In line with descriptive findings in Table 1, craft firms are significant smaller and less oriented towards export activity than industrial firms. More similarities between craft and industrial firms are detected if we focus on micro firms with one to nine employees only (see columns four and five in Table 3). Neither the variable process innovation nor the variable cooperation with public research institutions show a significant sign. We conclude that small craft firms are more similar to small industrial firms than large craft firms to large industrial firms.

4.2 Innovation behaviour and firm growth
This section firstly describes the econometric framework we use to analyse the relationship between innovation activity and change in employment as well as sales for craft and industrial firms. After that, we present the estimates.

Asking for change in sales and employment on an ordinal scale may imply that respondents have threshold model in mind. The respondent i indicates "increased" if the current change in firm performance measure, hereafter denoted by Y_{i^*}, is above an upper threshold μ_2. For true metric values below a lower threshold μ_1, the respondent i answers "decreased". If the true metric value is between the lower and upper thresholds, the respondent i reports "unchanged". Ordinal values in endogenous variable suggest to apply an ordered probit model to estimate the unobserved (latent) firm performance variable Y_{i^*} (see Greene 1997: pp. 875).

$$Y_i^* = X_i\beta + X_i \cdot D_i\gamma + Z_i\delta + \varepsilon_i \quad (2)$$

with the coefficient vector β to be estimated. In addition, we add on interaction terms $X_i \cdot D_i$ with the coefficient vector γ to highlight differences between craft firms and other firms in craft dominated industries. The vector Z_i contains three industry dummies and one regional dummy (one for firm's siting in East Germany and zero otherwise). The error term ε_i is assumed to be normally distributed with mean zero and variance one.

With regard to the heterogeneity of innovation activities, the vector X_i contains the following three innovation variables: process innovation, product innovation and the share of sales with new/improved products related to total sales, in the following labelled as innovative sales. The last mentioned variable gains increased attention from scientific scholars. Klomp/Leeuwen (2001) find a positive employment effect of the share of sales with new products related to total sales on sales growth for the Netherlands. Janz et al. (2004) derive a positive impact of sales with new products on firm productivity in Germany and Sweden. Crepon et al. (1998) obtain similar results for France. Jaumandreu (2003) develops a quite different growth model to address the employment effects of sales with new products. Peters (2004) applies the model for Germany and detects a significant positive effect of sales change due to product innovations on net employment growth (employment growth minus nominal rate of sales growth to be attributed to old products).

The findings are presented in Table 4. In the model "change of sales (three classes)" we detect significant differences between craft and industrial firms in two of three innovation variables. The interaction term for the variable "process innovation" shows a positive sign, but it is insignificant at conventional significance levels. In contrast, craft firms with product innovations have a significant higher probability to achieve a higher category in sales change than industrial firms. Contrarily, industrial firms perform better than craft firms if the sales with new/improved products have increased. The interaction term is (weak) significantly positive correlated with the latent endogenous variable (p-value = 0.091).

TABLE 4

Innovation activity and firm performance (ordered probit model)

Dependent variable:	Change in sales (three classes)	Change in employment (three classes)
Process innovation	0.086	0.104
	(0.133)	(0.129)
Process innovation X IND	-0.059	-0.193
	(0.222)	(0.213)
Product Innovation	0.389***	0.246
	(0.150)	(0.152)
Product Innovation X IND	-0.437*	-0.174
	(0.263)	(0.243)
Sales share new/impr. products	0.107	0.311
	(0.483)	(0.469)
Sales share new/impr. Products X IND	1.545*	1.189
	(0.914)	(0.922)
Export share	-1.334	-0.912
	(1.449)	1.239
Export share X IND	2.638	2.869**
	(1.627)	1.394
Employment	0.023***	0.021**
	(0.009)	(0.009)
Employment X IND	-0.016	-0.013
	(0.010)	(0.010)
Employment^2	-0.00017**	-0.00016*
	(0.00008)	(0.00008)
Employment^2 X IND	0.00014*	0.00013
	(0.00008)	(0.00009)
Firm age	-0.044***	-0.039***
	(0.009)	(0.008)
Firm age X IND	0.021**	0.015
	(0.010)	(0.010)
Firm age^2	0.0004***	0.00032***
	(0.0001)	(0.00008)
Firm age^2 X IND	-0.00028**	-0.00019**
	(0.00011)	(0.00009)
East Germany	-0.349**	-0.232*
	(0.137)	(0.130)
Observations	524	524
Wald chi2(22)	81.62***	85.60***
Pseudo R^2	0.0686	0.0707

Robust standard errors in parentheses.

All regressions include four industry dummies. IND: Industrial firms

* significant at 10%; ** significant at 5%; *** significant at 1%

Probably, innovative sales as main variable of interest is biased due to endogeneity problems, meaning that unobservable factors like entrepreneurial abilities are positively correlated with innovative sales and firm performance simultaneously. Thus, we re-estimate equation (1) for industrial firms with simple OLS technique to derive the Durbin-Wu-Hausman (DWH) test on endogeneous regressors. The DWH statistic is 2.462 (p-value: 0.118) and thus, the null hy-pothesis that the simple OLS model is consistent seems to be questionable.[3] Following Peters (2004) we use "continuous R&D" as instrument, which is significantly correlated with innovative sales but is uncorrelated with the error term of equation (2).[4] Applying the Instrumental-Variable estimator for the sample of industrial firms, the coefficient estimate for innovative sales variable remains significant positive at a p-value of 0.074.

The findings for the variable employment change are slightly different from the above mentioned one for "change in sales (three classes)". Neither the outperformance of craft firms with product innovations nor the outperformance of industrial firms with increasing innovative sales is evident. This finding is not really surprising. The threshold to report an employment creation or reduction is many times higher than the threshold to answer changes in sales. A remarkable change in sales is necessary to adjust firm's employment level.

In section 2 we argued that size specific differences in the role of innovation for firm performance are also expected. Probably, the effect of the innovative sales variable in firm performance equation differs between small firms and larger ones. Henceforth, we split our sample and estimate equation (2) for micro firms (one to nine employees) and other SMEs (10 to 249 employees). The estimation results are shown in Table 5. First we observe that product innovation is only significant positive in the "change of sales (three classes) model" for the sample of micro firms. Lachenmaier/Rottmann (2007) detected an analogous size specific pattern. Product innovations are significant positive only in the employment growth model for firms with less than 200 employees. The variable is insignificant for the sample of firms with more than 200 employees.

A further size specific difference is detected for the interaction term of innovative sales variable. The interaction term is significant positive (p-value = 0.046) for industrial firms with 10 to 249 employees in the "change of sales (three classes)" model. Probably, advantages of standardization in industrial firms may require minimum efficient sizes. In contrast, craft and industrial firms with lower firm size seem to be very similar concerning the effects of innovation on firm performance. Finally, we exclude the "pure" industrial firms from the group of industrial firms to check the robustness of all listed empirical findings. We do not detect any change in the significance of all mentioned variables.

The findings for larger industrial firms point out that craft firms may have some limitations to achieve a higher propensity to grow due to sales with new products. One may argue that craft firms have the chance to expand their business activities in non-craft related business areas to use growth chances due to new products. At this point it is difficult to evaluate whether this kind of adjustment of business strategy really results in better firm performance. An explicit analysis for firms changing from pure craft firm's business to a mixed craft/non-craft firms business is necessary to shed some light on this question.

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[3] The DWH statistic is based on an additional regression. Equation (1) is extended by including the predicted value of innovative sales variable and an F test for significance of this additional regressor is applied.

[4] The partial R^2 was 0.0764 and the F-test was 8.94 (p-value = 0.0032). Both test statistics speak in favor of the relevance of the instrument.

TABLE 5

Innovation activity and firm performance according to firm size (ordered probit model)

	Change in sales (three classes)		Change in employment (three classes)	
	Micro firms (1-9 empl.)	Other SME's (10-249 empl.)	Micro firms (1-9 empl.)	Other SME's (10-249 empl.)
Process innovation	0.026	0.123	0.058	0.345
	(0.163)	(0.266)	(0.161)	(0.256)
Process innovation X IND	0.112	0.028	-0.395	-0.214
	(0.431)	(0.340)	(0.365)	(0.334)
Product Innovation	0.369*	0.388	0.232	0.273
	(0.188)	(0.277)	(0.196)	(0.268)
Product Innovation X IND	-0.223	-0.482	-0.237	-0.219
	(0.481)	(0.377)	(0.392)	(0.356)
Sales share new/impr. products	0.504	-0.709	0.381	-0.462
	(0.669)	(0.803)	(0.656)	(0.777)
Sales share new/impr. Products X IND	0.680	2.931**	1.118	2.330*
	(1.688)	(1.471)	(1.538)	(1.296)
Export share	-1.407	0.920	0.516	1.017
	(1.837)	(2.256)	(1.542)	(2.232)
Export share X IND	3.836	-0.190	-6.368	0.035
	(4.680)	(2.415)	(5.382)	(2.336)
Employment	-0.216	0.024*	-0.041	0.030**
	(0.143)	(0.013)	(0.135)	(0.013)
Employment X IND	0.022	-0.014	0.006	-0.020
	(0.199)	(0.013)	(0.187)	(0.013)
Employment^2	0.030*	-0.00017*	0.003	-0.00023**
	(0.016)	(0.0001)	(0.016)	(0.0001)
Employment^2 X IND	-0.018	0.00013	-0.003	0.00019*
	(0.022)	(0.0001)	(0.021)	(0.0001)
Firm age	-0.068***	-0.022	-0.055***	-0.023
	(0.013)	(0.017)	(0.012)	(0.014)
Firm age X IND	-0.027	0.005	0.048	-0.002
	(0.040)	(0.018)	(0.035)	(0.016)
Firm age^2	0.0006***	0.00027	0.00057***	0.00009
	(0.0001)	(0.00017)	(0.00014)	(0.0001)
Firm age^2 X IND	0.002*	-0.00017	-0.001	0.00003
	(0.001)	(0.00018)	(0.001)	(0.0001)
East Germany	-0.241	-0.568**	-0.136	-0.389
	(0.171)	(0.234)	(0.167)	(0.237)
Observations	297	227	297	227
Wald chi2(22)	60.53***	46.96***	46.78***	59.81***
Pseudo R^2	0.094	0.0892	0.0605	0.1131

Robust standard errors in parentheses. All regressions include four industry dummies. IND: Industrial firms

* significant at 10%; ** significant at 5%; *** significant at 1%

5. Conclusion

Within SME population, craft firms and industrial firms differ in several characteristics like individualization of goods and services, demand conditions and regulation by law. Against this background this empirical paper asks for differences between craft and industrial firms with regard to innovation activities and their effects on firms' propensity to grow. The analysis based on unique dataset prepared in the first half of 2003.

The results of the econometric analysis clearly show that craft firms with 10 to 249 employees differ remarkably from industrial firms of similar size. Large craft firms have a significant higher propensity to introduce process innovations and these firms also report to a significant lower extent that adding to capacity is very important for the introduction of new processes. These remarkable differences might be the key for understanding the differences in the effects of innovation on firm growth. Large craft firms do more substitute sales with old products due to product innovations than those of industrial firms. In contrast to that, small craft firms with one to nine employees do not differ remarkably from small industrial firms concerning the innovation behaviour and its effects on firm growth.

Based on our empirical findings we conclude that firm size is an important structural dimension to detect different effects of innovation output on firm growth for industrial firms. Only large craft firms might be exposed to specific conditions compared with large industrial firms. Therefore, it is evident that especially large craft firms have an incentive to expand their business activities into non-craft related business areas with new products in order to exploit growth opportunities like large industrial firms. A further analysis for craft firms which had changed their business strategy towards non-craft related businesses would be necessary, however, to test this expectation accurately.

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VIRTUAL NETWORKING:

ARE ENTREPRENEURS GAINING INDEPENDENCE FROM TIME AND SPACE?

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VIRTUAL NETWORKING: ARE ENTREPRENEURS GAINING INDEPENDENCE FROM TIME AND SPACE?

