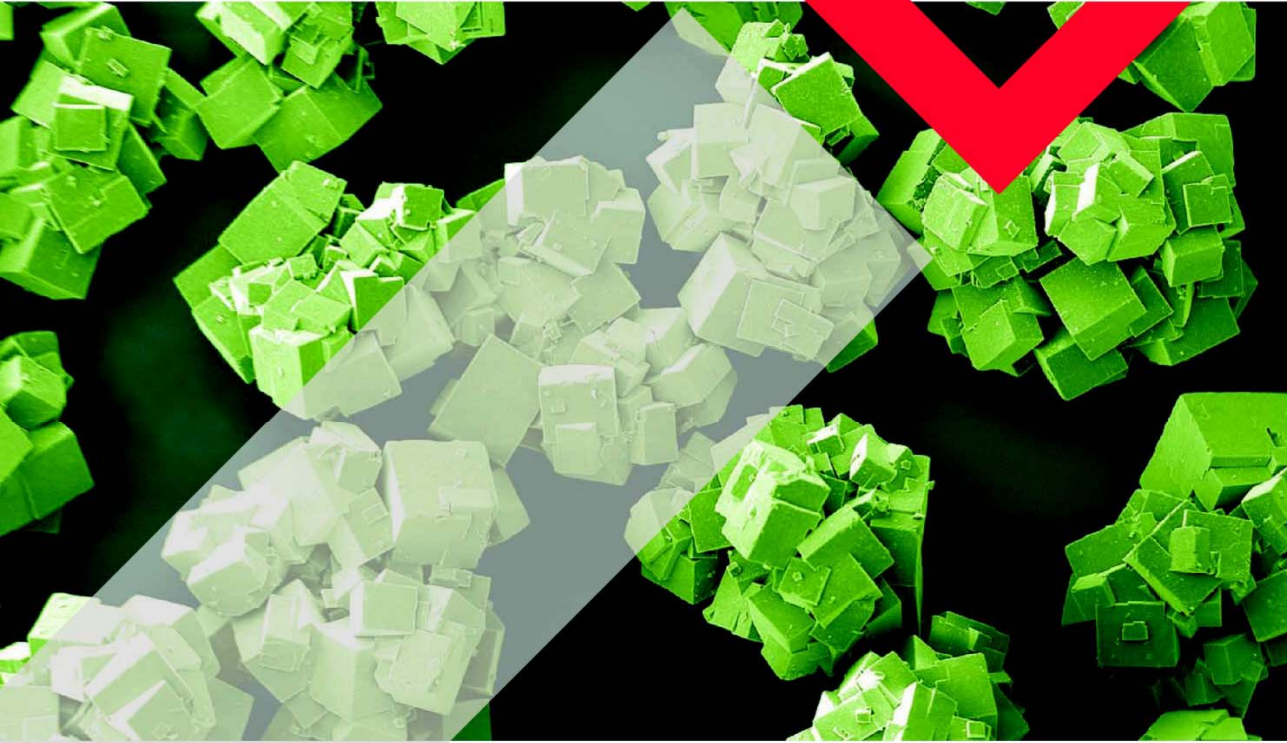


dortmund-project



Micro and Nanotechnology Start-up Monitor 2006

**Success factors for micro and
nanotechnology start-ups
in Germany**

Success Factors for Micro and Nanotechnology Start-ups in Germany

Micro and Nanotechnology Start-up Monitor

Abstract

The success of micro and nanotechnology start-ups depends on a combination of factors, including the quality, innovative potential, and applicability of the technology. But apart from the individual orientation of each company and universal market trends, there are general structural, economic, and political conditions that have a strong influence on the creation and survival of new enterprises. An analysis of these conditions and of the success factors for micro and nanotechnology start-ups in Germany has been conducted by the dortmund-project and IVAM Research and published in the "Micro and Nanotechnology Start-up Monitor 2006".

Motivation for the comprehensive survey has been to acquire valid knowledge of the motives, demands and opportunities of micro and nanotechnology start-ups as well as the advantages and disadvantages of the entrepreneurial climate in Germany with a view to developing and improving measures that help increase the prospects of success for the young companies.

It turned out that some conditions for high-tech start-ups are comparatively positive in Germany: for instance, there is an increasing support by public authorities regarding consultancy and infrastructure services. In contrast, the survey revealed deficiencies particularly in financing, education, and administration.

An analysis of the success factors for micro and nanotechnology start-ups revealed connections between the companies' growth (in terms of company age, employees and annual turnover) and, respectively, the professional/educational origin of the founders, the initial financing situation, the founders' motivation, and the business location.

