SURVIVAL OF NEW TECHNOLOGY BASED FIRMS IN THE UK AND GERMANY

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Recommended Citation
Available at: http://digitalknowledge.babson.edu/fer/vol26/iss22/2
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INTRODUCTION

Thanks to the efforts of researchers including McDougall and Oviatt (1994), Autio, Sapienza and Almeida (2000), Zahra, Ireland and Hitt (2000), Yli-Renko, Autio and Tontti (2002), Bürgel, Fier, Licht and Murray (2004) and Sapienza, Autio, George and Zahra (2006), a set of more challenging questions are now being asked given that the phenomenon of rapidly internationalising new ventures is now fully recognised. When it is appreciated that work specifically focused on rapidly internationalising young firms was rarely published prior to the mid 1990s, we have in effect had little more than a single decade of research interest. Thus, it is hardly surprising that the overwhelming majority of studies are cross-sectional in perspective. Recognising this limitation, Sapienza et al. (2006) have called for both longitudinal studies as well as more ‘matched sample’ methodologies that will allow us to explore the effect of internationalisation on (among other things) firm survival. They also note the absence of information on the effect of internationalisation on growth and profitability. Zahra et al. (2000) similarly argue the need to match the process of internationalisation to recognised performance outcomes.

These authors also rightly suggest that we need to explore further how new ventures learn, and not assume that such processes of knowledge accumulation are necessarily identical to more established firms. This is an important point as surviving international new ventures are clearly highly skilled at learning rapidly in order to compensate for scarce resources and any liabilities of newness or foreignness. Autio (2005) calls for work on a ‘fuller theory of internationalisation’ that can address both the initiation of internationalisation as well as the process of internationalisation. He also makes the point that we have tended to treat technology as an undifferentiated unity. More finely grained studies would almost invariably find differences in the incidence and intensity of internationalisation by type of firm that would allow us a great clarity in both theory and practice. Most certainly, it is highly improbable that the internationalisation trajectories of life science and ICT firms are likely to be similar and parallel.

The panel study of new technology based firms started in 1997 by Oliver Bürgel allows us to start to contribute to these recommended analyses given a comprehensive data set extending in exceptional cases nearly 20 years. Given the centrality of firm performance, and the binary and absolute conditions of survival or death, it is appropriate to begin by looking at the survival implications of the strategies employed by this matched sample of internationalising and non-internationalising German and British firms.

The focus of this empirical study is on business survival amongst a panel of new technology based UK and German firms. This is of great importance for several reasons. Firstly, because survival is the most basic measure of success, particularly in studies evaluating the relative merits of business start-up support programmes and government interventions. Analysing the particular characteristics of surviving and non-surviving businesses may provide some important insights into areas where public policy might intervene to correct for market failures or imperfections. This in turn may lead to higher initial and subsequent growth. As technological advance is so fundamentally related to economic growth, the lessons that we learn from this study are crucial to developing our understanding of critical initial success factors of NTBFs.
The rest of this paper is organised as follows; in section II we review the empirical literature from previous survival studies. In section III we discuss the source of our data. In section IV we present some basic sample statistics. Section V contains our survival analysis and results. We conclude in Section VI.

LITERATURE REVIEW

There are a large number of studies that consider factors which influence the likelihood of business survival, and early stage business growth. We begin by focusing on human capital and survival. Cowling (2006) summarises the findings of nineteen studies conducted across five countries focusing on the determinants of business survival. From this empirical evidence, we observe that the age of the individual typically has a positive effect on the probability of business survival, although in certain cases this effect is non-linear, with survival rates dropping off in later years. This effect is generally interpreted as being a proxy for accumulated informal human capital, which is sometimes subject to decay in later years. However, there may also be a retirement effect which is not generally captured.