Abstract

The paper discusses the implementation and use of modern IT in networks of and for women entrepreneurs. Empirically, it draws on an online survey with 241 network participants and in-depth interviews with seven 'traditional' networks and three virtual women entrepreneur communities in Germany. We investigate similarities and differences between virtual and 'traditional' entrepreneur networks, focusing on the importance of spatial proximity for the participants of both types of networks. Our results indicate that modern IT does not mechanically substitute spatial proximity as a success factor for networking and networks. On the contrary, our analysis provides evidence of a growing importance of spatial proximity from the perspective of participants as well as organisers of virtual women entrepreneur networks. In this regard, the paper contributes to the identification and understanding of the potentials and limits of modern IT applications for networking activities of entrepreneurs.

1. Introduction

Entrepreneurship research of the last decade increasingly has drawn attention to the link between successful venture creation, enterprise growth and the involvement of entrepreneurs in network activities. Spatial proximity permits regular, manifold and intensive face-to-face contacts, allowing for the development of trust within the network, which has been described as the lubricant and glue for networking activities (Anderson/Jack 2002). With the advent of Information and Communication Technology (ICT), the last decade saw the emergence of several Internet-based business networks. In Germany, such networks encompass several hundred participants, which is much higher compared to the membership of many 'traditionally organised' entrepreneurs' networks. However, the impact of ICT on the structures and management of entrepreneurs' networks, their network activities and communication channels has drawn less attention until today, especially with respect to spatial aspects and the creation of trust in virtual networking contacts.

In this context, our paper will investigate the role of spatial proximity with respect to the activities of mainly Internet-based ('virtual') entrepreneur networks, concentrating on networks for and of women entrepreneurs. Firstly, we will analyse whether Internet-based virtual relations substitute face-to-face contacts, as they render access to information more efficient, and how trust-building occurs in virtual networks. Secondly, we are interested in finding out whether the implementation of ICT in

'traditional' entrepreneur networks tends to reduce the importance of spatial proximity with respect to network activities and management. More specific research questions include:

1. Which are the similarities and differences with regard to the structure, management, communication and activities of virtual and non-virtual (women) entrepreneur networks?
2. How important is the network for its participants in terms of business development? Can we observe differences between virtual and non-virtual networks?
3. Are there differences in usage and assessment of the same type of activities and communication between networks? What are the conclusions with respect to the role of spatial proximity in networks?

This paper consists of four parts. The first part contains a conceptual review, followed by a short description of the methodology and the survey sample characteristics. The empirical results will be presented in part three, whilst part four discusses conclusions and implications.

2. Literature review
2.1 Social capital, trust and entrepreneurship

Social capital has become a popular concept in entrepreneurship research. It originates from sociology, where prominent authors such as Putnam, Coleman and Bourdieu identify social capital in terms of social institutions. The sources of social capital are understood to lie in the social relationships of actors. Adler and Kwon (2002) understand social capital as being based on social relations. The authors identify bonding and bridging forms of social capital, with the former referring to intra-firm relationships, the latter to inter-firm relations (Adler/Kwon 2002: 19-21). *The bridging form of social capital* can be of particular importance in starting and growing a firm. With respect to this form, social capital is understood to be inherent in networks and networking. Research shows networks and network contacts to be important for the establishment, development and growth of business (e.g. Brüderl/Preisendörfer 1998, Chell/Baines 1998, Greve 1995, Jenssen 2001, Lechner/Dowling 2003, Liao/Welsch 2005, Witt 2004). Jenssen (2001) analyses the impact of social networks on start-up success, demonstrating their direct and indirect effects (through access to resources) on the degree of start-up success. This applies especially to the number of initial weak ties and emerging strong ties. From their study of nascent entrepreneurs, Liao and Welsch (2005) conclude that it is less the amount of social capital inherent in networks which matters for entrepreneurs, but more how they utilize their social ties and interactions,

thus drawing attention to the social and personal interactions needed to create social capital and trust-based relations.

Networks also play a role in creating legitimacy for new ventures. Aldrich (2000: 217) indicates that successful new entrepreneurs are more likely to build networks of trust, which assists them in creating legitimacy within the market. *Trust* is the 'lubricant' without which network activities would not be possible, thus being recognised as one of the important properties of social capital (Anderson/Jack, 2002). Regional and sectoral factors facilitate trust building in those cases where they allow entrepreneurs to draw on common rules and conventions (Welter 2005). This is a fact which is also widely known from the literature on Italian districts (e.g., Dei Ottati 2005), where the local 'code of fair behaviour' creates a specific trust milieu within a region and for the district's firm.

Although trust might be considered higher in strong ties (such as family or friends), it is the use of weak ties within a network, which most studies have found to be related to business growth. For example, in their study of UK owner-managers, Chell and Baines (1998) concluded that especially weak ties influence business growth, as they help the entrepreneur to access non-redundant ideas and resources. On the other hand, Brüderl and Preisendörfer (1998), in their study of 1.600 Bavarian founders, identified support from strong ties as being more important for enterprise survival and success in the early venture creation stage compared to weak ties. During the early stages of venture creation particularly, strong ties can assist nascent entrepreneurs in being persistent (Davidsson/Honig 2003). Greve (1995) observed that while it is important for nascent entrepreneurs to maintain a number of weak ties in order to obtain non-redundant information (see also Burt 2000), it is also important to belong to a relatively dense network with trust-based personal relationships. Trust, the author argues, is important during the venture creation process because entrepreneurs benefit from discussing their idea with several people, which creates a risk that one of these people may copy the business idea. In this context, strong network contacts might facilitate the creation of trust.

2.2 Virtual networks, trust and spatial proximity

How does ICT change the development of social capital and trust-based relationships? For two decades ICT is increasingly penetrating economic processes, including venture creation, opening up new ways for intra-firm and inter-firm relationships (Picot/Neuburger 2005, p. 79). Through Internet-based networks entrepreneurs can easily gain access to opportunities and resources needed to set up and develop a business. Therefore, some authors consider ICT as a valuable means for entrepreneurs to accumulate social capital, albeit with ambiguous results for the involvement in networks: A large-scale Web survey in the US demonstrated that although the Internet increased personal connectivity and organizational involvement, it simultaneously could decrease commitment to community (e.g., Wellmann et al. 2001).

Regarding the value of Internet-based networks, the literature review shows two contrasting perspectives. One view understands 'virtual communities' (and enterprises) to be organisations which permit an intensive and cost effective Internet-based communication between spatiotemporal disconnected participants (Malone 2004). Discussion platforms (chat rooms, mailing lists) and joint databanks can be operated quite easily in order to provide information and contacts for the user, i.e., the network member. Based on a joint ICT architecture, economic actors are also able to temporarily bundle core competencies and resources in order to offer customized products and services, thus creating a so-called virtual enterprise. In this perspective the technology itself is seen as a central means to enable joint activities and communication of economic actors (Davidow/Malone 1992, Venkatraman/Henderson 1998, Tapscott et al. 2000) irrespective of existing governance structures and the spatial distribution of participants.

However, this view has been criticized for neglecting the embeddedness of entrepreneurship and networks, especially also the socio-economic and spatial context in which networks and network participants operate (cf. Johannisson et al. 2002, Rautenstrauch 2002, Riemer/Klein 2005). There appears to be a 'trust dilemma' included in virtual networking (Handy 1999, Picot/Neuburger 2005, p.85). As participants in virtual networks interact on short notice, this could impede the emergence of trust-based networking relationships. Some research reveals that a solely electronically-based communication hampers personal interaction in business networks: The interaction via ICT includes possibilities for misunderstanding. If network participants do not use face-to-face meetings to settle this,

long lasting conflicts might arise (Amstrong/Cole 2002, Andres 2002). Face-to-face interaction permits a visual observation of the partner, joint side-activities such as eating, drinking and informal exchanges. This allows business partners to establish and strengthen trust-based personal relations (Nardi/Whittacker 2002). ICT obviously cannot substitute this kind of personal interaction in the context of tightly coupled work (Olson/Olson 2000).

Studies in geography and regional economics strongly emphasize this dual character of ICT usage in firms and inter-organisational cooperation. Where electronically supported cooperation permits the access to resources and contacts in distant locations, communicative distances no longer play an important role, which might increase individual and local competitiveness (Gräf 1993, 2001). However, the usage of ICT can also contribute to a larger codification of tacit knowledge, thus facilitating the transfer of competitive knowledge-based advantages towards potential competitors. This 'ubiquitification' in turn could contribute to a loss of competitiveness of a single entrepreneur or a group of economic actors (Maskell et al. 1998, Piscitello/Sgobbi 2004). Therefore, spatial proximity and the local embeddedness of personal interactions continue to play an important role in creating competitive advantages (Maskell/Malmberg 1999, Schamp/Lo 2003). In other words: Because the wide usage of ICT in the business world permits vast access to new resources it simultaneously stimulates a renewed interest in spatial proximity. Therefore, even in the age of Internet spatial proximity might play a role for ICT to be effectively used in virtual (business) relations and virtual networks to be successful.

3. Empirical design
3.1 Methodology and sample
The paper draws on empirical results from a research project which analysed the importance of networks supporting women start ups in Germany, commissioned by the Federal Ministry of Economic Affairs (cf. Welter et al. 2004). Methodologically, the study employed a multidimensional approach, combining qualitative elements (document analysis, in-depth interviews) on the supply side (i.e., the networks) with a standardised online survey of female network users and regional case studies. For this paper we draw on the findings of 14 in-depth interviews with promoters from ten networks and the results of the online survey with 241 valid observations. The online survey was based on a standardized questionnaire. It was published on the websites of the ten selected networks as well as on three national Internet platforms for women entrepreneurs in February 2004.

In order to select partners for the in-depth interviews, we selected ten typical networks, using a classification of a) organization structures (real structures, virtual), b) target group (start-ups/existing firms, potential entrepreneurs) and c) gender (exclusive women, non-exclusive). Secondly, face-to-face interviews, supported by topic guidelines, were carried out with promoters from three virtual networks (two exclusively for women, one non-exclusive) and organisers of seven 'traditional' networks (six exclusively for women, one non-exclusive).

3.2 Statistical analysis
The online survey covered 264 respondents. Because of missing answers, we reduced the number to 241 valid observations. For our descriptive, bi- and multivariate analyses we statistically evaluated 18 out of 30 questions (cf. Welter et al. 2004: pp. 171). When performing hypothesis tests in the following analysis, we will have to assume a randomly selected sample of independent observations. However, one has to bear in mind, that, since each website user decided by herself whether to participate in the survey or not, we do not know whether this assumption is valid. Therefore, the quantitative results are meant to give only preliminary suggestions on the topic. A statistically thorough analysis of better data will remain a task for future research.

The statistical analysis includes group mean comparison tests and multiple regression analyses. The group mean comparison test employs t-statistics to test the null hypothesis that the variable y's mean in group A equals the variable y's mean in group B. Based on a prior variance-comparison test we will account for unequal variances between groups if required.

We will complement the analysis by multiple regression analyses using binary and ordered probit models. That way, we can analyse the determinants of interest on network usage and assessment while holding other factors constant. Binary probit models are used when the dependent variable is a discrete binary variable. The probability that the dependent variable y equals 1 is modelled as follows:

$$P\left(y=1\,|\,x\right)=P\left(\varepsilon > x'\beta\right)=F\left(x'\beta\right)=\Phi\left(x'\beta\right),$$

where *y* is the dependent variable, *x* contains the explanatory variables and an intercept and *ε* is the error term, which is assumed to be normally distributed with zero mean and variance equal one. By using maximum likelihood methods we will estimate the coefficients *β* and use the estimates to calculate the marginal effect at the means for each explanatory variable.

