ACADEMIA FACING SMALL BUSINESS REALITY – A STUDY FROM THE PERSPECTIVE OF UNIVERSITY TRAINEES

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AR 99:36

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Paper to be presented at 15th Nordic Conference on Business Studies, Helsinki, Finland, August 19-21.
ABSTRACT

Promoting the development of small and medium-sized enterprises (SMEs) by means of different programs for knowledge and technology transfer from universities is common in most countries. In this paper we, building on two decades of experience from a university trainee program for smaller firms, address two questions: (1) How do SME-Trainees taking part in a specific program in Sweden perceive the value of their trainee period, and (2) how do trainees, utilising a specific list of variables, characterise their host firms. In focus are differences relating to firm size. The results indicate that trainees in micro firms are more satisfied with their trainee period than trainees in larger SMEs, which – considering that the trainees characterised these micro firms as less developed – was somewhat surprising. Utilising former trainees as initiated respondents this paper also suggests that a cut-point represented by five employees in a significant way distinguish smaller and larger SMEs.
BACKGROUND AND PURPOSE

In order to stimulate the further development of smaller businesses, different initiatives have been launched to promote and facilitate e. g. a more effective technology transfer between universities and smaller firms. One such measure is to stimulate SMEs to employ a larger portion of graduates from universities and higher education institutes. As the first university in Sweden, Luleå University of Technology introduced a university graduate trainee program in 1979. The purpose of the program was already from the start to promote competence development and competence building in SMEs located to the region by stimulating smaller firms to test and employ university-trained staff, and thereby strengthen these firms’ ability for further development. Since 1979 the program has involved more than 200 trainees and a somewhat lower number of SMEs. In this paper we, building on the experiences from this program, specifically address how the SME-Trainees perceive their experiences from working in smaller firms, separating SMEs in different size categories by their number of employees.

The SME Trainee Program provides both trainees and SMEs an opportunity to gain experience (from a firm perspective) utilizing university-trained specialists and (from a trainee perspective) working in a smaller firm. This program originally spanned over six months of practical work in the firm, under which the university or its development foundation Centek formally employed the trainee. Every trainee assignment was (and still is) based on one or several different development projects in which the trainee was expected to contribute. After the trainee period, the host firms were expected to have discovered whether the trainees’ competence motivated further employment by the firm or not. Similar, the trainees were expected to have a better understanding of what working in a smaller firm means. During the two recent years the program has developed by adding a more theoretical course/seminar program, involving that the total program today spans over 7.5 months. The course/seminar program contains three phases:

- Introduction days, including presentation of host firms and university tutors.
- Company audits, where trainees during a couple of weeks map and analyse different functions in the host firms, such as their function for economic control, marketing, R&D, production and quality control, or how the host firms manage their Human Resource Development and internal/external communication. These audits then serve as a base for succeeding course weeks.
• Four course weeks given by (normally) university teachers on subjects highlighted by the audits performed in the host firms, and with a specific focus on the conditions prevailing in smaller organisations.

After these introducing six weeks, trainees are placed in their host firms and supervised by both SME- and university tutors. Regularly during this practical training period, seminars on different subjects are arranged for trainees and SME-tutors.

In a previous study, Lassinantti and Ylinenpää (1998) reported that out of more than 200 trainees set out in smaller firms in the region, a vast majority continued as ‘real employees’ or, in some cases, got an offer to do so after the completed trainee period. Most trainees have accordingly through the trainee program got the opportunity to get a job in a smaller firm in the region. Similar, out of all SMEs receiving trainees and the opportunity to test and discover the benefits of employing university trained staff, a majority have decided to continue to utilize this specific (and to many firms new) competence. In this specific respect, the program is a success story and is generally by the University and SMEs in the region regarded as one of the most effective ways to transfer technology and knowledge between academia and the small firm sector. More specifically, the program

• has succeeded in giving the firms practical experience of what university trained staff can contribute with to the firm,
• has introduced new knowledge or competence to the firm, and thereby enabled the firm to develop new products, new customer segments or new functions in-house the firm,
• through the trainees has introduced a more analytical way of work in development projects, e.g. in terms of the use of formal analyses and different types of investigations and plans for future development.

In this paper we shift focus. Instead of analysing how the introduction of university-trained staff generally affects smaller firms, we here take the perspective of the trainees. From this perspective we will investigate whether trainees perceive the value of their trainee period differently depending on the size of the host firm. We will moreover elaborate on whether the SME-trainees perceive small firms to be different depending on organisational size and some critical variables, and discuss whether these differences in turn affect the perceived value of the trainee period.