Other measures of informal human capital often tested for are self-employment experience, more general labour market experience and industry specific experience. On prior self-employment experience the evidence is fairly conclusive in that studies covering the UK, US and Netherlands all find a positive effect on survival. This strongly supports the notion that entrepreneurial human capital, possibly a learning-by-doing effect, raises the quality of the entrepreneurs input. More general work experience was also found to increase survival probabilities in a number of studies, as did industry specific experience.

Taken as a whole, the empirical evidence strongly suggests that the most relevant form of human capital to individuals wishing to create a sustainable new venture is informal rather than formal. In short, it is the experience accumulated through working, particularly if it is in self-employment, which will have the greatest impact on the ability of the entrepreneur to survive in business. The one caveat we add here is that in high technology businesses formal education plays a greater role as technology based science requires very specialist knowledge. Turning to the evidence relating to formal human capital, typically captured by years of completed schooling or highest completed educational qualification, the effects are mixed. Furthermore, this holds even within countries across different studies.

Next we discuss findings from studies that consider basic business characteristics such as industry sector, age and size. These are all factors that we might expect to have a significant role to play in the determination of business survival. On industry, for example, we might expect to capture differences in the level and structure of competition, barriers to entry and growth, scale economies and a host of other influences. We know that smaller businesses tend to have higher entry rates in construction and service sectors. And we also know that some of the most important new economy sectors, particularly knowledge based, are located in services. Thus even within the broad service sector we would expect to observe significant differences in survival rates.

The empirical evidence is in line with our expectations as regards variations in survival rates across different industry sectors. In nearly all of the studies reported in Cowling (2006) we observe statistically significant variation across industry sectors. Importantly, this holds across countries. Perhaps the most notable, and consistent, industry effect is for business services, which is generally found to be highly and positively associated with survival probability. Arising from this, an important issue is whether industry sector is a choice variable for individuals starting up a business. In short is it plausible that any person can start a new business in any sector they choose? This is a particularly important question in the light of the evidence regarding industry specific experience reported earlier which generally shows a positive impact on survival for those starting a business in an industry sector in which they have built up specific human capital through experiential learning.

Whilst the majority of business survival studies do not include an age of business variable as they track businesses from inception, a small number of studies do. Of those that do, the results are consistent...
in that they all show a positive, and significant effect indicating that the older a business is the greater its survival probabilities. This is in line with a volume of evidence showing that the peak failure time is between eighteen months and two years, a period during which approximately 80% of all failures occur. After this period, failure probabilities typically decline dramatically and after six years failure is not really an issue for the vast majority of surviving businesses.

Business size at start-up is also an important variable included in a number of empirical studies. A priori, we might predict that size is an indicator of resource availability, both in financial and human capital terms, and in particular quality of the entrepreneur or entrepreneurial team. As such size should be associated with higher survival probabilities. Perhaps surprisingly, the empirical evidence is less than conclusive on this issue. For example, Meager et al (2004), Cowling (2003), and Cressy (1996), all for the UK, and Bruderl et al (1998) for Germany report the expected positive relationship. But two other studies, one UK and one German report no relationship and a further UK study reports a negative relationship. The interesting feature is that all three of the latter studies are for previously unemployed people starting a new business. What this might suggest is that previously unemployed people might have more limited managerial skills, and that this may limit their capacity to manage larger sized businesses. Thus starting at a smaller scale may be more appropriate for certain types of entrepreneurs.

Having presented evidence from an array of empirical studies into factors associated with business survival covering a number of developed countries, we now try to draw together the common themes. Perhaps the most consistent variable associated with increased survival probabilities is age of individual, although several studies report that this is non-linear implying that age acts in a positive way up to a certain point after which survival probabilities decline. Building on this human capital theme, there is further evidence that formal human capital and prior self-employment experience also enhances survival prospects. This is further enhanced if new entrepreneurs have relevant experience of the industry sector they set their business up in.

We also note that there is a strong effect from the industry sector that an individual chooses to start their business in. In particular, business services appear to be a sector in which new and smaller business can thrive. It is likely that higher survival rates are associated with being in sectors which are knowledge or human capital based rather than those in which financial capital, large volumes and economies of scale are important.

