Factors in SWOT Analysis Applied to Micro, Small-to-Medium, and Large Software Enterprises: An Austrian Study

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Many companies are conducting a SWOT analysis as part of the strategic planning process to identify the organisations' strengths, weaknesses, opportunities and threats before proceeding to the formulation of a corporate strategy. This paper reports on the results of an empirical survey and seeks to identify differences in SWOT analysis factors between micro, small-to-medium and large software enterprises. A questionnaire was used to interview a random sample of key executives in 174 Austrian software enterprises. The important role of micro and small-to-medium software enterprises is outlined in an overview of the Austrian computer software industry. The empirical results show, that in general, almost every identified discriminating endogenous success factor is viewed more negatively by managers of micro-enterprises compared to larger firms. In return, managers of Austria's large software enterprises perceive major barriers to companies growth in the business environment. Due to the highly globalised nature of the software industry, the findings are also applicable for other countries in the European Union.
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Introduction

The economic and industry analysis literature is characterised by an emphasis on a new knowledge-intensive era of economic activity (OECD, 1996; OECD, 1999; Marceau *et al.*, 1997; Sicklen *et al.*, 1998). Knowledge is the 'driver of productivity and economic growth' and 'there is a new focus on the role of information, technology and learning in economic performance' (OECD, 1996). The software industry, which will be investigated in this article, is a knowledge industry. Its major product is knowledge itself and its major output is research which translates into new products and services. The growing economic activity in knowledge- and technology-intensive sectors is already translating into rapidly expanding output and employment growth. Information and communication technology intensity (ICT expenditures/GDP) is rising in OECD countries and reached almost 7 per cent on average in 1997. The software market has shown rapid growth and together with services dominates the IT market with a share of around 55 per cent of the total (OECD, 2000a). The software industry growth market has created many opportunities for software companies. But globalisation, the acceleration of technological change and innovation have also created threats. To survive in this new environment, many firms have

had to become more responsive to change. One reason for the success of smaller businesses is their ability to adapt rapidly to new circumstances (Vickery, 1999), which is the foundation of continued competitiveness in the dynamic environment of IT companies. A key characteristic of the IT industry in general is its fast clockspeed, fast innovation and short life cycles (Fine, 1998; Mendelson and Pillai, 1998; Mendelson and Pillai, 1999).

Scholars in economic sciences have focused on the role of SMEs in economic development, especially on the contribution of SMEs to total innovation output (Acs and Audretsch, 1991; Acs and Audretsch, 1988; Foster, 1986; Keeble, 1996; Isaksen and Smith, 1997; Pavitt *et al.*, 1987; Sandven, 1996; Scherer, 1984). In OECD countries over 95 per cent of enterprises are SMEs. They account for 60–70 per cent of jobs in most countries. In the European Union, SMEs provide employment relating to two-thirds of all EU jobs. In Japan, 78 per cent of jobs are provided by such firms. Common to all countries is the vital role in job creation played by SMEs (OECD, 2000b). The increasing importance of SMEs in economic growth, job creation, regional and local development is also recognised by government committees (Bologna Charter, 2000).

The software industry has received surprisingly little attention, given the size of the industry, its rapid growth and apparent importance. The aim of this article is firstly to give an overview of the Austrian software industry with a special view to the role of different sized software enterprises. Secondly, to investigate differences in SWOT analysis factors; respective strengths, weaknesses, opportunities and threats between three different types of enterprises: Micro (ME), small-to-medium (SME) and large organisations (LE). Due to the highly globalised nature of the software industry the findings can also be very informative for other countries in the European Union.

Methodology

The methodology employed is an empirical study of the Austrian computer software industry, which was carried out in the year 2000. The supplied address material for the study contained not only all Austrian software companies but also many hardware manufacturers and other IT firms. Therefore, the empirical work undertaken had to consist of two steps. The first step allowed the screening of the provided address material in order to filter out the relevant software companies for the second main step of analysis. In order to be included in the main sample, firms had to belong to the software industry, which was divided into three segments: Packaged software (SIC 7372, respectively NAICS 51121, 334611), custom software and software-related services (SIC 7371,

7373 respectively NAICS 541511, 541512) (NAICS, 1999a; NAICS, 1999b). Although custom software, i.e. software that is produced only once, is viewed as service output (Steinmueller, 1996) this segment was analysed separately.

For both the preliminary and the main analysis, the design of a questionnaire which was validated in several pre-tests was necessary. For the preliminary phase random sampling was employed and the 600 chosen companies were contacted by telephone. The achieved response rate was 70.4 per cent. Some companies could not be contacted, because they had ceased to exist, the address was wrong or could not be found, etc. These neutral dropouts were considered in the calculation of the response rate and therefore did not decrease the return quota. On completion of the preliminary analysis structured face-to-face interviews followed with the remaining software companies in the sample. The rate of return for this second and main step of the study was 55.6 per cent. After completing both the preliminary and main step of the analysis, non-response effects were examined. The analysis (regarding known distributions of variables of the Austrian computer software market such as the type of the organisation) revealed no significantly different characteristics between non-respondents and respondents.

Of the 174 data sets received after the interviews, 91 belonged to micro enterprises (MEs) and 50 to small- or medium-sized enterprises (SMEs). The remaining minority (33) was classified as large enterprises (LEs). A consequence arising from the different group sizes was that the precision of the estimates concerning the population characteristics of micro organisations was likely to be more reliable compared to cases of small to medium and large organisations, but the statistical tests employed account for the different sample sizes.

The data was analysed using a statistical package. The applied statistical techniques were Kruskal-Wallis H-test, Spearman rank correlation and discriminant analysis, which will all be described at the first point of usage.

Conceptual Framework

Although there is an extensive amount of literature covering the strategic planning process, most approaches include a cyclic iteration of the following five elements. The strategic planning process begins with a statement of the corporate mission and goals (step 1). This is followed by the analysis of the organisation's external competitive environment (step 2) and the analysis of the organisation's internal operating environment (step 3). The internal analysis is followed by the selection (step 4) and the implementation of strategies (step 5). The last step also involves the design of the organisational struc-