Last but not least, it is the founders themselves who are responsible for the success of their enterprise. Awareness of the challenges and difficulties entrepreneurship involves can be essential for the survival of a young company.

1. Introduction

The Micro and Nanotechnology Start-up Monitor analyzes the general conditions and success factors for micro and nanotechnology start-ups in Germany. The results are based on written interviews with entrepreneurs who have founded a micro or nanotechnology company in Germany between 2000 and 2005. Included in the survey were small and medium-sized enterprises (SME) that practice various kinds of miniaturization technologies and related services, including micro components

and production processes, mostly top-down nanotechnology products and processes as well as technical and non-technical services. A questionnaire was sent to 154 founders, 48 of which completed and returned it. Accordingly, 31.2 % of the identified founders took part in the survey. In order to verify the conclusions drawn from the statistical data, they were discussed with experts who are involved in the process of establishing high-tech companies in different ways.

2. Statistical Data

Research in the database of relevant associations, conferences and trade fairs, government-funded research projects, trade registers and other sources produced more than 400 micro and nanotechnology companies that were founded in Germany between 1985 and 2005 and survived as self-dependent SMEs. After a rise of founding activities in the second half of the nineteen nineties, there is a distinctive drop in 2002 that correlates with the economic slump following the crash of the New Market. More than 60 % of the companies created between 1985 and 2005 were founded in the four federal states North Rhine-Westphalia, Thuringia, Bavaria and Baden-Württemberg. In most of the federal states, the quota of micro and nanotechnology company foundations roughly corresponds to the proportion of public R&D funding each state receives, with the exception of Thuringia where an above-average number of companies were founded in the nineteen nineties.

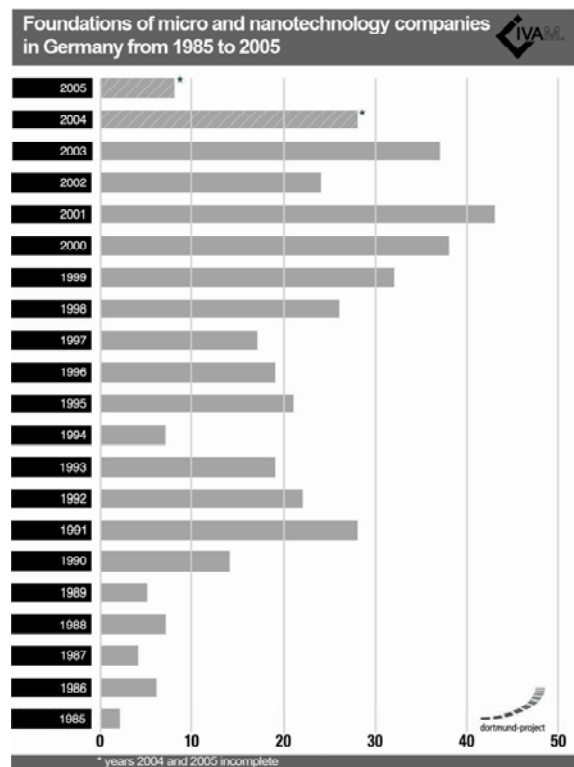


Figure 1: Foundations of micro and nanotechnology companies in Germany from 1985 to 2005 (years 2004 and 2005 are incomplete).
© IVAM Research 2006

3. Motivation of the Founders

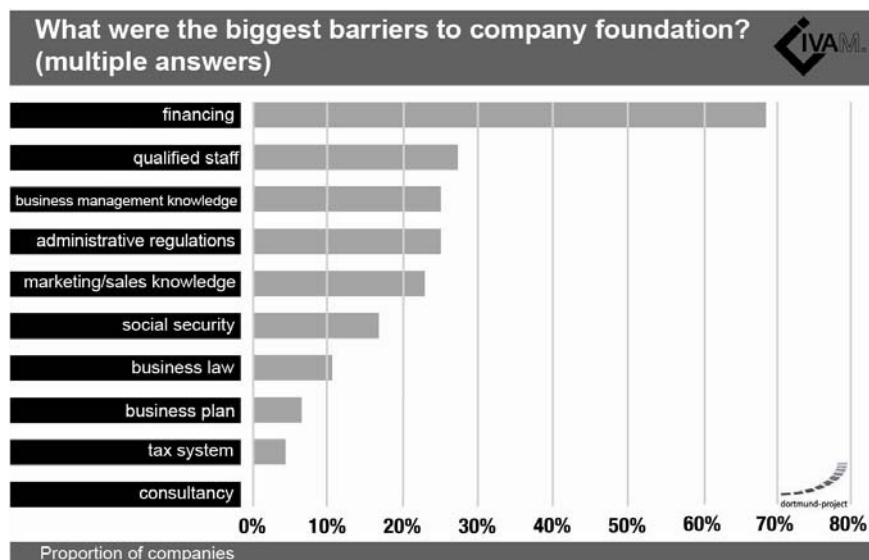
About half of the founders of micro and nanotechnology companies in Germany are concentrating on technical development rather than market entry. Only 50 % of the founders expect to achieve increasing sales figures in growing markets, and just 60 % assume that there is a concrete demand for their