We also re-affirm the positive relationship between business age and size and survival. This former is consistent with many studies showing the inverted ‘U’ (with a long tail on the right hand side) shaped relationship between failure probabilities and the age generally peaking around 18 to 24 months after start-up and declining strongly thereafter. Implicitly, we might assume that it takes this long for a bad entrepreneur to fully recognise his or her lack of entrepreneurial skills, or for initial reserves to be run down to such an extent that the business is no longer viable. This is in line with the Jovanovic (1982) learning-by-doing model in which bad entrepreneurs lack of ability is revealed over time and they exit and good entrepreneurs survive and grow once their abilities are revealed.

Importantly, given the nature of this paper, which implicitly assumes a linkage between survival and growth, we also find that business size is commonly associated with survival. This is in line with the early findings of Phillips and Kirchoff (1989) who reported that new businesses that grew by even a small amount had dramatically higher survival rates. Thus survival in business can be seen as an important indicator of performance and future growth potential, particularly if we consider that there is an expanding body of empirical evidence that shows persistence over time in terms of superior growth for initially high performing businesses (see for example Cowling, 2004).

THE DATA
While the term ‘high tech’ is in common usage, the actual determination of what we mean is not a
trivial exercise. In this study, we continue to use the definitions employed in our first AGF report in
2001. Technology-oriented firms are identified using the definition of high-technology manufacturing
sectors in the UK established by Butchart (1987). He provided a definition based on the ‘ratio of R&D
expenditures to sales’ and the ‘share of employees working in R&D.’ Using this definition, Butchart
identified nineteen UK 1987 SIC codes, which were translated into the NACE Rev. 1 code.

This study is based on two surveys that were simultaneously carried out in Germany and the UK
originally in 1997 and again in 2003. The source data set originates from Dun & Bradstreet in the UK
and Creditreform in Germany. Using these databases, all firms with at least three employees in 1997 that
were operating in one or more high-tech sectors as defined by Butchart (1987) and having been founded
as legally independent companies between 1987 and 1996 were selected. Subsidiaries, de-mergers or
firms that were founded as a management buy-out (MBO) or buy-in (MBI) were excluded from the
analysis. This resulted in a population of 3,562 firms from the UK and 5,045 from Germany. A random
sample of 2,000 firms was drawn from each country’s population, stratified by size, sector
(manufacturing versus services), and, for Germany, by region (Western and Eastern Germany).

The firms were first contacted in winter 1997/1998 via a written questionnaire after an initial series
of pilot interviews. The first survey was carried out by the present British authors while at Warwick
and London Business Schools in the UK and the Centre for European Economic Research (ZEW) in
Germany. 362 completed questionnaires returned from the UK, 232 questionnaires from Germany,
resulting in a combined net sample of nearly 600 NTBFs from the two countries. The first survey is
described in detail in Bürgel et al. (2004).

In order to determine the development and status of internationalisation of this sample of 600 NTBFs,
a joint research team from the University of Exeter and the ZEW prepared a new survey in which all
previously responding firms were to be contacted a second time in 2003. At this date the average
respondent firms was approximately 12 years old. To determine the target sample of the second survey, at
first all formerly responding firms that turned out to be mismatches (e.g. non-high-tech firms or non-
independent or subsidiary companies) were excluded. We then eliminated each German firm labelled in
the database of Creditreform as ‘dead’ (due to bankruptcy as well as voluntary firm closure) at the
beginning of 2003. In the UK, firms that could be identified as dead by the researchers themselves using
multiple database sources were also excluded from the target sample. As a result, we produced and
subsequently contacted a final target sample of 188 German and 250 UK-based formerly responding
firms.

Since the present research team also tries to answer additional questions, in particular with respect to
high-tech firms’ financial strategies, a ‘new’ target sample was drawn from the original 1997 cohort of
identified NTBFs. More precisely, from each country’s population (i.e., the sample of NTBFs that was
still alive in 2003) a ‘new’ random sample of 712 German and 561 UK-based firms was drawn, stratified
by the same criteria as in 1997.