THEORETICAL BACKGROUND AND RESEARCH QUESTIONS

Universities have gradually been given a more important role in creating economic growth and wealth in society (Klofsten et al 1997; Stankiewicz 1986), especially in the small firm sector. A problem identified in many studies is, however, a low level of formal qualifications in the SME sector (cf. Ylinenpää 1997). Several studies (e.g. Dankbaar 1998) accordingly recommend governments to initiate measures encouraging smaller firms to recruit more and better qualified staff, especially on the technical side. The problem in Sweden, as well as in many other countries, has been that SMEs traditionally have been reluctant to employ graduates from universities. Co-operation with universities is normally less developed in smaller firms as compared to larger companies, implicating that SMEs often perceive an alien relation to university researchers, teachers and students (cf. Hult 1996, or Beckérus & Roos 1985. See also Westhead & Storey, 1996, who describe the situation in the U.K. in a similar way). Graduates, in turn, have generally regarded employment in the large firm sector as the
standard route to a professional career, and have often not even considered employment in smaller firms as an alternative.

Small business research has demonstrated that small firms are different from larger corporations. From an early notion that ‘small is beautiful’, the main stream of research now often emphasises pros and cons of size per se (cf. Rothwell 1985;1989; Roothwell & Dodgson 1994; Nooteboom 1994). Vossen (1998) thus concludes that the advantages of large firms are generally the disadvantages of small firms and vice versa, but that also characteristics implicated by size may create advantages in one specific respect and disadvantages in another. One example is that fewer hierarchical layers in a small firm on one hand reduces red tape and facilitates flexibility, but also limit career opportunities inside the organisation. Vossen then concludes the relative advantages of small and large firms in the following way:

<table>
<thead>
<tr>
<th>Small firms</th>
<th>Large firms</th>
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<tr>
<td>- Little bureaucracy</td>
<td>- Formal management skills</td>
</tr>
<tr>
<td>- Rapid decision making</td>
<td>- Able to control complex organisation</td>
</tr>
<tr>
<td>- Risk taking</td>
<td>- Can spread risk over a portfolio of products</td>
</tr>
<tr>
<td>- Motivated and committed management</td>
<td>- Functional expertise in staff functionaries</td>
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<tr>
<td>- Motivated labour</td>
<td>- More specialised labour</td>
</tr>
<tr>
<td>- Rapid and effective internal communication, shorter decision chains</td>
<td>- Time and resources to establish comprehensive external Science and Technology networks</td>
</tr>
<tr>
<td>- Fast reaction to changing market requirements</td>
<td>- Comprehensive distribution and service facilities</td>
</tr>
<tr>
<td>- Can dominate narrow market niches</td>
<td>- High market power with existing products</td>
</tr>
<tr>
<td>- R&amp;D efficiency</td>
<td>- Economies of scale and scope in R&amp;D</td>
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<td>- Capacity for customisation</td>
<td>- Can support the establishment of a large R&amp;D laboratory</td>
</tr>
<tr>
<td>- Capable of fast learning and adapting routines and strategy</td>
<td>- Access to external capital</td>
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<tr>
<td>- Appropriation of rewards from innovation through tacitness of knowledge</td>
<td>- Better able to fund diversification, synergy</td>
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<td></td>
<td>- Learning curve economies through investment in production</td>
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<td>- Capacity for absorption of new knowledge/technology</td>
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<td></td>
<td>- Able to erect entry barriers</td>
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Table 1: Relative advantages of small and large firms (adopted from Vossen 1998)