Ordered probit models apply when the outcomes of the dependent variable can be ordered hierarchically. In our application, the dependent variable has three hierarchically ordered outcomes. The probability of the dependent variable y to equal a particular outcome is modelled as:

$$P\left(y=1\,|\,x\right)= P\left(x\beta +\varepsilon < \mu_1\right)= \Phi\left(-\,x\beta\right),$$
$$P\left(y=2\,|\,x\right)= P\left(\mu_1 < x\beta +\varepsilon < \mu_2\right)= \Phi\left(\mu_2 - x\beta\right) - \Phi\left(\mu_1 - x\beta\right),$$
$$P\left(y=3\,|\,x\right)= P\left(\mu_2 < x\beta +\varepsilon\right)= 1-\Phi\left(\mu_2 - x\beta\right)$$

where *y* is the dependent variable, *x* contains the explanatory variables and *μ1* and *μ2* are threshold parameters with *μ1* set to zero and *μ2* to be estimated together with the *β*. The error term *ε* is assumed to be normally distributed with zero mean and variance equal one. Same as in the binary probit model, we can use maximum likelihood to estimate the coefficients and calculate marginal effects at the means for each category of the dependent ordinal variable. We will confine the presentation of results to one category only in order to keep the presentation as concise as possible.

3.3 Survey sample characteristics

Before we report the results from our analysis, this section gives some background information on the sample. The sample contains of respondents with an affiliation to altogether 37 entrepreneur networks. In addition many respondents declared a membership in professional associations. Out of the 37 networks 11 can be considered as a virtual network and 26 as 'traditional' (= non-virtual) network organisation. In each group two networks were non-exclusive in terms of gender while the vast majority was exclusively for women entrepreneurs.

Two thirds of the 241 respondents were younger than 40 years, when founding their business. Likewise two thirds of the entrepreneurs attained a university or college degree. And half of the respondents founded their firm either out of a period of family management, vocational qualification or unemployment (annex 1).

Nearly two thirds of the firms are younger than six years. Around 90 % are located either within large cities or within highly urbanised areas. Nearly all respondents operate in the service sector, i.e. 37% of them provide business related services and 59% personal services. Three quarter of the respondents are engaged full time with their businesses. And 71 % operate as self employed persons (annex 2). From these we conclude that the sample is a satisfactory representation of the population of female entrepreneurs in Germany.

With regard to our topic we divided the sample in two groups. Around 44 % (107) of the respondents are mainly engaged in virtual entrepreneur network organisations (altogether 11), whereas 56% (134) are affiliated with 'traditional' non-virtual networks (altogether 26 / see figure 1). In both groups two networks were open for women as well as for men.

Nearly 60% of the members of virtual networks are engaged in two or even more network organisations, while the majority of members in non-virtual networks are associated with only one organisation (figure 1).

Memberships in different network organisations
share in %
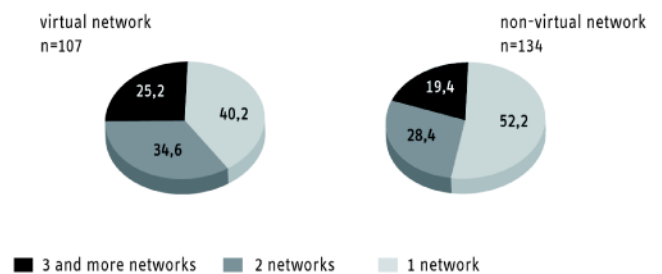
Source: sfs/RWI-Questionnaire survey 2004

Figure 1

4. Empirical results

4.1 Activities, structure and communication in virtual and 'traditional' networks

From the in-depth interviews with network promoters we can draw information with regard to similarities and differences in goals and activities, size, structure and the style of communication (cf. Welter et al. 2004). This allows us to study the importance of ICT from the perspective of network promoters, i.e., which role does ICT play for offering services and managing the network. Both types of network organisations aim at strengthening the entrepreneurial competences of their members. The second goal is lobbying towards politicians and intermediaries in favour of (women) entrepreneurs and small businesses.

In this context *'traditional'* networks consider local or regional regulars' roundtable meetings ('Stammtisch') as very important: This is the main platform to exchange views, to gather information, to establish contacts and to seek advice from experienced entrepreneurs. Seminars, workshops and individual consultations as well as jointly conducted cultural activities complement the range of network services allowing for face-to-face contacts. Furthermore, printed materials such as newsletters or handbooks are an important means to ensure the flow of information within the network organisation. Most networks offer additional membership services such as insurances, car renting, advertising facilities, software packages, joint visits of trade fairs at reasonable prices. Since all 'traditional' networks operate in the form of a registered association or a cooperative society, their organisational structure is more or less characterised by fixed responsibilities with regard to administration, finances, public relations and conflict management.

Latest from 2000 onwards all 'traditional' network organisations established homepages. However, the quality of websites still shows remarkable differences across networks. Some networks use their website only as a kind of blackboard for the latest news and main contact addresses. Others have already implemented joint data banks with exclusive access for their members and even chat rooms. In any case E-mail facilities are linked to the networks' website.

With regard to network size, the surveyed 'traditional' networks differ remarkably with the smallest ones comprising about 50 to 200 members, some of them representing around 500 members. while iust two or three unite 1.000 or more members.

Virtual networks showed a rapid growth since the middle of the 1990s and unite generally a few hundred members. They use the Internet platform as their main means for network activities. This includes the collection and exchange of information via electronic newsletters and data banks as well as chat rooms for discussing business topics. In several networks the electronically based discussions are structured by mailing lists for different topics, while volunteers moderate the discussions, making sure that netiquettes are paid attention to. In one network the Internet-based discussion forum is complemented with a telephone hotline. In this way, entrepreneurs get access to information through personal contacts.

Apart from this, virtual communities have started to foster the systematic emergence of a system of regional groups. This occurs in the form of a monthly arranged regulars' meeting, seminars, workshops or irregular meetings of network participants who are engaged in lobbying and awareness building activities in favour of (women) entrepreneurs. This is also reflected in the websites of virtual networks where more and more 'real time' meetings are announced. A striking example refers to one particular virtual network which announced its closure via Internet, since the commitment of its members to communicating only via mailing lists declined rapidly (www.mediacoaching.de, 10.01.2006).

Interestingly, network promoters in both 'traditional' and virtual networks consider all forms of moderating and structuring ICT-based communication to be very time consuming. In order to manage the network, they prefer face-to-face meetings. In line with results of the literature review, our empirical findings indicate a role for spatial proximity also in virtual networks.

This is supported further by the results of our online survey (table 1). Most of the members of virtual networks use the Internet 'often', i.e. daily or several times per week, but not necessarily within their main network organisation (compare table 2 below), compared to only 57 % users of 'traditional' networks. A statistical test suggests that these behavioural differences are significant.

TABLE 1

Style of communication

Type of network			
	Virtual	**Non-virtual**	**T-value***
How often do you ....?			
use the internet for professional purposes			
often**	84.00	56.50	-4.88
sometimes	16.00	38.90	4.10
never	0	4.60	
N	106	131	
chat for professional purposes			
often	50,00	11,40	-6.86
sometimes	37,70	55,00	2.67
never	12,30	33,60	4.07
N	106	131	

Source: sfs/RWI – Questionnaire survey 2004. – Note: *T-value from a group mean comparison test. – **'daily' or 'several times in a week'. Bold figures indicate significance at the 5% level.

Furthermore, half of the virtually linked entrepreneurs use chat facilities daily or at least several times in a week. The same is true for only about 11% of the entrepreneurs being in the first instance associated with 'traditional' network organisations. On the other hand, one third of participants in 'traditional' networks and a surprisingly high share of 12 % of the virtually linked entrepreneurs show no preference for an Internet-based discussion. Again, this suggests that in virtual networks internet-based and personal ways of interaction are co-existing.

4.2 Networks and enterprise development

Networks seem to provide strong support for the members of virtual communities. Nearly 60% of relevant respondents first turn to network participants for advice and assistance in business matters. Members of 'traditional' networks show a higher preference for turning to individuals such as family members, friends or former colleagues, and professional consultants. A regression analysis indicates that these differences are significant at the 10% level, even when controlling for other factors that might influence help-seeking behaviour (annex 3).

Moreover, members of virtual networks show a significantly higher probability to consider their network as very important for a number of particular business matters, ceteris paribus.

This includes the decision to start a venture, the design of a business concept, the search for business partners, first market entry and overcoming business crisis (annex 3). No significant differences between virtually and 'traditionally' linked respondents occur with regard to measures for stabilising the young firm, the entry into new business segments and the establishment of a new venture after a first failure (regression results can be provided by the authors on request).

To sum up: Internet-based networks do not only provide a vast array of information but also seem to be a more appropriate source for advice and assistance for their participants than traditional networks. A reason might be the possibility to contact a larger number of other network members much quicker than would be possible in 'traditional' networks. The larger size of virtual networks could play an additional role, as this allows participants to use and access a larger pool of information sources. Thirdly, virtually linked entrepreneurs often join several networks while the members of 'traditional' networks mainly stick to one organisation. On the whole, virtual network members might be more familiar with drawing advice and assistance from networks. However, these findings do not allow a final conclusion with regard to the role of face-to-face

contacts (spatial and social proximity) within virtual networks. With the help of IT-based communication channels one may identify and contact valuable advisors more easily, but one cannot automatically assume that an entrepreneur will receive all of the requested information.

4.3 Usage of network activities and communication facilities

We have shown above that internet and chat facilities are generally used by a significantly larger proportion of virtual network participants than of 'traditional' networks. The same is true for the use of the organisations' website and chat rooms (table 2).

TABLE 2

Usage of network services

Type of network			
	Virtual	**Non-virtual**	**T-value***
	How often do you…. ?		
	look for news at the organization's website		
often	66.00	58.70	-1.14
sometimes	32.10	37.20	0.80
never	1.90	4.10	1.00
N	106	121	
	chat with other organization members		
often	34.70	6.40	**-5.26**
sometimes	34.70	42.20	1.11
never	30.60	51.40	**3.08**
N	98	109	
	use the organization's e-learning facilities		
often	7.40	5.80	-0.45
sometimes	49.50	24.00	**-3.85**
never	43.10	70.20	**3.98**
N	95	104	
	attend a regulars' meeting ('Stammtisch')		
often	16.80	36.00	**3.36**
sometimes	50.50	44.80	-0.85
never	32.70	19.20	**-2.34**
N	101	125	
	attend seminars or workshops organized by the organization		
often	21.00	43.40	**3.74**
sometimes	60.00	51.90	-1.22
never	19.00	4.70	**-3.29**
N	100	129	

Source: sfs/RWI – Questionnaire survey 2004. – Note: * T-value from a group mean comparison test.
Bold figures indicate significance at the 5% level.

Interestingly, the communication within virtual networks is not as dominated by chatting than one might assume. Only 35% of the participants state that they frequently use this communication channel within the network. On the other hand the majority of the virtually linked entrepreneurs meet their mates personally, at least from time to time, for example at regular meetings of the local network groups (67%) or at internal seminars and workshops (81%). Obviously, face-to-face contacts are a feature of virtual networks as well (table 2). This indicates that meetings in virtual networks might not have such an 'ad hoc' character as normally assumed. Local meetings and workshops need persons who are well embedded and connected locally and such relations take their time to emerge.

Not surprisingly, members of 'traditional' networks use IT-based network facilities to a significantly lower degree compared to virtually linked entrepreneurs. Interestingly, a large proportion sometimes uses chat facilities, although those often are considered a typical feature of virtual networks (table 2). Interesting as well is the point that e-learning facilities seem to play an equally unimportant role in both types of network organisations.

These survey findings underline our suggestion that in both types of networks electronically based and personally based activities and forms of communication tend to play an important role. The survey results match with our findings from the in-depth interviews and website analyses according to which over time the virtual networks tend to establish a system of local and regional groups while 'traditional' networks put a (slowly) growing emphasis on the improvement of their Internet base (and skills).

4.4 Assessment of network activities and communication facilities

The results of the assessment of network activities and communication facilities provide additional arguments in favour of a high importance of spatial proximity for network users and network management. A major share of respondents considers the arrangements for personal meetings (regulars' meeting, workshops) as 'good'. Moreover, with regard to regulars' local meetings the statistical test shows no significant difference between the two types of network organisations. The good assessment of the regulars' meeting in virtual networks even outnumbers the assessment for chat facilities (table 3).