products. This approach reveals a difference in mentality between founders in Germany and other nations, such as the USA, where entrepreneurs are keener on making profit and quite often sell a successful company in order to start up a new one.

4. Basic Conditions and Barriers

Due to an increasing range of consultancy and other services – often associated with founders’ contests arranged by public authorities – preparing the foundation rarely causes the prospective founders of micro and nanotechnology companies any trouble. Only 6.3 % say that drafting a business plan is a barrier to the foundation. This is a very low quota, which may be attributed to false assumptions the founders make

about the expectations of capital providers, whose financing decision depends, amongst other things, on the quality of the business plan. The efforts required for administrative procedures and decisions are a barrier for a quarter of the founders of micro and nanotechnology companies. Foundations, however, rarely fail because of administrative barriers.



Bigger and more serious barriers are encountered in the establishing phase when human resources, capital and technical infrastructure are required – three areas where micro and nanotechnology companies have very specific or high demands.

Figure 2: Financing is a barrier to company foundation for 68.8 % of the micro and nanotechnology start-ups in Germany. © IVAM Research 2006

In regard to human resources, finding suitably qualified staff seems to cause fewer problems than deficiencies in the founders' own education, concerning in particular business management and marketing knowledge. Obviously, academic founders with a technological or scientific background do not have sufficient opportunity to acquire business management knowledge during academic studies. However, a professional management, just like the business

plan, is essential for the willingness of financiers to invest in the company. Financing is the biggest barrier by far for micro and nanotechnology start-ups in Germany. Almost 70 % of the founders have problems to finance the company foundation. Almost one third of the (usually capital-intensive) enterprises are financed exclusively with private capital and without venture capital, bank loans, or public funding.

5. Location Factors

The micro and nanotechnology company founders' choice of business location is largely based on so-called "hard" location factors, such as proximity to research institutions, availability of

qualified staff and infrastructure facilities. "Soft" location factors, e.g. working close to home and quality of life, are a little less decisive.

However, when finally deciding on a business location, the founders of micro and nanotechnology companies turn out to be rather stationary. Only 46 % compare or analyze locations. Most of the spin-offs stay close to the institution or company they have originated from. The low mobility is a great advantage for locations with institutes and universities with a high spin-out quota.

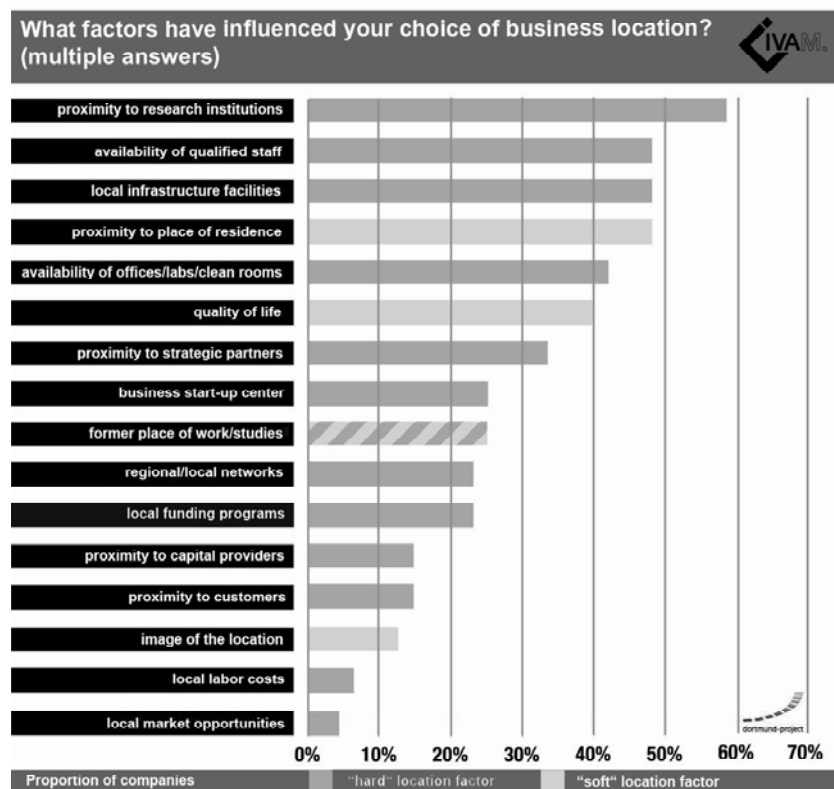


Figure 3: Factors that influence the choice of business location.
© IVAM Research 2006

Nevertheless, communal cluster-initiatives that establish specific infrastructure or services for high-tech companies succeed in attracting start-ups: 90 % of the founders who analyze locations set up their business in existing micro and nanotechnology clusters.