The second survey was conducted in 2003 via computer-aided telephone interviews (CATI). The
research team decided on a telephone survey for contacting the ‘old’ (i.e. 1997) target sample because of
the assurance of a relatively high response rate by direct personal contact. This was critical given that a
sufficiently high number of repeat observations was necessary to obtain reliable econometric results. In
the case of the UK, the ‘new’ target sample was contacted using a postal survey instrument. In Germany,
these additional firms were also interviewed by telephone.

In both the UK and Germany, the response rate of each country’s ‘old’ target sample exceeded 50%.
After performing several consistency checks, 217 companies were retained in the longitudinal data set.
The 2003 cross-sectional data set further contains 193 ‘new’ companies from both Germany and the UK
that participated in the second survey.
SAMPLE STATISTICS

Here we present the basic sample statistics relating to survival across the two countries. The focus here is on factors previous studies have identified as being critical determinants of survival such as industry sector, size, growth, skills shortages and access to finance. Table 1 reports the survival statistics by industry sector.

We immediately observe that basic survival rates are higher in Germany than the UK. In the former only 10.68% of firms ceased trading over the survey period which is substantially lower than the UK where 20.75% ceased trading. The pattern within the two countries was also different in terms of the relative performance of firms located in different industry sectors. For example, in Germany ICT-Hardware had the highest cessation rate at 15.58%. In the UK, health recorded the highest cessation rates at 23.24%. It is also noticeable that the within country variation is much larger in Germany than the UK where cessation rates across sectors ranged between 19.24% and 23.24%.

Table 2 highlights some interesting similarities and differences between the two countries in terms of how different characteristics impact on survival. In both Germany and the UK firms with a smaller initial employment size were more likely to survive. Further, R&D intensity was also associated with higher survival rates, as was developing ones own technologies. This suggests that smaller firms, investing heavily in new, bespoke technologies are better placed to survive than larger start-ups with low R&D levels using widely available technologies.

Early stage growth also produced interesting results, acting to enhance survival in Germany and reduce it in the UK. The same can be said for international sales. Yet there were also characteristics that had an impact on survival in the UK, but not in Germany. For example, older UK businesses had a higher survival probability. In Germany age had no effect. In addition, a longer average window of opportunity in the UK before rivals could effectively replicate the product/service was also positively associated with survival, although the actual period was only two months longer.

Regarding access to finance at start-up we note that in Germany and the UK firms in receipt of venture capital and/or publicly provided grants both had lower survival probabilities. This raises some interesting questions about the method of selection for both public grant awards and venture capital investments at start-up. It also raises further questions about the subsequent role and actions of venture capitalists in the post-start period.

Finally, we consider how managerial and technical skills shortages in the firms early life stages impact on future survival. The first point of note is that there is little difference across countries in terms of the extent of skills shortages experienced in surviving firms, with the notable exception that UK firms appear to have a greater problem with R&D staff shortages. For non-surviving firms, Germany appears to have a much greater problem with managerial skills shortages across the range of functions. Within Germany, we note that skills shortages appear to be an important area of distinction between surviving and non-surviving firms. For the UK, the problem appears to be confined to general management and production skills shortages.

MODELLING FIRM SURVIVAL

In this section we investigate econometrically the determinants of business survival. The data on which survival is based are made over two time points – the initial survey data in 1997 and a review of surviving businesses made in 2001/2002. Our basic procedure is to estimate a series of probit models which take into account the binary nature of the dependent variable, i.e. coded 1 if the business survives and 0 if it fails. In the following analysis we do not discriminate by the reasons for the termination of the enterprise. To allow more a meaningful interpretation of the results, we choose to report the marginal effects of the
probit models calculated around the means of the independent variables. This allows us to determine the influence and importance of a variable on firm survival in both countries. In Table 3, two models are presented for each country. A fuller model (1 & 3) in which a larger set of variables of potential importance are included and a refined and more parsimonious model (2 & 4) where non-statistically significant variables (i.e. >10% probabilities) are removed from the subsequent computation.