TABLE 3

Assessment of network offerings

Type of network	Virtual	Non-virtual	T-value*
How do you assess your organization's…. ?			
website: news, newsletter			
good	77.45	60.75	-2.64
should be improved	22.55	39.25	
N	102	107	
website: chat facilities			
good	63.51	56.25	-0.80
should be improved	36.49	43.75	
N	74	48	
e-learning facilities			
good	30.00	42.42	1.20
should be improved	70.00	57.58	
N	60	33	

	regulars' meeting ('Stammtisch')		
good	66.28	75.00	1.31
should be improved	33.72	25.00	
N	86	100	
	seminar, workshop		
good	55.56	72.55	2.42
should be improved	44.44	27.45	
N	81	102	

Source: sfs/RWI – Questionnaire survey 2004. – Note: * T-value from a group mean comparison test. Bold figures indicate significance at the 5% level.

The multivariate regression on the assessment results strengthens the idea of a growing importance of personal (or social) proximity in virtual networks, thus indicating a distinctive element of spatial proximity, namely the possibility to have face-to-face contacts. Virtual network members tend to opt for an improvement in the field of personal meetings to a significantly higher degree compared to the 'traditionally' linked respondents (annex 4).

We also asked respondents directly which way of communication they considered more important within their network organisation. The results show a high preference for personal communication, i.e. face-to-face contacts. Just 4% of the virtually linked entrepreneurs prefer Internet communication as a main means of interaction. A slight majority of this group prefers a mixture of both forms, while around 44 % clearly prefer direct personal meetings. For the group of 'traditional' networks the share of 80% 'voters' for personal communication was somehow expected (table 4).

TABLE 4

Importance of different types of communication

Type of network			
	Virtual	Non-virtual	T-value*
	Which way of communicating is more important for you… ?		
personal communication	44.20	79.80	5.61
communication via internet	3.90	1.60	-1.06
both of them	51.90	18.60	-5.53
N	104	129	

Source: sfs/RWI – Questionnaire survey 2004. – Note: * T-value from a group mean comparison test. Bold figures indicate significance at the 5% level.

The results of a multivariate regression underline these findings, especially for the participants of virtual networks (annex 5). In comparison to members of 'traditional' works they tend to opt for personal forms of communication with a significantly lower probability when controlling for effects of other variables (age of the firm, education, business size, branch etc.). In contrast, they have a significantly higher probability to be indifferent between the two forms of communication.

5. Conclusions

With regard to similarities and differences in the communication behaviour between virtual and 'traditional' networks, the empirical results show that, not surprisingly, members of virtual networks are inclined to use internet and chat facilities to a significantly higher degree than participants in 'traditional' networks. Interestingly half of the members of virtual networks do not use chat facilities very often. Moreover, members of both types of networks show a high preference for personal contacts. Regarding the role of spatial proximity, we can conclude that Internet-based virtual relations obviously render access to information more efficient and easy but they do not substitute for face-to-face contacts. In fact, we observed an overall high acceptance of direct personal meetings as a central means of interaction between participants of virtual communities and especially also for the purpose of network management. Moreover, the implementation of modern IT in 'traditional' entrepreneur networks does not reduce the importance of spatial proximity. Rather, IT facilities are used as a supplement for communication, interaction and network management. Overall, the comprehensive usage of IT in entrepreneur network organisations and the wide spread dissemination of virtual communities has not lead to a general shift in the communication behaviour between network members and participants. Instead, Internet- and ICT-based as well as personal ways of interaction go hand in hand in virtual networks. On the whole, the survey results and in-depth interviews demonstrate that *virtual networking does not render entrepreneurs independent from time and space, instead indicating the importance of local embeddedness of entrepreneurship.*

With regard to the structure of networks and the role of trust, our research also suggests that comparable to 'traditional' networks personal relations (social proximity as a part of spatial proximity) will form the main base for the interaction of entrepreneurs in network organisations. IT takes on a complementary role, in providing tools to better arrange face-to-face contacts. In this way IT may facilitate spatial proximity, through contributing to the emergence of local social capital and fostering the local embeddedness of entrepreneurship.

Finally, regarding the emergence of 'traditional' and virtual networks, our results suggest typical ways of network development, thus adding to the few studies on network emergence. 'Traditional' networks mainly emerge through personal interactions of promoters and network members, while virtual networks initially develop based on personal contacts of promoters combined with ICT contacts to potential members; only in later stages they also develop or are sustained through added-on personal contacts and meetings for all network participants. All in all, spatial proximity continues to play an important role in networks and for networking contacts.

6. Implications for research and policy

Our results suggest that trust is an element for networking, as became apparent in the importance members of both 'traditional' and virtual networks put on personal and face-to-face contacts. Research on trust and its role in entrepreneurship demonstrates that personal trust is but one element in business relations, where collective trust as expressed in recommendations and reputations of business partners play a role as well (see the contributions in Höhmann/Welter 2005). In terms of future research, this invites the question of which forms of trust play the major role in spatio-disconnected business relationships, how trust emerges and whether in virtual business connections face-to-face contacts are the only means for trust to be built up.

In terms of implications for policy makers and practitioners, our results and conclusions indicate a need for network promoters to concentrate on offering sufficient space for personal exchange and meetings instead of worrying about not being 'modern' enough in terms of ICT usage and Internet-facilities such as chat rooms and e-learning facilities. Those involved in supporting entrepreneurs and network organisations might consider supporting a system of physical contact points for network members and the organisations themselves, where network participants and network promoters could meet and exchange experiences. Support for modernising and upgrading IT solutions for networks obviously is of less value both for network participants and promoters.

In this regard, the paper contributes to the identification and understanding of the potentials and limits of modern IT applications for networking activities of entrepreneurs.

TABLE A1

Sample: Respondents' personal characteristics

Respondents' age at the time of foundation	No. of observations	share in %
below 30 years	45	18.7
30 to 39 years	117	48.5
40 to 49 years	67	27.8
50 to 59 years	12	5.0
total	241	100.0
Educational attainment		
vocational training (in-firm/off-the-job)	44	18.3
technical school/master craftsman's diploma	6	2.5
university/college	157	65.1
other forms of vocational training	27	11.2
no vocational training	7	2.9
total	241	100.0
Initial situation		
employment	98	40.6
unemployment	74	30.7
family management	35	14.6
vocational training/studies	21	8.7
vocational qualification	13	5.4
total	241	100.0

Source: sfs/RWI-Questionnaire survey 2004.

TABLE A2

Sample: Firm characteristics

Firm was founded ...	No. of observations	share in %
within the last year	35	14.5
1 to 2 years before	56	23.2
3 to 5 years before	67	27.8
6 to 10 years before	36	14.9
more then 10 years before	27	11.2
Missing	20	8.3
Total	241	100.0
Location *		
large city and hinterland	218	90.5
rural area	22	9.1
missing	1	0.4
total	241	100.0
Employees**		
no employee	171	71.0
1 to 9	66	2704
10 and more	4	107
total	241	100.0
Sectoral affiliation		
manufacturing, construction, agriculture	9	3.8
business services	90	37.3
personal services***	142	58.9
	241	100.0
Style of entrepreneurs engagement		
full time	184	76.3
part time	57	23.7
total	241	100.0

Source: sfs/RWI - Questionnaire survey 2004. – Notes: *Question: Is your firm located within a large city (100.000 inhabitans or more) or can a large city be reached within one hour ? (YES/NO). – **at present/strived in the near future. – ***health, retail trade, financial services for private households, tourism, culture.

TABLE A3

Determinants of Network Usage[1]

Variable	Binary Probit	Ordered Probit[2]				
		How important was your network for …				
	Asking advise on business matters from the network	…deciding to start-up a business?	…creating a business plan?	…finding a business partner?	…the market entry of your firm?	…over-coming business crisis?
Type of network		*Reference category: non-virtual*				
virtual	0.122	0.092	0.099	0.064	0.128	0.148
	[0.068]*	[0.036]**	[0.033]***	[0.027]**	[0.043]***	[0.062]**
Place of residence		*Reference category: urban*				
rural area	-0.129	0.059	0.033	0.019	-0.010	-0.011
	[0.118]	[0.070]	[0.057]	[0.045]	[0.072]	[0.110]
Age of firm		*Reference category: 3 years and older*				
2 years and younger	0.037	0.049	0.005	-0.011	-0.029	0.066
	[0.072]	[0.038]	[0.031]	[0.022]	[0.041]	[0.066]
Age of respondent at the time of business start-up		*Reference category: 30-39 years*				
20-29 years	-0.015	0.000	-0.057	-0.046	-0.071	-0.188
	[0.095]	[0.047]	[0.029]*	[0.020]**	[0.046]	[0.074]**
40-49 years	0.091	0.040	-0.056	-0.030	-0.026	-0.076
	[0.078]	[0.042]	[0.028]**	[0.021]	[0.043]	[0.068]
50-59 years	0.082	0.006	0.004	-0.031	-0.030	-0.042
	[0.152]	[0.075]	[0.063]	[0.029]	[0.081]	[0.143]
Education		*Reference category: no university degree*				
University degree	0.084	0.029	0.020	0.027	0.026	-0.014
	[0.070]	[0.032]	[0.028]	[0.021]	[0.040]	[0.064]
Employment status		*Reference category: part-time*				
Full-time	0.000	-0.074	-0.106	-0.011	-0.133	-0.156
	[0.083]	[0.047]	[0.047]**	[0.028]	[0.059]**	[0.078]**
Number of employees		*Reference category: none*				
One or more employees	0.008	-0.037	-0.010	-0.011	-0.035	0.007
	[0.078]	[0.036]	[0.032]	[0.024]	[0.043]	[0.071]
Economic activity		*Reference category: manufacturing, construction, agriculture*				
Personal services	0.214	0.095	-0.149	-0.022	0.055	-0.115
	[0.192]	[0.142]	[0.070]**	[0.068]	[0.143]	[0.187]
Business services	0.295	0.102	-0.155	-0.015	0.082	-0.110
	[0.188]	[0.107]	[0.109]	[0.076]	[0.125]	[0.192]
Observations	241	232	232	227	229	230
Pseudo R2		0.061	0.081	0.052	0.055	0.040

Source: sfs/RWI - Questionnaire survey 2004. – Notes: [1] Marginal effects, standard error in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. [2] Categories of dependent variable are "no importance", "some importance", and "great importance"; marginal effects refer to category "great importance".

TABLE A4

Determinants of Network Assessment

| Variable | Binary Probit [1] | | | | |
| | How do you assess your organization's ….[2] | | | | |
	Website: news, newsletter	website: chat facilities?	e-learning facilities?	regulars' meeting (Stammtisch)?	seminar, workshop?
Type of network	Reference category: non-virtual				
virtual	-0.139	-0.014	0.048	0.151	0.183
	[0.069]**	[0.103]	[0.122]	[0.073]**	[0.077]**
Place of residence	Reference category: urban				
rural area	-0.047	-0.027	0.231	0.173	0.281
	[0.130]	[0.181]	[0.148]	[0.129]	[0.139]**
Age of firm	Reference category: 3 years and older				
2 years and younger	0.001	-0.264	0.069	0.113	0.031
	[0.074]	[0.098]***	[0.112]	[0.077]	[0.084]
Age of respondent at the time of business start-up	Reference category: 30-39 years				
20-29 years	-0.062	-0.165	-0.129	-0.134	0.180
	[0.090]	[0.112]	[0.158]	[0.085]	[0.115]
40-49 years	0.079	0.104	-0.044	-0.007	0.176
	[0.082]	[0.125]	[0.133]	[0.080]	[0.091]*
50-59 years	-0.062	-0.226	-0.104	-0.201	
	[0.090]	[0.180]	[0.311]	[0.110]*	
Education	Reference category: no university degree				
University degree	-0.028	0.017	0.133	-0.094	0.104
	[0.071]	[0.099]	[0.116]	[0.075]	[0.077]
Employment status	Reference category: part-time				
Full-time	0.010	-0.110	-0.131	0.039	-0.013
	[0.084]	[0.118]	[0.115]	[0.083]	[0.094]
Number of employees	Reference category: none				
One or more employees	0.106	0.096	0.203	0.166	0.092
	[0.085]	[0.114]	[0.109]*	[0.088]*	[0.091]
Economic activity	Reference category: manufacturing, construction, agriculture				
Personal services	0.165	-0.428	0.348	-0.298	-0.309
	[0.273]	[0.276]	[0.293]	[0.184]	[0.184]*
Business services	0.135	-0.393	0.511	-0.328	-0.235
	[0.251]	[0.317]	[0.337]	[0.227]	[0.227]
Observations	201	122	93	186	179
Pseudo R2	0.0388	0.0819	0.0898	0.0786	0.0947

Source: sfs/RWI - Questionnaire survey 2004. – Notes: [1] Marginal effects, standard error in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. [2] Probit regression with dependent variable y = 1 if respondent answered "should be improved".