Characterising small and large firms in this way has the merit of illustrating that firms are different depending on organisational size. Recognising the simplification this kind of reasoning is built on this and similar typologies may however seduce us to regard ‘large’ and ‘small’ firms as homogenous groups of firms, characterised by a uniform list of attributes. Neither small nor large firms however represent homogenous categories, and e.g. ‘small firms’ expose considerable variety across cases. As Julien (1998) points out, one of the greatest difficulties in small business research is “the extreme heterogeneity of the subjects”. Numerous different typologies have therefore been put forward to distinguish different subgroups of small firms by management objectives and strategy (e.g. Miller & Friesen 1982), by growth rate (e.g. Greiner 1998), by sector and type of market (e.g. Vesper 1979), or by type of ownership (e.g. Barry 1978). Common in the field is also to distinguish different kinds of smaller firms by their number of employees. OECD here differentiates between micro firms (1-4 employees), very small firms (5-19 employees), small firms (20-99 employees) and medium-sized firms (100-499 employees). Other cut-points are however common. One example is Cagliano et al (1999) who distinguished between micro firms (5-20 employees), small firms (21-50 employees) and medium-sized firms (51-200 employees).
Small firms are hence different from larger firms, but by no means represent any homogenous group. The number of employees is one important variable to recognise in this respect, since organisational size has significant implications for how the organisation operates and is managed. Larger SMEs may hence be expected to be more influenced by Vossen’s characteristics’ of ‘large firms’ in Table 1 as compared to small, micro firms. Two recent studies (Barth 1999; Cagliano *et al.* 1999) seem to suggest that there is a critical cut-point around 20 employees, which has major implications for how the firm is managed and operated. Development and adoption of management practices characterising larger firms accordingly seem to become especially critical when the smaller firm reaches this specific size. This implicates that small (more than 20 employees) and medium-sized firms (more than 50 employees) in a significant way adopt organisational and management characteristics from larger firms at a cut-point around 20 employees, such as a more complex organisation, employment of functional expertise, and development of formal management skills.

A question evolving from this observation is whether ‘moving up the ladder’ and adopting large-firm practices affect the way university-trained staff perceive the firm and the value SME trainees assign their trainee period. Building on the understanding that universities normally provide knowledge which is more related to management and large-firm logic than to small business logic (cf. Gustavsson & Johannisson 1997), graduates from university should be more familiar with conditions prevailing in larger SMEs than in, e.g., archetypes of micro firms formed and in an explicit way managed by their owner-managers. Consequently, it seems reasonable to expect that SME-trainees in larger SMEs would appreciate their trainee period more than trainees in micro firms. This is also, together with the question related to where the cut-point for adopting management (instead of entrepreneurial) practices is, the questions we try to answer in this paper.

**METHOD**

Building on a similar study in the US (Wyrick & Peterson 1995), a survey study was conducted among 72 SME-Trainees from Luleå University of Technology in 1990-97. 43 usable answers were obtained, implicating a response rate of 60%. The questionnaire contained both structured and open questions, and addressed topics such as the trainee’s short- and long-term expectations on the trainee period, whether these expectations were met, and the most positive/negative experiences from the trainee period. The questionnaire also contained structured questions where the trainees were asked to characterise their host firms by a set of different variables (variable names, used in Table 3, inside parentheses. See also Appendix):

- Whether the business concept and the firm’s vision was clearly defined (CONCEPT),
- Whether the firm had developed and documented its policies in different fields (POLICY),
- Whether procedures and routines for different operations were defined and rooted among the firm’s employees (ROUTINES),
- Whether the firm had introduced an accepted quality system which was accepted by the organisation (QUALITY),
- Whether cross-functional teams were utilised for decision-making and production planning (TEAM), and the percentage of employees taking active part in the work of such teams (PARTICIP),
- Whether the decision-making process in the firm was a ‘one-man-show’ or involved the organisation (DECISION),
• Whether the firm utilised any structured or systematic method for problem solving (PROBLSOLV),
• Whether meetings in the organisation were prepared in advance and conducted in a professional way (EFFMEET),
• Whether information was given and shared in the organisation (INFO), and whether the organisational climate could be characterised as closed or open (CLIMATE), and
• Whether employees were given vocational training in relevant fields for doing a professional job, including areas such as communication, problem-solving, teamwork etc. (EDUC).

Using response alternatives (different predefined alternatives; for examples see Appendix), each respondent was asked to characterise its host firm on a scale from 0 to 10. Every structured question was then followed by an open question depicting whether the trainee perceived him/herself to have had the opportunity to influence the firm and its operations referring to each variable. The data was collected after the completed trainee period, and in many cases the respondents had several years of working experience between the trainee period and the time for data collection.

Data from the survey study will here be used for analysing whether SME-Trainees experience their trainee period differently depending on education, gender and the size of the host firm. More specifically we will here be interested in whether there are any significant differences between groups by using t-tests. We then combine the quantitative data analyses by illustrating differences between groups based on the more qualitative answers obtained to the questionnaires’ open questions. Some descriptive data referring to the group of respondents (n=43) are depicted in Figure 1, separating responding trainees by the size of their host firms, their sex and their educational background (graduates from engineering, business administration and ‘others’, mainly graduates from systems engineering).