**Survival Results – Germany**

We observe that in Germany business survival decreases as a function of age. The older a business is, the lower the probability that it survived until 2001. This is contrary to the findings of previous studies of business survival in more conventional sectors of the economy. Age usually increases the chances of firm survival. By implication, this result may reflect the technological orientation of this sample of German businesses and the highly volatile conditions between 1997 and 2002 in domestic and international technology markets.

The means by which German technology businesses are financed also appears to play a role in the determination of survival or exit. In model (1) we note that businesses which received government finance at a later stage (i.e. in 1997, the year of the survey) had a 4.6% lower probability of surviving until 2001. In model (2), this effect ceased to be relevant. However, businesses in receipt of business angel finance at the time of start-up had 10.5% lower chance of survival. This may suggest that German business angels find it difficult to evaluate new, technology-based businesses adequately. Alternatively, it may also indicate that follow-on financing by the formal VC market is hard to obtain in 2002. The former finding, although weaker, suggests that government financiers may need to examine their investment appraisal techniques and existing VC policy when dealing with follow-on funding.

Finally, we observe that skills shortages at the general management level also play a role in determining which businesses survive. This appears to be a robust finding in that it is significant across both models (1) and (2), although it becomes stronger in the more parsimonious, second, model. The magnitude of the coefficient here implies that businesses experiencing a skills shortage at the general management level have a 6.1% lower survival probability.

To summarise, German businesses which are likely to have the highest probability of survival are younger (i.e. started later), did not have an equity investment from a business angel at start-up nor government financial support at a later stage, and do not suffer from general management skills shortages after they have been trading for a few years.

**Survival Results – UK**

From the UK results, we note that business survival decreases significantly with initial (employment) size of business. Larger sized start-ups have a higher probability of exit (non survival). This again is contrary to findings regarding business survival in more conventional sectors of the economy.

In model (3), the more internationally orientated a business is (when measured by the ratio of international to total sales) the lower the survival probability. However, this result did not hold true in model (4). But the size of the founding team was found to exert a positive, and significant, effect on survival. This can be interpreted as a ‘human capital effect’ as larger groups of founders have more tacit resources to invest in the business through greater accumulated experience. It may also be the case that businesses with larger founding teams also have more financial capital available. The magnitude of this founding team size effect is very substantially larger than the (negative) employment size effect.

Mode of financing was also found to be important. Here, from model (1), we observe that businesses in receipt of government-backed finance at start-up had lower survival probabilities. Yet those who
received government investments at a later stage were more likely to survive. These two findings suggest that UK government finance providers are less competent at evaluating new technologies at the point of business start-up than once the businesses have been up and running for a few years. It could also suggest that there is a greater moral hazard in financing unknowable start-ups. In model (4), businesses in receipt of later stage, venture capital investments had a 16.7% lower survival probability than those firms which had not received venture capital finance. This suggests that formal venture capitalists in the UK are not particularly good at picking winners from smaller, newer, technology-based businesses. However, it should be noted that venture capitalists do not try to optimise portfolio survival but the value of the portfolio over time. Regarding the greater success of later stage government investment, this might suggest that formal venture capitalists could learn something from the evaluation techniques of government-backed financiers.

We see that UK businesses using tried and tested combinations of existing technology had lower survival probabilities than those using newer technologies irrespective of whether they were developed externally or internally. The scale of this effect was large, effectively reducing survival probabilities by 15.6%. This strongly suggests that staying technologically innovative in both products and services enhances firm survival. Businesses not at or near the technology frontier are more likely to fall by the wayside as their sales and profitability are less likely to be protected by unique and defensible IP resources over the longer term.