TABLE A5

Determinants of Communication Preferences

| | Binary Probit [1] | | |
| | Which way of communicating is more important for you… | | |
Variable	…personal communication?	…communication via internet?[2]	…both?
Type of network	*Reference category: non-virtual*		
virtual	-0.339	0.014	0.305
	[0.064]***	[0.013]	[0.063]***
Place of residence	*Reference category: urban*		
rural area	0.011	0.015	-0.016
	[0.120]	[0.034]	[0.111]
Age of firm	*Reference category: 3 years and older*		
2 years and younger	-0.103	0.005	0.097
	[0.074]	[0.012]	[0.070]
Age of respondent at the time of business start-up	*Reference category: 30-39 years*		
20-29 years	-0.031	0.017	-0.003
	[0.093]	[0.025]	[0.086]
40-49 years	0.210	0.002	-0.213
	[0.071]***	[0.014]	[0.063]***
50-59 years	0.057	0.016	-0.086
	[0.145]	[0.041]	[0.123]
Education	*Reference category: no university degree*		
University degree	0.041	-0.012	-0.026
	[0.070]	[0.014]	[0.067]
Employment status	*Reference category: part-time*		
Full-time	-0.003	0.004	0.021
	[0.082]	[0.010]	[0.075]
Number of employees	*Reference category: none*		
One or more employees	0.016	0.014	-0.090
	[0.077]	[0.017]	[0.069]
Economic activity	*Reference category: agriculture, manufacturing, construction*		
Personal services	0.235	0.805	0.023
	[0.166]	[0.070]***	[0.189]
Business services	0.284	0.323	0.042
	[0.179]	[0.123]***	[0.182]
Observations	241	241	241
Pseudo R2	0.1403	0.1417	0.1415

Source: sfs/RWI - Questionnaire survey 2004. – Notes: [1] Marginal effects, standard error in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%. [2] Note that only 2,49% (n=6) of the sample prefer communication via internet.

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PUBLIC POLICY AND SUCCESS OF BUSINESS START-UPS IN GERMANY[1]

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PUBLIC POLICY AND SUCCESS OF BUSINESS START-UPS IN GERMANY

Abstract

In this paper, we evaluate the success of publicly supported business start-ups by comparing the outcomes of various support measures. Our question is: do business starter get what they need? Since we do not know the needs of the founders we analyse (1) who received which kind of support (financial support, individual coaching, general information) and (2) which kind of support is successful for whom with regard to his/her job history (employed, unemployed or being not part of the job market). While start-up measures possibly could aim at different kinds of effects, our focus is on the effect on subsequent firm growth. The analysis is based on a survey conducted in 2005. The sample was drawn from a highly heterogeneous population of business start-ups. By using propensity score exact matching for success measurement we try to capture those differences.

1. Introduction

New venture support has become a popular field for governments attempting to create more employment possibilities and a vibrant entrepreneurship sector. In order to improve the effectiveness of the policy measures, governments are also interested in the effects their support programmes and measures have on the survival and sustainability of new businesses. Previous research has demonstrated a variety of micro and macro factors which might influence the success of business creation. Nevertheless surprisingly few studies evaluate government measures using comparison groups. By using matching for success measurement this paper tries to capture the difference in those factors between business start-ups which have received public support and those that have not. In addition to evaluation studies for Germany we shed light on those programmes which are co-funded by European Social Fund. This fund complements efforts of European countries to reduce labour market problems in economically backward regions. Furthermore we evaluate the success of publicly supported business start-ups by comparing the outcomes of various support measures at entrepreneur level. The measures comprise five types: two kinds of financial assistance whereby we can differentiate between subsistence payments and the provision of subsidized capital, start-up coaching (before and after the establishment of the new business) and general information seminars. The target group is very heterogeneous and so might be their needs. Thus, the paper asks, whether start-up training and financial measures are oriented towards the needs of start-ups. In other words, do business starter get what they need? Since, however, we do not know the needs of the founder we try to answer this question by analysing who received which kind of support and which kind of support is successful for whom. In line with a human capital approach we assume that the support need of business starters is highly dependent on his/her job history. In the further analysis the business starter are therefore differentiated according to their occupation before the establishment such as employed, not being at the job market (house maker, students etc.) and unemployed.

2. Literature Review

2.1 Effects of public support on business start-ups

All industrialized countries offer support measures for business start-ups. In Germany, the variety of local, Länder and Federal programmes can hardly be overlooked. Surprisingly, few studies so far have seriously evaluated the impact public support has on venture creation and the success of new firms. An important feature in the context of German business start-up support is financial support during the founding period to develop necessary skills to secure a stable new business over time. Those skills comprise on the one hand sufficient technical and commercial know-how but also special entrepreneurial skills to stand risky and uncertainty, to identify possibilities and decision making. Obviously financial support does not help in developing those skills directly but offers a time window for learning without having to worry about the daily income source (Wießner, 2005:4).

The evaluation results of Pfeiffer and Reize (2000) show that business start-ups out of unemployment with public financial support have the same survival rate and employment effects as non supported business start-ups in general. Additionally, self-employment leads to a lower risk to be unemployed again than wage employment (Reize 2000). Two other studies found – at least on the first view – rather positive results. However, they did not use comparison groups such that no judgement is possible whether the positive results were caused by the start-up support. Wießner (2000) found that 70% of the public financially supported business start-ups from the years 1994/1995 were still self-employed three years after the foundation and every third supported business starter creates at least on additional job during three years after the foundation. A more recent study of Wießner et al. (2005) evaluated the German instruments for supporting unemployed business

founders since 2004. The findings show that about 85% of the participants remained self-employed one and a half year after the start of the measure, after which they either switched to wage employment or became unemployed again.

Almus and Prantl (2001) investigate the effects that German subsidized medium- or long-term loans for business start-ups have on the survival rate and the average annual employment growth of assisted firms. By using a statistical matching procedure they find significant positive effects of public assistance on the success indicators of business start-ups. Prantl (2005) further examines the effect of entry subsidies on short- and long-term employment and turnover growth, finding that financial assistance leads in the short run to higher start-up investments and has no effect on employment while in the long run additional employment growth can be observed and turnover is reduced.

Although there is a common sense that phase specific start-up knowledge plays an important role for the success of new businesses, there are no empirical studies which have analysed this so far. Moreover, while there is a wide range of literature about the effects of financial support on the success of business start-ups, surprisingly, the effect of special entrepreneurial training measures is hardly investigated. One of the few studies in this regard, albeit analysing established firms, assessed the impact of assistance for consultancy advice on the performance of SMEs (Wren and Storey 2002). The authors show that the policy had no impact on survival of smaller SMEs, but it raised survival rates and growth rates for medium-sized firms. Additionally, the authors draw attention to the possible displacement effects of such support, which is a topic only dealt with in few evaluation studies.

2.2 The importance of human capital for business start-up and success

Human capital plays an important role with respect to entrepreneurial know-how as well as with respect to access to external resources. With regard to the influence of human capital on entrepreneurship, some authors (e.g., Kolvereid, 1996) claim a more indirect influence through an effect on attitude and subjective norms, which influence the propensity for entrepreneurship. Others (e.g., Aldrich, 1999) emphasize the importance of human capital itself as a source of entrepreneurial knowledge, where education and professional experiences will facilitate the way into entrepreneurship and influence survival and success. In this view, a higher level of human capital increases entrepreneurial alertness regarding opportunities as well as the ability to exploit these opportunities.

Additionally, human capital might indirectly influence access to resources, thus impacting on business development beyond the start-up phase.

Human capital expresses itself through factors such as the origin of the entrepreneur, the (professional) education, work experiences and previous management experiences. Results relating to the socialization of entrepreneurs such as the importance of an entrepreneurial family background are not conclusive: some studies show a positive effect on entrepreneurship, others not. Age influences the human capital resources of entrepreneurs in two ways. Whilst knowledge, know-how and personal abilities will increase with age, professional mobility could decrease, thus rendering a business start-up less likely the older the person (e.g., Klandt 1984). Gender might have an additional influence where women temporarily leave the labour market for child rearing and thus have fewer opportunities to accumulate professional experiences.

With regard to education and professional experiences, research has shown this to positively influence entrepreneurship and business formation (e.g., Cooper and Dunkelberg, 1986; Evans and Leighton, 1990; Martin and Grubb, 2001). For example, in West Germany, every second new entrepreneur previously worked in the same branch (Pannenberg, 1997, 1998). Brüderl et al. (1996) demonstrated for their sample of Bavarian new entrepreneurs that entrepreneurs are significantly more likely to set up larger enterprises in terms of initial capital and initial employment in case they have long professional and previous sectoral experience as well as management experience and previous experiences in self-employment. Other studies indicate that habitual entrepreneurs succeed more often in starting another business, due to already existing networks or their ability to recognize business opportunities whilst the previous entrepreneurial experiences as such do not play a significant role in explaining any differences between habitual and non-habitual founders (e.g., Alsos and Kolvereid, 1998; Westhead and Wright, 1998).

In general, economic theory suggests that increased unemployment would lead to increased entry into entrepreneurship as the opportunity costs of starting a business are decreased (Evans and Jovanovic, 1989). Recently, research has shown that unemployment (and thus a lack of professional experience, of self-confidence in combination with fewer resources) plays a major role with respect to business success in terms of employment growth (Hinz and Jungbauer-Gans, 1999). Employment growth is significantly lower in businesses of unemployed founders, and it is connected to the duration of unemployment. A consequently low capital resource base plus a lack of access

to external credit, which might be expected the longer the duration of unemployment, might constrain further business development, in the case unemployed entrepreneurs would need to fall back on the resource base of their enterprises to e.g., compensate for a drop in demand. Aldrich and Auster (1986) labelled these phenomena the liabilities of "newness" and "smallness", drawing attention to the fact that especially newer and micro enterprises experience difficulties in surviving and growing, which might be aggravated in the case of unemployed founders.

Drawing on results from this stream of literature we therefore suggest that support needs of business starters are highly dependent on his/her labour market history; and that different kinds of measures have a different effect on the success of the business start-up.

2.3 Start-up support and firm growth

On the background of the literature review and the desired effects of the instruments, hypotheses about the expected signs of treatment effects can be derived for the three groups of entrepreneurs scrutinized. In general, firm growth in respect to both employment and turnover is only one of several possible positive effects of business start-up support. In addition, a higher stability of the start-ups in respect to survival time could be aimed at. Due to the high survival rate of the start-ups in our sample, however, this aspect cannot be analysed with our dataset. A third possible aim of start-up support would be to increase the population of new firms in general by introducing individuals to the possibilities of founding new businesses and giving financial aid.

Of course, also firm growth is not the central goal of business firms. Entrepreneurs often do not aim at growth in respect to employment and turnover, but just to be independent and earn modest financial means for their living. However, in most cases, new start-ups need a certain period of time to start business activities. State aid can possibly reduce this time period and therefore lead to higher growth in turnover in the first years of business activity. Additionally, one aim of state funded support for new businesses is to increase employment. So, also the question arises, how far these support measures lead to higher employment growth rates later on. By analysing the growth effects, we have to keep in mind the difference between growth and level. By comparing two start-ups with the same turnover

or employment after a certain time period that start-up with the lower initial turnover or employment subsequently exhibits the higher growth rates.