![Figure 1: Some basic data of respondents](image-url)
RESULTS

Were expectations on the trainee period fulfilled?

In answers to open questions, former trainees often underlined the value the trainee period had for “learning how a company works”, or “getting ‘the whole picture’ of a firm”. “I learned how to work independently and under my own responsibility, and experienced all aspects of running a smaller firm” is a typical comment illustrating this understanding among most trainees. Most trainees appreciated the variety of work tasks they were confronted to. One respondent hence reported that she became “a hell of an expert on tax reports and tax regulations”, while another trainee was happy to have gained the experience of “managing an ADP-project and participating in merger discussions going on in my company”. One reason to why trainees perceived their trainee period as a positive experience was specifically pinpointed by one respondent: “I got the opportunity to work under a great degree of freedom, and my ideas for development and improvement were taken seriously. I was listened to”. Several respondents also stressed the opportunity to build a personal external network that was facilitated by the work in the firm: “Met a lot of people, and got access to a lot of other interesting companies”.

These generally positive and often enthusiastic comments illustrate the overall benefits the SME-Trainee program has had from a trainee perspective. When we investigated whether this generally positive understanding of the program differed across sex or educational background profiles (graduate engineers, graduates in business administration and systems engineering) no significant differences were revealed. Regardless of educational background or sex, the former SME-Trainees hence perceived the value of their trainee period in a similar way. University trainees hence generally perceived that they have had an interesting trainee period, and normally felt that their host firms had met their expectations. Comparing respondents by the size of the host firm did, however, indicate one significant difference: Trainees working for micro firms (i.e., firms with up to five employees) hence to a significantly (t<0.1) higher degree perceived the program to have met their expectations. This specific category was generally more satisfied with their trainee period when evaluating the program’s results. The answers to our open questions moreover indicated that this group of respondents often had prior close relations to small businesses in their family or among relatives, and that they often had ‘recruited’ the host firm themselves.

This result is interesting, since micro firms normally managed in an autocratic way by its owner-manager, by no means can be regarded to represent any model for academic teaching. Instead academic institutions such as universities are often accused of only preparing their students for a future work and career in larger firms. This also motivated us to elaborate on how the trainees’ perceived their host firms, and how these perceptions could be related to firm size.

Trainees’ perceptions of their host firms by firm size

How did the trainees perceive their host firms? Building on structured questions depicting some critical variables outlined above, and specifically comparing differences across different size categories of SMEs, revealed the results depicted in Table 2. We here compare SMEs by size using different cut-points (5, 10 and 20 employees respectively). For a more detailed description of the variables used, see Appendix.
Table 2: Trainees’ perceptions of their host firms distributed on different size categories

In focus of this paper are differences relating to organisational size. One initial observation, however, is that the investigated SMEs generally score low on the variables used in this study. No single variable thus reaches a mean of 6 for the studied group of, in total, 43 SMEs. Variables that by trainees were given the highest scorings were the presence of a visible business concept and vision (CONCEPT; mean 5.9) or the existence of an open culture, characterised by e.g. an open and confident discussion climate (mean for all investigated SMEs 5.9). On the other hand the group of SMEs scored low regarding the degree of developed routines (mean 3.2), quality systems (2.2) and staff training and education (2.8). Moreover, ‘large’ SMEs regardless of cut-point by the trainees were regarded to be more developed on most of the selected variables.

It should however be recognised that ‘more developed’ in this context not necessarily should be understood as ‘better’. The variables used here, and the way scales and response alternatives were defined (see Appendix), often addressed the degree of routinisation, formalisation or standardisation, i.e. typical characteristics which often correlate with increasing organisational size. It is hence not very surprising that SME-Trainees noticed that larger SMEs, regardless of which cut-point used, had developed more procedures, standards and experiences for e.g. formalised cross-functional teams, specific problem-solving techniques or professional meetings. Contributing to the low scorings may also be the fact that we here investigate SMEs in a peripheral region of Sweden, where small firms often have problems to attract educated and competent key-persons to the firm. This was, in fact, an important motive for starting and continuing the SME-Trainee program in north Sweden.

Bearing this in mind, Table 2 depicts significant differences relating to firm size that refers to three specific functions of SME-operations:

1. How decisions are made and prepared (variables DECISION and PROBLSOLV),
2. The use of (formal) cross-functional teams (variables TEAM and PARTICIP), and
3. The degree of formal routinisation and professional meetings (variables ROUTINES and EFFMEET).
These differences were further underlined by the respondents’ answers to open questions, which often pointed at lack of systems, standards and formalisation in especially the group of firms categorised as micro firms.