Finally, we observe that businesses with financial skills shortages at the managerial level after they have been trading for a few years have significantly lower survival probabilities. These firms have an 8% lower chance of survival. This suggests that training in financial management is critical for new, technology-based businesses seeking to establish themselves. (The issue of training is also likely to be reflected in the widely differing productivity of UK and German firms in our sample.)

To summarise for the UK, the probability that a business will survive is dependent upon the size of the initial founding team, the total size of the business at start-up, mode of financing, technological sophistication and financial management skills at the managerial level. Businesses that have larger founding teams but smaller numbers of other employees, who are using advanced technology and have adequate financial management skills will be significantly more likely to survive. However, they should be wary of venture capitalists involvement in their businesses, particularly at later stages, and might be better served by seeking out government sources of finance after the start-up period.

CONCLUSION

These early figures give a number of interesting insights into the respondent firms which have either survived or failed over a five year period in their early growth stages. The findings also raise a number of important issues for further investigation. Clearly, the great majority of these firms have survived despite enduring very volatile and increasingly difficult trading conditions in the period 1997-2002. Even accepting that the firms’ survival was appraised between their fifth and tenth years on average, this subsequent survival rate of four out of five young companies remains a highly impressive statistic. This is particularly the case given that these firms generally compete in highly contestable markets where any protection provided by unique assets can be quickly eroded away by the technology responses of competitors.

The survival statistics pose a number of important questions from both policy and theory perspectives. Of particular interest is the high degree of difference in the key variables influencing survival between the two country cohorts. In a majority of cases, a variable shown to be important in one or both model variants for, say, Germany does not register as significant at all for the UK (and vice versa). When the variable is seen as significant, the direction of the coefficient is on occasion reversed. For example, the provision of Government finance at a later stage is associated with a reduced probability of survival in Germany and an increased probability in the UK.
Overall, the results serve to challenge accepted wisdom in a number of areas. In Germany, the negative associations (with survival) of firm age, angel financing and government finance at later stage are interesting. Similarly, in the UK, the negative effects of employment size at start-up, the role of government finance at start-up, and the contribution of venture capital are also somewhat counter-intuitive.

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NOTES

1. Address for correspondence: marc.cowling@ies.ac.uk. The authors would like to thank the Anglo-German Foundation for their financial support for this study and seminar participants at Babson 2006.

2. As Germany’s largest credit rating agency, Creditreform has the most comprehensive database of German firms at its disposal. Creditreform provides data on German firms to the Centre for European Economic Research (ZEW) for research purposes. Dun & Bradstreet is the UK equivalent.

3. Details of the econometric model’s specification are available from the authors.

4. This is a credible assumption after the major reduction in venture capital investments in Germany post the market corrections in 2000-2001.

REFERENCES


Table 1: Survival Status 2003 of Firms Participating in the 1997 Survey (%)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Germany Non-Survivors</th>
<th>Germany Survivors</th>
<th>UK Non-Survivors</th>
<th>UK Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software/Services</td>
<td>11.75</td>
<td>88.25</td>
<td>20.81</td>
<td>79.19</td>
</tr>
<tr>
<td>ICT-Hardware</td>
<td>15.58</td>
<td>84.42</td>
<td>20.98</td>
<td>79.02</td>
</tr>
<tr>
<td>Engineering</td>
<td>9.22</td>
<td>90.78</td>
<td>21.18</td>
<td>78.82</td>
</tr>
<tr>
<td>Health</td>
<td>11.28</td>
<td>88.72</td>
<td>23.24</td>
<td>76.76</td>
</tr>
<tr>
<td>Others</td>
<td>4.64</td>
<td>95.36</td>
<td>19.24</td>
<td>80.76</td>
</tr>
<tr>
<td>Total</td>
<td>10.68</td>
<td>89.32</td>
<td>20.75</td>
<td>79.25</td>
</tr>
</tbody>
</table>