The observed firm growth induced by different policy instruments should – this is what we would expect – depend on the individual situation of the entrepreneur which varies substantially. Table 1 shows the treatment effects we expect for previously employed (E) or unemployed (U) individuals and individuals who have not been in the labour market before starting their businesses (N). We expect differences between these kinds of start-ups especially in respect to employment growth. While start-ups from unemployment should more likely be aimed at creating an existence independent from state aid in order to prevent individual unemployment, we expect these entrepreneurs to be more reluctant to create additional jobs compared with the previously employed individuals. We also expect them also to have lower average turnover. However, turnover growth also depends on the initial level of turnover which should be lower on average. Therefore, there is no ex ante reason to believe that turnover growth is lower or higher compared with start-ups from employment. Entrepreneurs who have not been in the labour market before as such are rather heterogeneous. They comprise individuals who had cared about the household before and want to increase household-income as well as academics who are planning to start up a new business as spin-off. Therefore, we expect them to be in between the other two groups in respect to employment growth.

Financial support schemes aim at easing the initial start-up phase and bridging some time until the business can support itself. It should not be directly associated to employment growth. The influence on turnover growth is difficult to assess. However, the financial resources available reduce the economic pressure to generate high turnover in the beginning, which could lead to higher growth rates later on. The effects of credits are diverse. Usually, credits are only given to firms that develop a business-plan which should be associated with higher growth rates. Furthermore, by raising a credit, the entrepreneur creates some pressure to reimburse the financial means in the future. Therefore, credits should be associated at least with higher rates of turnover growth. Growth in employment often also increases the risk by establishing an additional cost factor. Thus, we expect no effect.

Expected signs of Treatment effects

	Financial Support	Credit	Information	Coaching before	Coaching after
Positive employment growth (U,N)	0 (E/ U/N)	0 (E/U/N)	0 (E/U/N)	+/E), 0 (U,N)	+(E), 0 (U,N)
Positive turnover growth (E/U/N)	+ (E/U/N) +(E/U/N)	+ (E/U/N) +(E/U/N)	0		

Information seminars often aim at giving the entrepreneurs help as to whether it is advisable for them to start a new business. Therefore, we expect their effect to be more on reducing drop-out rates than influencing growth rates. Individual coaching measures help the entrepreneurs by giving them advice how to set up a business plan and to organize their businesses in general. We expect them to influence turnover growth by making the organisation more efficient and maybe also lead to higher employment growth at least for the start-ups from employment.

3. Data Sets, Estimation Strategy and Methodology
3.1 Data Sets

The paper draws on a survey which was conducted by RWI and SÖSTRA in the context of an evaluation of the European Social Fund measures for new business start-ups in Germany in the period 2000 to 2006. Our dataset originates from questionnaire surveys among participants in publicly funded business start-up support and non-participants respectively. We collected about 11,300 addresses of start-ups from craft chambers and chambers of commerce as well as project executing organisations from several regions in East and West Germany. The participants are made up by a rather broad range of entrepreneurs both from craft trades and the industry sector. Start-ups of formerly unemployed persons are important. However they do not dominate. Due to a return rate of 44.6% respectively 15% our net sample consists of 3,650 firms. The sustainability of the support was of special interest in our analysis. Thus, we drew firms which were supported after the year 2000 and before 2003. Also our control group was chosen from firms which were founded in that period. Due to the broad focus of the support at hand, we abstained from other restrictions.

Regardless of the different groups of business start ups the sample is highly selective with respect to the success of the establishment. Over 90% of the founders stated that their business is successful. This result is not surprising, business starter which were not successful on the one hand may be ashamed about their failure and therefore be less motivated in reporting, on the other hand unsuccessful businesses start-ups may have already been closed and the questionnaire has never reached the addressee.

3.2 Outcome Measures and Estimation Strategy

Because of the sample selection we chose outcome measures that reflect the extent of the success rather than the success itself and that could cope with the differences in size of the business start-up at the beginning of the establishment. Such outcome measures are: positive growth in employment and turnover between the second and the third year of the business start-up existence as well as turnover per employee two years after the founding. Due to the heterogeneity of our sample, getting unbiased estimation results is rather challenging. Therefore, our control variables comprise primarily socio-demographic variables, i.e. age, gender, health status, immigrant status and branch variables. Unobservable individual traits like cognitive ability are persistent over time; they will be partly reflected in individual education (schooling degree, highest vocational degree and previous profession) and the labour market history of respondents.

As the literature review already showed, the labour market history is a very important feature for the success of the business start up. Thus, we always split the sample in three groups according to the last activity of individuals prior to the establishment of the new business: (1) business starter that were employed before the establishment, (2) business starter that were unemployed before the establishment and, (3) business starter that were not part of the job market before the establishment, such as family workers, students, early retired persons etc.. Additionally, the motivation of the founders

might have another important possible impact on our success indicators. Motivation is captured in our survey by asking how important different motivational features like a good business idea or own job creation have been.

The aim of our study is to analyze the benefit individuals draw from the different kinds of public start-up support. Because we can not control for quality and content of the measures, we are only able to differentiate if the founder has participated in general information measures or individual coaching before and after the establishment of the new business. Additionally we asked for financial assistance whereby we can differentiate between subsistence money (labelled "financial support") and the provision of subsidized capital ("credit allowance"). We assume that the various kinds of support combination have different effects on business start up success. Therefore we use additionally support measures for exact matching.

3.3 Methodology: Probit regression and matching procedure

For analyzing sample heterogeneity we use on the one hand simple descriptive data interpretation and on the other hand multivariate marginal Probit regressions[2] that permit to identify the determinants of participation in public business start up support in terms of the different features of the participants.

When it comes to our aim to estimate treatment effects for the different policy instruments in respect to the different outcome measures, the theoretical framework corresponds to the general matching framework: Assume that Y_i^1 denotes a response of individual i to a labour market programme and that Y_i^0 gives the state of individual i with no treatment. If the binary variable T_i indicates the treatment status of individual i, then the observed outcome is $Y_i = T_i Y_i^1 + (1-T_i) Y_i^0$. This approach to the evaluation problem is known as the potential outcome approach to causality (e. g. Rubin, 1974, 1977; Holland 1986; Kluve, 2004). In order to identify the treatment effect in that framework would require the response of one individual to be independent from all other individuals. This framework assumes that there is only one of two potential outcomes for each individual (Y_i^0 and Y_i^1) depending on the two treatment states and that there are no further potential outcomes depending on the treatment assignment of the individual (stable unit treatment assumption – SUTVA, Rubin, 1986).

Within this framework, the individual treatment effect is given by $\delta_i = Y_i^1 - Y_i^0$. This effect is never observable because for each individual either the observation Y_i^0 or Y_i^1 is missing. The average treatment effect therefore is given by:

$E(\delta_i | T_i = 1) = E (Y_i^1 | T_i = 1) - E (Y_i^0 | T_1 = 1)$

While we can observe $E (Y_i^1 | T_i = 1)$ for the individuals in the treatment group, the counterfactual $E (Y_i^0 | T_1 = 1)$ cannot be directly observed. If treated individuals differ systematically from non-treated individuals, because selection into the treatment group is non-random, the counterfactual expected value differs from the observation for non-treated individuals $E (Y_i^0 | T_1 = 0)$. If the vector of variables X which determines selection into treatment is known, the conditional expectation $E (Y_i^0 | X, T_1 = 1)$ is equal to $E (Y_i^0 | X, T_1 = 0)$. In this case, selection into treatment can be controlled for by conditioning on X (conditional independence assumption).

However, exact matching will be impossible if X is of high dimension. Therefore, Rosenbaum and Rubin suggest matching on the one-dimensional propensity score. The propensity score denotes the probability to participate in treatment given the vector X, $p(x) = Pr(T = 1 | X = x)$, where Pr denotes the probability. They show that in case X removes selection bias, then matching on $p(X)$ will do so either.

We use optimal full matching on the propensity score with restrictions on the cell size (Rosenbaum, 1995). This algorithm restricts matching to the close vicinity of each individual by introducing a calliper with $\tau > 0$. Our algorithm utilizes all untreated units with a finite distance to a treated individual. In our calibration, an individual in the comparison group must not be matched to more than 10 treated, while one treated is not matched to more than 30 untreated individuals. By these restrictions, we make sure that individual cells do not contain too many individuals.

Calliper width varies with the estimated value for the propensity score. In our estimates, we set

α = 0.01, β = 0.04 and γ = 0.6.

We chose the matching parameters to balance between matched pairs and number of matches found. While the distance between the propensity score of treated and controls were allowed to be somewhat larger with higher propensity scores, the programme requires differences to be rather small in case of small propensity scores. We also did some not reported sensitivity checks. However, our results in general were rather robust to changes of these three parameters. In addition, we match exactly on variables that seem rather important for catching unobserved heterogeneity.

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[2] Multivariate marginal Probit is a widespread method to identify impacts on binary outcome variables. For an introduction in the methodology see for example Wooldridge (2003), Chapter 7.

Those variables are: a) region: East or West Germany, b) sex: women or men, and c) till e) other additional types of public promotion, such as financial aid, credit, general information as well as individual coaching before and after the establishment of the new business to capture multiple attendance in public promotion.

4. Results

4.1 Who gets which kind of support?
Some empirical evidence

The importance of the different kinds of public support differs between the East and West German Länder. We also find notable differences between male and female founders (Table 2). The columns do not sum up to 100%, because many business starters participated not only in one measure but in two or more. In general, the share of entrepreneurs who did not rely on public support was higher for establishments out of employment than for establishment out of unemployment. The share of start-ups by individuals who were not in the labour market before who did use support in our sample is somewhere in between. In General, a higher share of the East German start-ups did use financial aid.

Coaching measures and bank credits are used to a lesser extent. Previously unemployed founders and non-labour market participants as well as East German founders in all three groups draw on financial assistance to a large extent, partly reflecting a lack of financial resources in these groups, but partly also the availability of special programmes.

TABLE 2

Participation in public business start-up support by region and gender

	West Germany				East Germany			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
Establishment out of employment								
Financial support	52	25.5	20	30.3	33	47.8	19	65.5
General information	55	27.0	15	22.7	25	36.2	13	44.8
Coaching before establishment	19	9.3	13	19.7	11	15.9	5	17.2
Coaching after establishment	25	12.3	10	15.2	14	20.3	6	20.7
Credit	37	18.1	8	12.1	3	4.3	3	10.3
No public support	95	46.6	32	48.5	23	33.3	7	24.1
Total	204		66		69		29	
Establishment out of unemployment								
Financial support	109	67.3	61	79.2	147	71.7	92	70.2
General information	78	48.1	33	42.9	114	55.6	67	51.1
Coaching before establishment	20	12.3	19	24.7	35	17.1	21	16.0
Coaching after establishment	12	7.4	17	22.1	40	19.5	24	18.3
Credit	17	10.5	13	16.9	14	6.8	6	4.6
No public support	20	12.3	1	1.3	18	8.8	12	9.2
Total	162		77		205		131	

still Table 2	West Germany				East Germany			
	Male		Female		Male		Female	
	%	No.	%	No.	%	No.	%	No.
Establishment out of labour market non participants								
Financial support	47	42.3	86	54.8	34	61.8	28	68.3
General information	42	37.8	54	34.4	25	45.5	21	51.2
Coaching before establishment	17	15.3	39	24.8	3	5.5	7	17.1
Coaching after establishment	12	10.8	12	7.6	8	14.5	7	17.1
Credit	6	5.4	8	5.1	2	3.6	2	4.9
No public support	35	31.5	35	22.3	10	18.2	9	22.0
Total	111		157		55		41	

Source: RWI/SÖSTRA survey 2005.

Figure 1 shows the frequency of participation and the chosen combinations in case of multiple measurement participation. 48.2 % of the business starters participated in just one measure and this was mainly financial aid (60.3 %) followed by general information (26.3 %). If participants combined two kinds of public support it was mostly financial aid and general information seminars followed by financial aid and coaching before the establishment of the new business. Other support combinations are rather equally distributed. Combinations of individual coaching (before or after) and credit allowance were rather seldom ("other combinations").