Noticeable is also the result that SMEs, according to the SME-Trainees’ understanding, did not significantly differ regarding several variables although comparing means revealed considerable variation between the groups. Our results hence indicate that variables such as whether the business concept was clearly defined (CONCEPT), whether the firm had developed a quality system or policies in different fields (QUALITY; POLICY), or to what degree the firms’ culture could be described as ‘closed’ or ‘open’ (CLIMATE) do not distinguish large and small SMEs in any significant way.

Another and even more interesting observation relates to the fact that the cut-points used in this study (5, 10 and 20 employees) reveal different numbers and levels of significant differences when comparing firms by size. Generally, using the cut-points 5 or 10 employees reveal more differences than using the cut-point of 20 employees (6 versus 3 variables that distinguish ‘large’ and ‘small’ SMEs in a significant way). Using the cut-point 5 employees however resulted in the highest levels of significance, while separating ‘large’ and ‘small’ firms at the cut-point 20 employees revealed the lowest degrees. To conclude, the cut-point represented by five employees in a smaller firm seems to be a very critical boarder-line which, for expanding small firms hiring more employees, seems to implicate another type of management and another way of organising the firm’s activities. The level of five employees hence distinguishes smaller and larger SMEs regarding e.g. how decisions are made and prepared, the use of (formal) cross-functional teams and the degree of formal routinisation and professional meetings.

CONCLUSIONS AND IMPLICATIONS

This study has aimed at answering two specific questions: (1) How do SME-Trainees taking part in a specific program in Sweden perceive the value of their trainee period, and (2) how do these trainees, utilising a specific list of variables, characterise their host firms. Recognising that academic training and preparation of students for their working life only to a very limited degree is based on the model represented by micro firms; this study has revealed an interesting paradox. While SME-Trainees obviously perceive larger SMEs to be more developed referring to almost every investigated variable (and thus more close to what they have ‘learnt in school’), trainees in micro firms with less than five employees are more delighted with their trainee experience. We see two possible explanations behind this paradox:

1. Trainees in micro firms often perceive themselves to be (and in fact often quickly become) ‘key persons’ in their firms, given the task and responsibility of utilising their specific knowledge and competence to develop the firm and act as change agents. This interpretation was strongly supported by several answers to our open questions to the trainee respondents.
2. Micro firms represent a challenge for entrepreneurial ‘change agents’ and attract another type of trainee-personalities than larger SMEs with more developed procedures, routines and structures. One indication supporting this assumption was the finding that micro host firms often were ‘recruited’ by the trainees themselves.
This specific result is however also a good starting-point for stating the relevance of not only
classifying organisations in terms of level of development, but (as proposed in Table 1 by
Vossen, 1998) as different. Firms have different relative advantages related to organisational
size. A micro firm heavily depending on its flexibility to adjust to various customer needs is
hence less likely to (or should not) score high on variables such as degree of routinisation,
number of developed and documented policies or frequency of standardised meetings.
Scoring low on such variables might accordingly only reflect the fact that smaller firms’
business concepts often are different from their larger colleagues’. The implication of this
kind of reasoning is hence that simple comparison between variables (such as those exercised
in this study) should be made with utmost caution. The result should however be encouraging
both for micro firms hesitating to ‘take on’ university-trained staff as well as for students
considering the possibility to work for a smaller firm.

Referring to results recently and independently presented in a Swedish and a European study
(Barth 1999, Cagliano et al 1999); the significance of the cut-point at five employees is
especially interesting. These studies namely found that 20 employees represented the most
significant boarder-line between ‘small’ and ‘large’ SMEs, having important implications for
the management and operations of smaller firms. In this study, utilising university-trained
‘insiders’ to characterise their host firms, the five-employee-cut-point instead comes forward
as the most significant boarder-line. Although neither research methodologies, nor the
specific variables nor scales utilised in the studies were identical, the results seem to indicate
two important cut-points distinguishing smaller firms:

- The level 5 employees, which separates smaller firms which very much rely on informal
communication, procedures and decision-making from other SMEs, and
- The level 20 employees, which separates smaller firms which to a considerable degree are
managed and controlled by their owner-manager from larger SMEs developing functional
managers and a management team.

Recognising that organisational culture and structure are inter-related, we may understand the
first cut-point (5 employees) as more related to the firms’ culture and the second cut-point (20
employees) as more related to structure.
REFERENCES