Clusters with thirty or more micro and nanotechnology companies – the cities Dortmund, Berlin, Munich and Jena – are particularly popular among founders who care about the image of the business location.

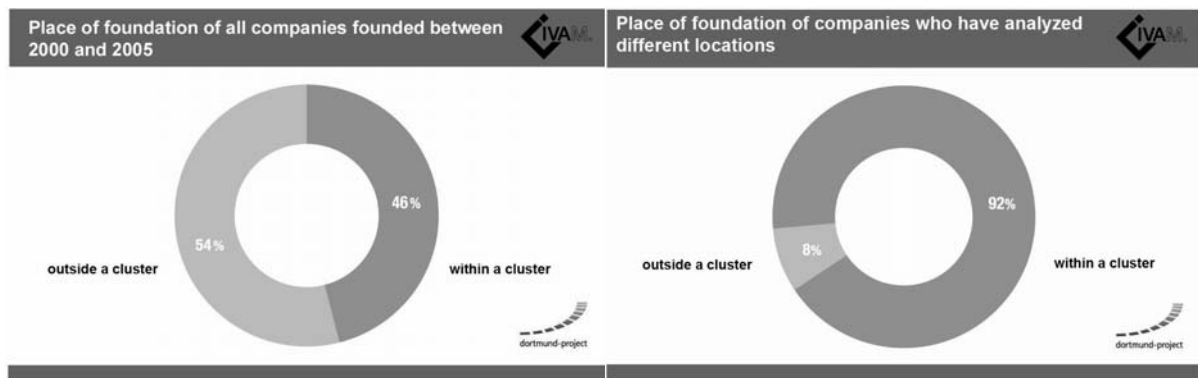


Figure 4: Choice of business location of founders who do not (left) or do analyze locations (right) respectively. © IVAM Research 2006

6. Success Factors

More than three quarters of the micro and nanotechnology companies founded between 2000 and 2005 were spun-off from established companies, research institutions or universities (in more or less equal shares). In regard to turnover and employees, micro and

nanotechnology companies spun-off from research institutions or established companies are growing faster than those that were spun-off from universities. University-spin-offs are also most strongly affected by financing difficulties.