Weighted results.
Source: ZEW, University of Exeter, own calculation.
Table 2: Key Characteristics of Survivors and Non-Survivors

<table>
<thead>
<tr>
<th>Firm characteristics</th>
<th>Measure</th>
<th>Germany Non-Survivors</th>
<th>Germany Survivors</th>
<th>UK Non-Survivors</th>
<th>UK Survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees 1997</td>
<td>mean</td>
<td>19.49</td>
<td>14.20</td>
<td>20.12</td>
<td>14.92</td>
</tr>
<tr>
<td>Annualised employment growth rate from start-up to 1997 (in %)</td>
<td>median</td>
<td>21.64</td>
<td>29.10</td>
<td>31.14</td>
<td>25.99</td>
</tr>
<tr>
<td>Age in 1997 (in years)</td>
<td>mean</td>
<td>4.85</td>
<td>4.89</td>
<td>4.85</td>
<td>5.57</td>
</tr>
<tr>
<td>Permanent R&amp;D activities</td>
<td>%</td>
<td>48.58</td>
<td>45.44</td>
<td>49.33</td>
<td>58.83</td>
</tr>
<tr>
<td>New, self-developed technology</td>
<td>%</td>
<td>32.09</td>
<td>37.19</td>
<td>31.73</td>
<td>33.50</td>
</tr>
<tr>
<td>Window of opportunity. (in months)</td>
<td>mean</td>
<td>20.49</td>
<td>20.27</td>
<td>14.74</td>
<td>16.70</td>
</tr>
<tr>
<td>Venture capital 1997</td>
<td>%</td>
<td>10.44</td>
<td>8.51</td>
<td>10.94</td>
<td>8.54</td>
</tr>
<tr>
<td>Public grants 1997</td>
<td>%</td>
<td>29.82</td>
<td>20.24</td>
<td>17.74</td>
<td>12.45</td>
</tr>
<tr>
<td>International sales 1997</td>
<td>%</td>
<td>42.35</td>
<td>56.07</td>
<td>68.65</td>
<td>58.27</td>
</tr>
</tbody>
</table>

Weighted results.
Source: ZEW, University of Exeter, own calculation.
Table 3
The Determinants of Business Survival in Germany and the UK
Dependent variable: survival=1, non-survival=0 (marginal effects reported)

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1) Germany</th>
<th>(2) Germany</th>
<th>(3) UK</th>
<th>(4) UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment size at start-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>-0.004**</td>
<td>-2.43</td>
<td>-0.014**</td>
<td>-2.55</td>
</tr>
<tr>
<td>International Sales Share %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Founding Team Size</td>
<td>0.049**</td>
<td>1.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC later stage (yes)</td>
<td>-0.167*</td>
<td>1.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angel finance at start-up</td>
<td>-0.105**</td>
<td>-2.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gov’t finance at start-up</td>
<td>-0.229*</td>
<td>-1.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gov’t finance later stage Technology</td>
<td>-0.046*</td>
<td>-1.71</td>
<td>0.143*</td>
<td>1.91</td>
</tr>
<tr>
<td>Tried and tested combination (yes)</td>
<td></td>
<td></td>
<td>-0.156**</td>
<td>-2.36</td>
</tr>
<tr>
<td>Skills Shortages (yes=1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance later stage</td>
<td>-0.080***</td>
<td>-3.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General management at start-up</td>
<td>0.013**</td>
<td>2.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General management later stage</td>
<td>-0.021***</td>
<td>-2.59</td>
<td>-0.061***</td>
<td>-2.97</td>
</tr>
<tr>
<td>-2LL</td>
<td>-34.63</td>
<td>-59.63</td>
<td>-72.98</td>
<td>-102.47</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>0.388</td>
<td>0.160</td>
<td>0.181</td>
<td>0.121</td>
</tr>
</tbody>
</table>

Notes: base categories are: industry_1; produced for end user; technology developed internally; window of opportunity_3. Only significant coefficients (p = <10%) are reported.