Frequency and combination of public business start-up promotion measures
Share in %
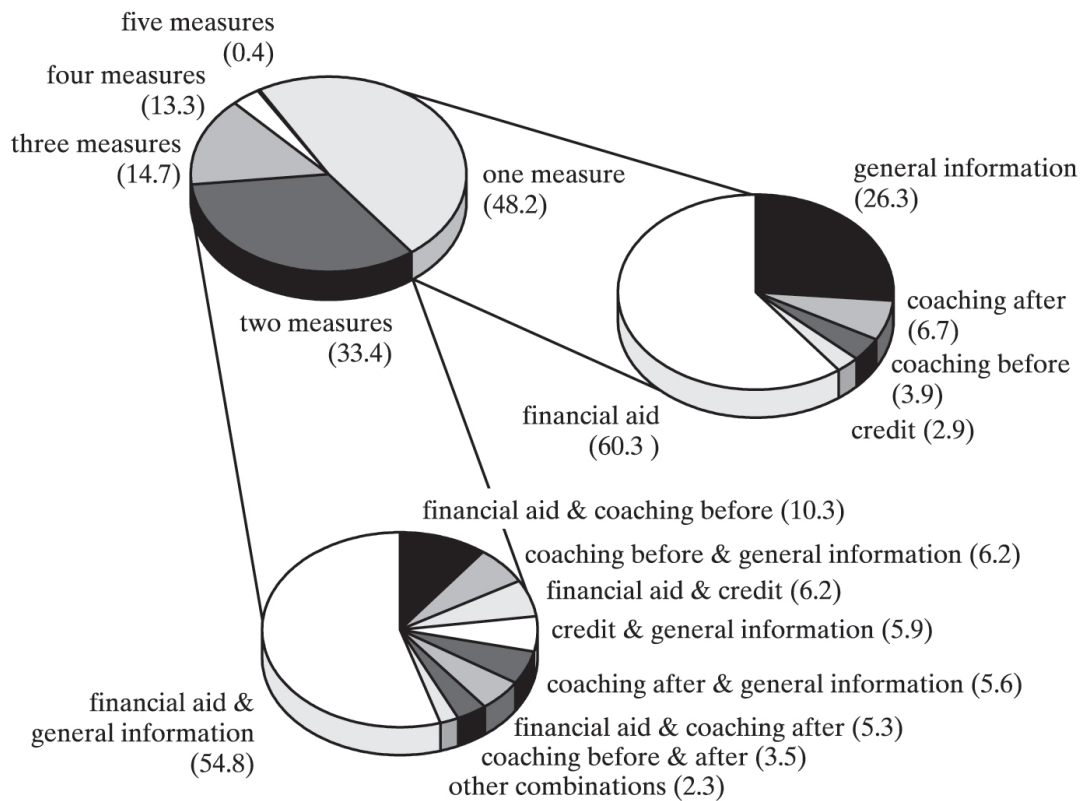
Source: RWI/SÖSTRA, ESF Survey (2005).

Figure 1

To investigate the motivational differences between the different groups of founders we used a 5-point Likert Scale in our survey by posing the question, how important the different motivations like "own job creation", "independency of state aid", "to be my own boss", "income improvement" and "a good business idea" were for the establishment of the new business. The box plots in Figure 2 illustrate the respondents' motivational attitudes. For representing the average rating, we used the median (not mean). Variation is given by 75 and 25 percentiles and in addition upper and lower adjacent values (at least two mentions). Dots show whether there were individual outside values. The values go from 1 (very important) to 5 (unimportant).

It is not surprising that the motivation for own job creation is the highest in the sample with previous unemployed founders, but it is also very important for supported and important for not supported business starter of the other two groups. The results in respect to "independence of state aid" are more heterogeneous between the three groups. While the business starters out of unemployment on average assess this motivation as "important", it is "more or less important" for the formerly employed business starters. In the third group we can observe differences between promoted and not promoted business start ups. Not promoted business starter find the independence of state aid as a less important motivational feature while it is important for the supported business starters that were not at the job market before the establishment of the new business.

Motivation of business start-up public promotion and previous occupation
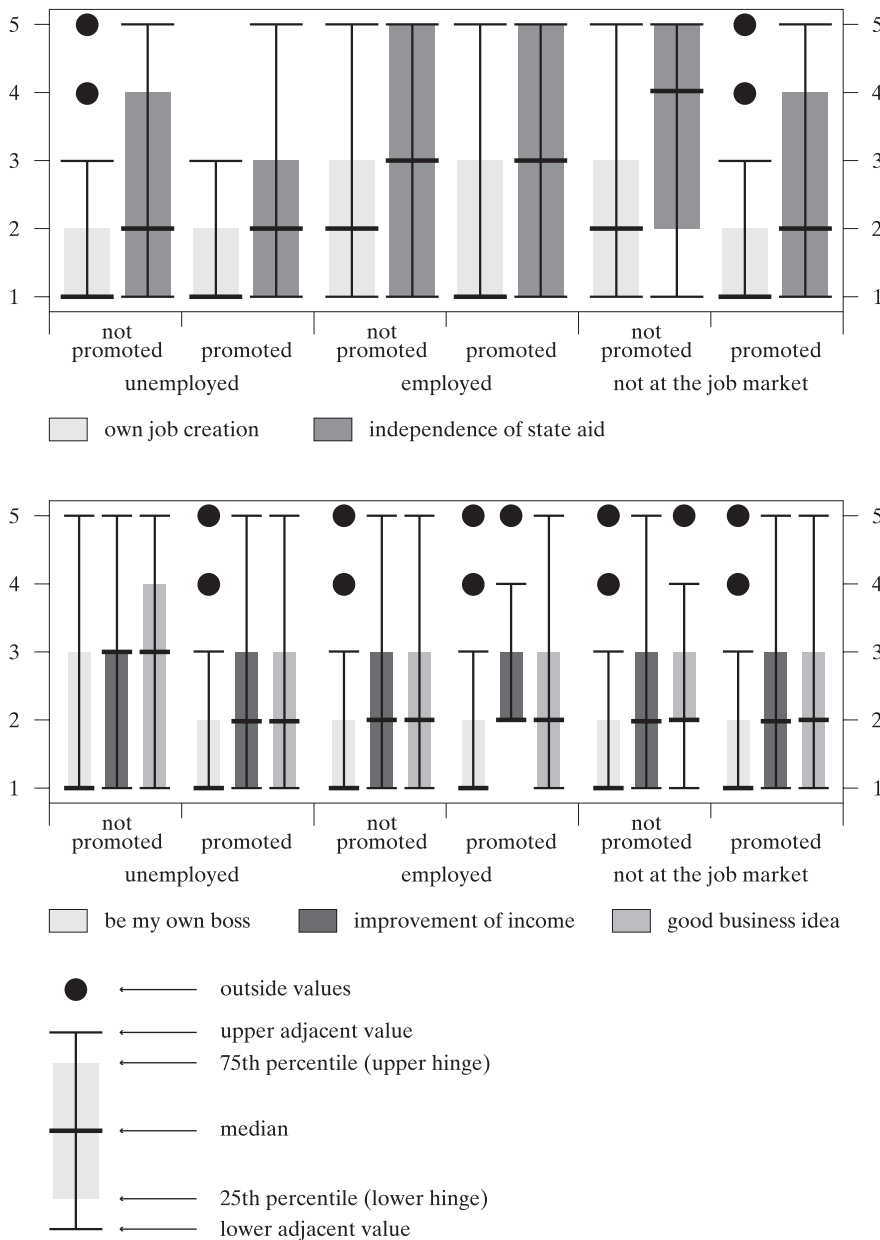
Source: RWI/SÖSTRA, ESF Survey (2005).

The different groups all together state in the majority that "be my own boss" is a very important motivation to set up the new business. This is rather astonishing and somehow comforting because one could have assumed that this form of "self-actualization" statement would be of minor priority for the entrepreneurs who were formerly unemployed or not in the job market. In the case of the motivations "improvement of income" and "good business idea" we can identify, that there are only minor differences between the groups.

TABLE 3

Probit Estimation:
Participation probability in Public business start-up support

Variables	Public support in general	Financial support	Credit	General information	Coaching before	Coaching after
			Public Support			
Demographic variables			Marginal effects (Standard errors)			
Women	0.194***	0.132***	0.023	-0.015	0.072***	0.021
	(0.032)	(0.036)	(0.018)	(0.034)	(0.026)	(0.024)
East Germany	0.257***	0.105***	-0.049***	0.068***	-0.032	0.076***
	(0.030)	(0.036)	(0.015)	(0.034)	(0.023)	(0.025)
Age	-0.004**	-0.007***	-0.001	0.000	-0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
Single	0.050	-0.036	-0.005	0.025	0.040	0.028
	(0.038)	(0.042)	(0.017)	(0.039)	(0.029)	(0.027)
Children	0.083***	0.031	0.007	-0.015	-0.004	-0.020
	(0.031)	(0.034)	(0.015)	(0.031)	(0.022)	(0.021)
Immigrant	0.008	-0.108	-0.031	-0.014	0.095**	0.013
	(0.062)	(0.067)	(0.022)	(0.062)	(0.053)	(0.047)
Health problems	0.019	0.053	-0.034	0.072	0.040	-0.038
	(0.064)	(0.0677)	(0.036)	(0.060)	(0.039)	(0.047)
Schooling degree	**Reference group: no schooling degree**					
Secondary degree (9 years)	0.018	-0.104	0.029	0.123*	-0.058	0.100*
	(0.065)	(0.071)	(0.040)	(0.070)	(0.039)	(0.062)
Secondary degree (10 years)	0.009	-0.127**	0.045	0.113*	0.031	0.050
	(0.060)	(0.064)	(0.033)	(0.061)	(0.043)	(0.045)
University entrance diploma	0.052	-0.024	0.026	0.092	0.016	0.082*
	(0.057)	(0.062)	(0.033)	(0.060)	(0.042)	(0.046)
Vocational degree	**Reference group: no vocational and college degree**					
In-firm training degree	-0.055	-0.003	0.006	-0.061*	0.033	0.022
	(0.037)	(0.038)	(0.017)	(0.035)	(0.026)	(0.025)
Technical college degree	-0.041	-0.052	-0.007	0.043	0.009	0.008
	(0.037)	(0.038)	(0.016)	(0.036)	(0.025)	(0.024)
University degree	0.045	-0.012	0.007	-0.016	-0.038	0.011
	(0.041)	(0.044)	(0.022)	(0.041)	(0.027)	(0.029)