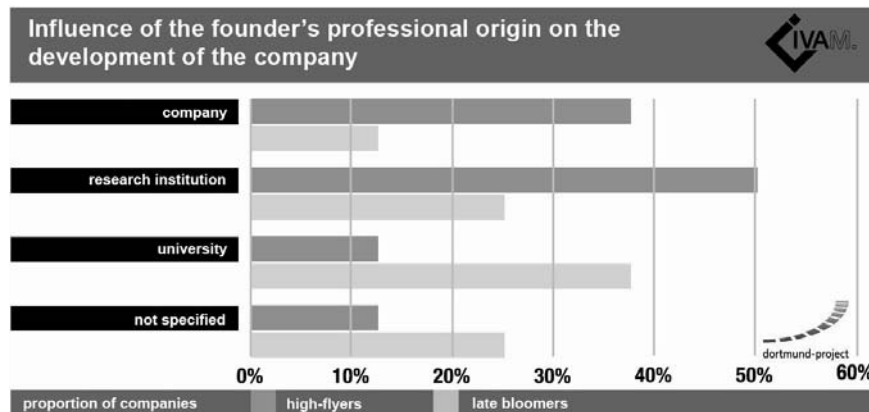
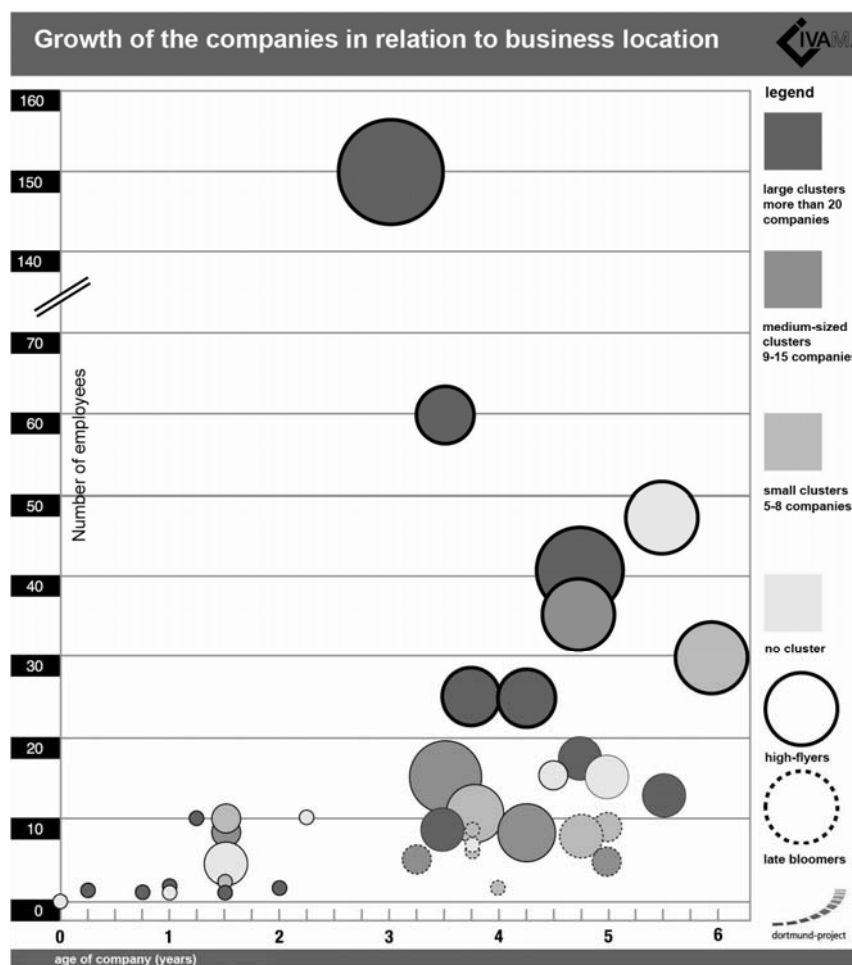


Figure 5: Influence of the founders' professional origin on the development of the companies. © IVAM Research 2006

Insufficient financing in general has a negative effect on the growth of the companies: start-ups that receive venture capital or public funding flourish faster than companies that do not draw from such financial sources. In addition, the motivation for the company foundation can have an effect on

the company's success. As can be expected, start-ups that expect a high turnover and a concrete demand grow faster than those that address niche markets. The founder's motivation, however, may influence the decision of venture capital providers whether to invest in the company or not.



The choice of business location also has an effect on the company's development. A large part of the fast-growing companies have set-up their business in a big cluster, i.e. a place where twenty or more micro and nano-technology companies reside.

Figure 6: Growth of the companies in relation to business location. © IVAM Research 2006

Incidentally, aligning the company's activities with generally available market and sales prognoses does not guarantee success, as markets, such as telecommunication, are subject to rapid and incalculable fluctuation. In addition, product development and product launch are more often than not delayed.

Less than half of the interviewed founders have realized or expect to realize the business plan according to schedule. Consequently, the market situation at the time of market entry may have changed fundamentally and completely differ from the situation expected at the time of business planning.

Authors



Dr. Heiko Kopf
Group Leader Cluster Management of dortmund-project
Managing Director of MST.factory dortmund GmbH
Phone: +49 (0) 231 50 29210
E-mail: hkopf@dortmund-project.de



Dr. Uwe Kleinkes
Managing Director of IVAM GmbH and IVAM Research
Member of the Management of IVAM Microtechnology Network
Phone: +49 (0) 231 9742 148
E-mail: uk@ivam.de



Iris Lehmann
Economic Data, IVAM Research
Phone: +49 (0) 231 9742 149
E-mail: il@ivam.de

Gründungsmonitor Mikro-/Nanotechnik (Micro and Nanotechnology Start-up Monitor)

published by:

dortmund-project
Toellnerstrasse 9-11
44122 Dortmund • GERMANY
Phone: +49 (0) 231 50 265 36 Fax:
+49 (0) 231 50 241 12
info@dortmund-project.de
www.dortmund-project.de

IVAM Research
Emil-Figge-Straße 76
44227 Dortmund • GERMANY
Phone: +49 (0) 231 9742 168
Fax: +49 (0) 231 9742 150
info@ivam.de
www.ivam.de

April 2006
70 pages, A5

The Micro-/Nanotechnology Start-up Monitor was published in German and is available from IVAM Research for 115.00 Euros incl. VAT and postage.