still Table 3	Public support in general	Financial support	Credit	General information	Coaching before	Coaching after
Previous position	**Reference group: unskilled worker**					
Skilled worker	-0.003	0.035	-0.026	0.027	0.039	0.066**
	(0.046)	(0.046)	(0.022)	(0.043)	(0.030)	(0.032)
Leading position	-0.035	0.007	0.011	0.003	0.036	0.085**
	(0.052)	(0.052)	(0.025)	(0.049)	(0.037)	(0.041)
Self-employed	-0.219***	-0.222***	-0.051**	-0.158**	0.019	0.050
	(0.079)	(0.070)	(0.016)	(0.061)	(0.054)	(0.059)
Not at the job market	0.148***	0.184***	-0.060***	0.171***	0.071**	-0.020
	(0.036)	(0.042)	(0.015)	(0.044)	(0.035)	(0.028)
Unemployed	0.261***	0.352***	-0.040**	0.231***	0.057**	0.008
	(0.033)	(0.035)	(0.016)	(0.037)	(0.028)	(0.026)
Sector	**Reference group: Service sector**					
Building & Construction	-0.093**	0.005	-0.018	-0.031	0.034	-0.002
	(0.044)	(0.044)	(0.018)	(0.041)	(0.031)	(0.028)
Education	0.190**	0.253**	0.091	0.087	0.087	0.075
	(0.070)	(0.086)	(0.081)	(0.099)	(0.084)	(0.084)
Energy & water supply	-0.231	0.227*	-0.047	-0.041	0.015	[1]
	(0.150)	(0.109)	(0.025)	(0.122)	(0.097)	
Hotel & restaurant	0.036	-0.072	-0.017	0.018	0.064	0.026
	(0.078)	(0.077)	(0.031)	(0.074)	(0.060)	(0.052)
Health & welfare	0.007	-0.021	0.017	-0.018	-0.028	0.001
	(0.075)	(0.075)	(0.040)	(0.068)	(0.045)	(0.050)
Housing	-0.083	-0.081	-0.034	0.019	-0.036	0.007
	(0.059)	(0.058)	(0.017)	(0.054)	(0.034)	(0.037)
Trade	-0.076**	-0.021	0.006	0.005	0.014	0.028
	(0.037)	(0.037)	(0.017)	(0.034)	(0.025)	(0.024)
Communications & information transmission	0.064	0.132*	0.041	-0.032	0.124**	0.030
	(0.064)	(0.067)	(0.042)	(0.067)	(0.061)	(0.049)
Insurance & banking	-0.176**	-0.063	-0.006	-0.156**	0.015	-0.058
	(0.075)	(0.072)	(0.032)	(0.059)	(0.050)	(0.036)
Agriculture & forestry	-0.172**	-0.079	-0.054*	-0.062	-0.020	0.076
	(0.091)	(0.088)	(0.016)	(0.077)	(0.054)	(0.067)
Other public and personal services	-0.050	-0.049	-0.003	0.006	0.033	0.015
	(0.038)	(0.039)	(0.017)	(0.036)	(0.027)	(0.026)
Manufacturing	0.046	-0.035	0.009	-0.069	-0.042	0.046
	(0.060)	(0.070)	(0.030)	(0.061)	(0.042)	(0.050)

still Table 3	Public support in general	Financial support	Credit	General information	Coaching before	Coaching after
Craft	**Reference group: Craft firms**					
No craft firm	0.025	-0.005	-0.084***	-0.063	0.021	0.006
	(0.042)	(0.044)	(0.025)	(0.041)	(0.028)	(0.027)
Full time income source	**Reference group: half-time income source**					
Full time	0.365***	0.2858***	0.076***	0.065	0.008	0.036
	(0.045)	(0.0419)	(0.011)	(0.042)	(0.029)	(0.027)
N	1201	1201	1201	1201	1201	1201
Pseudo R²	0.2615	0.1680	0.1329	0.0891	0.0548	0.0436

Notes: RWI/Söstra 2005, own calculations. The estimation is based on the Probit – Method. The coefficient describes the „marginal effects". *Significant at the 10 % level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors in parentheses. 1Estimation could not be conducted since no respondents in the energy sector participated in coaching after the establishment of new business.

The non promoted former unemployed founders are not completely in line with the other groups. While in the other groups the motivation "improvement of income" and "good business idea" seems to be important on average, they are just more or less important for the group of not supported unemployed founders. However, the distribution of answers is rather similar. This suggests that formerly unemployed persons who were not supported are a bit less convinced about their business idea and have lower expectations with respect to their income development.

There are notable differences concerning the probability of participation in different kinds of measures with regard to sector, motivation of entrepreneurs, and their labour market status previous to setting up an own business (Table 3). The probability of women to get public support at all is about 19% higher compared to their male counterparts. Also, women are 13% more likely to receive financial support whereby there are no significant differences between sexes regarding other support measures. In contrast, the probability for women to participate in individual start-up coaching before the establishment of the new business is around 7% higher compared to the male business starter.

For business starters in East Germany the probability to attend public support in general is around 26% higher than for business starter in West Germany, reflecting both the need for general support in a turbulent economic environment and the lack of overall resources to start a business. Other demographic variables like age, marital & immigrant status, children and health problems have a lesser influence on the probability to participate in public business start-up support. People with children are 8% more likely to participate generally in public support, although we would need to control for gender in this

regard. Regarding the age influence, the probability of receiving financial support decreases for about 1% with every year. Immigrants are also about 32% less likely to receive financial support, which might signal their access to ethnic networks of assistance, but they are about 10% more likely to participate in coaching before the establishment of the new business. This is however also a result of the existence of special measures for immigrants within the sample.

Education in terms of schooling and vocational degree hardly matters for participation in public support. The results for occupation before the establishment confirm the descriptive findings (Table 2). Previously self employed persons are less likely to get public start-up support in general, financial support, credit allowance and to participate in general information measures. Additionally it is the skilled employees (in leading positions) that are more likely to participate in individual coaching measures after the establishment of new businesses.

4.2 Which kind of support leads to success by whom? Empirical findings

In general, the results of our calculations of programme effects seem to confirm some of our expectations (table 4). As expected, business starters that received financial support are on average less successful in terms of positive employment growth but more successful in terms of positive turnover growth. Business starters that participated in general information programmes are less likely to experience positive employment growth while the insignificant estimate for turnover growth is in line with our expectations. Business starters that participated in individual coaching before the establishment were more successful at least in terms of a positive employment growth. Other than expected, the results indicate no positive effect in respect to growth in turnover.

TABLE 4

Results of propensity score exact matching: Total sample

	Positive employment growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	-0.069*	0.1714***	-0.061**	0.082**	0.022
	(0.036)	(0.057)	(0.030)	(0.041)	(0.046)
Number of treated after matching	404	83	364	134	135
Mean prop.score of matched treated	0.606	0.140	0.470	0.182	0.175
Mean prop.score of matched untreated	0.606	0.140	0.468	0.182	0.174
Mean prop.score of unmatched untreated	0.488	0.105	0.398	0.147	0.141

	Positive turnover growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	0.078*	-0.025	-0.050	0.016	-0.024
	(0.042)	(0.063)	(0.040)	(0.050)	(0.048)
Number of treated after matching	404	82	364	134	135
Mean prop.score of matched treated	0.606	0.141	0.470	0.182	0.175
Mean prop.score of matched untreated	0.606	0.141	0.468	0.182	0.174
Mean prop.score of unmatched untreated	0.488	0.104	0.398	0.147	0.141

Source: RWI/Söstra 2005, own calculations.

TABLE 5

Results of propensity score exact matching: Unemployed before business started

	Positive employment growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	-0.052 (0.057)	0.098 (0.071)	-0.089** (0.043)	0.071 (0.068)	-0.057 (0.061)
Number of treated after matching	182	33	175	56	62
Mean prop.score of matched treated	0.715	0.113	0.552	0.166	0.188
Mean prop.score of matched untreated	0.714	0.113	0.551	0.166	0.187
Mean prop.score of unmatched untreated	0.681	0.089	0.523	0.148	0.160
	Positive turnover growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	0.052 (0.071)	-0.038 (0.098)	-0.006 (0.058)	-0.175** (0.078)	-0.090 (0.076)
Number of treated after matching	182	33	175	56	62
Mean prop.score of matched treated	0.715	0.113	0.552	0.166	0.188
Mean prop.score of matched untreated	0.714	0.114	0.551	0.166	0.187
Mean prop.score of unmatched untreated	0.681	0.088	0.523	0.148	0.160

Source: RWI/Söstra 2005, own calculations.

Interestingly, the results for the group of previously unemployed business starters show no positive effects on subsequent firm growth (see Table 5). There are even some negative effects of general information and individual coaching before the establishment. So far, we find no evidence that public support is able to increase the performance of start-ups by previously unemployed entrepreneurs.

Within the group of previously employed business starters the results in Table 6 show just one significant positive effect of the participation in coaching measures after the establishment of the new business on positive turnover growth.

TABLE 6

Results of propensity score exact matching: Employed before business started

	Positive employment growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	-0.153 (0.116)	0.211 (0.137)	-0.078 (0.105)	0.003 (0.128)	0.102 (0.119)
Number of treated after matching	42	18	0.332	20	24
Mean prop.score of matched treated	0.357	0.207	0.329	0.109	0.1644
Mean prop.score of matched untreated	0.357	0.206	0.300	0.110	0.164
Mean prop.score of unmatched untreated	0.308	0.195	0.332	0.091	0.146

	Positive turnover growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	0.060 (0.084)	0.091 (0.127)	-0.169 (0.107)	0.028 (0.145)	0.187* (0.096)
Number of treated after matching	42	18	44	20	24
Mean prop.score of matched treated	0.357	0.207	0.322	0.109	0.1644
Mean prop.score of matched untreated	0.357	0.206	0.320	0.110	0.164
Mean prop.score of unmatched untreated	0.308	0.199	0.298	0.091	0.146

Source: RWI/Söstra 2005, own calculations.

In the case of business starters that were not part of the labour market before foundation, the participants of coaching before the establishment are more successful in terms of positive employment growth (table 7). Additionally business starters that received public credit allowance or participated in coaching measures before the establishment perform better with respect to positive employment growth than those who did not. However, the participation in general information measures has a significant negative effect on employment.

To sum up, there are only few effects of all measures in every group. As expected, general information measures have no or even a significant negative effect on firm growth. Coaching before has a negative effect on employment growth in the group of previous unemployed business starter and a positive effect in the group of business starter that were not part of the job market before the foundation. Individual coaching after the foundation has just a positive effect in the group of former employees on turnover growth and credit allowance has just a positive effect in the group that were not part of the job market before. With regard to the whole sample we can observe positive effects of credit allowance and coaching measures on employment growth while financial support has an effect on positive employment growth.

TABLE 7

Results of propensity score exact matching: Not part of the job market before business started

	Positive employment growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	-0.063 (0.047)	0.168*** (0.065)	-0.115*** (0.036)	0.092* (0.054)	0.034 (0.056)
Number of treated after matching	251	69	241	86	103
Mean prop.score of matched treated	0.617	0,147	0.488	0.159	0.185
Mean prop.score of matched untreated	0.617	0,148	0.487	0.159	0.184
Mean prop.score of unmatched untreated	0.477	0,123	0.408	0.125	0.157

	Positive turnover growth				
	Financial Support	Credit	Information	Coaching before	Coaching after
ATET (Standarderror)	0.045 (0.054)	0.016 (0.069)	-0.040 (0.049)	-0.029 (0.063)	0.015 (0.057)
Number of treated after matching	251	68	241	86	103
Mean prop.score of matched treated	0.617	0.149	0.488	0.159	0.185
Mean prop.score of matched untreated	0.617	0.149	0.487	0.159	0.184
Mean prop.score of unmatched untreated	0.477	0.123	0.408	0.125	0.157

Source: RWI/Söstra 2005, own calculations.

5. Discussion and implications

The missing effect for general information measures should be associated with the general aims of these measures. As expected, coaching is more successful in the whole sample and in case of former employed business starter or business starter that were not part of the job market. Thus, the "time to learn" hypothesis may work, as necessary skills are taught in some detail before the establishment in contrast to the general information measures that comprise just one day or even less in the majority of the cases. Especially individual coaching after the establishment is successful in the group of former employed founders. We know from our participation probability regression that it is overall the higher skilled employees partly in leading position that participated in coaching after the establishment – probably knowing which kind of skills they need and carefully choosing the appropriate measures. Here, the question comes up, how to finance long-term individual coaching measures that are costly and time-consuming and of course windfall gains may exist, because we do not know the willingness to participate without support – especially in the group of previously employed founders.

The effects in respect to financial support are in line with our expectations. Public credit allowance has a positive effect on employment growth in the whole sample and in the group of founders that were not part of the job market before the establishment. This shows that those business starter mostly former students and house maker do need the public subsidies for a good performance. However, it is this group that is less likely to receive credit allowance, so a very caution policy implication would recommend the expansion of the measure for especially this target group.

No or negative effects of all measures in the group of previously unemployed business starters might result from unobserved characteristics of the participants that lead to a participation in general information measures such as a high uncertainty concerning how to establish the new business and obviously all measures do not effectively reduce this uncertainty. One possible interpretation from our results is that it apparently difficult to target support for this group. Otherwise, this might be the group with the least propensity to grow in respect to both employment and turnover.

Overall, results underline recent debate around evidence-based policy measures and emphasize urgent need for needs-based support. On the whole, our paper contributes to the ongoing discussion of what makes public support successful in bringing a perspective from a matched sample.

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