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LOOKING EASTWARDS

CHALLENGES AND OPPORTUNITIES FOR INNOVATIVE COMPANIES IN THREE EU-BORDER REGIONS
THE CASE OF CARINTHIA

Simon Pohn-Weidinger, Kristina Zumbusch

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JOANNEUM RESEARCH Forschungsgesellschaft mbH – Institut of Technology and Regional Policy (InTeReg)

Graz Office:
Elisabethstraße 20
A-8010 Graz, Austria
Phone: +43-316-876 1488
E-Mail: intereg@joanneum.at

Vienna Office:
Wiedner Hauptstraße 76
A-1040 Vienna, Austria
Phone: +43-1-581 75 20
E-Mail: intereg@joanneum.at

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CHALLENGES AND OPPORTUNITIES FOR INNOVATIVE COMPANIES IN THREE EU-BORDER REGIONS

THE CASE OF CARINTHIA

By order of INFORMEST (Service and Documentation Centre for International Economic Cooperation), Gorizia, Italy

Simon POHN-WEIDINGER, Kristina ZUMBUSCH

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JOANNEUM RESEARCH Forschungsgesellschaft mbH
Institute of Technology and Regional Policy (InTeReg)
Elisabethstraße 17, A-8010 Graz, Austria
Tel. +43-316-876 1488

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1. Introduction

The report is part of an EU-project co-financed by the DG Enlargement and handled in co-operation of the three European border-regions Friuli-Venezia Guilia, Anatoliki Macedonia-Thraki and Carinthia. The main focus of the project lies on the organisation of three partnership events for small and medium sized enterprises (SME) in these regions. The overall aim of these events is to foster the development of three priority sectors in each of the three border regions. For Carinthia the following sectors are chosen as priority sectors in the sense of the project:

three priority sectors

- mechanical engineering
- (micro-)electronics
- software

Among the complementary activities of the project a market analysis is foreseen for each of the regions, that discusses the three selected sectors with a specific relevance for the specific regional economy. In this context the following report carries out the market analysis for the region of Carinthia. The study gives an overview of the regional economy, specific statistical data and a focus on the three priority sectors of the region. The specific characteristics of these sectors, their development trends as well as innovation potentials will be highlighted. These information shall provide an useful basis for the coming partnership-events of the project. The analysis will be composed of four parts:

- In the beginning, a short description of the region of Carinthia will be given to introduce the region in general to the readers (chapter 2).
- Subsequently a quantitative analysis (chapter 3) describes the sectors mainly by indicators, especially referring to the number of employees and number of companies. At first the three sectors are discussed with respect to their regional environment as well as to national averages to highlight their outstanding position in the regional economy of Carinthia. Afterwards each sector will be analysed separately in its quantitative terms and development trends.

  quantitative analysis
- Chapter 4 discusses the challenges emerging by the EU-enlargement. Therefore an overview of the conditions and the potential impact of the liberalisation on trade with Accession countries as well as on the current export structures of Carinthia in general and the three priority sectors in particular is given.

  EU-enlargement
- Chapter 5 complements the quantitative descriptions with a qualitative analysis focusing on development conditions of the three sectors. Information is based on in-depth interviews with key-players in each sector. The analysis emphasises the integration of each sector in its specific innovation system, sectoral potentials with respect to research activities as well as qualification institutions are named. In addition, expectations and challenges that the previous chapters have not been able to seize are identified.

  qualitative analysis

Data and Methodology

sector classification

For the quantitative part of the report the definitions of the sectors are based on the European 2-digit NACE rev. 1.1 classification. Mechanical engineering is therefore defined by NACE 29. (Micro-)electronics encompasses NACE 30 to 33. Both sectors are part of the manufacturing sector, which comprises NACE 15 to 35. The software sector is defined by NACE 72, and is part of the business service sector (NACE 70-74). As these definitions are quite narrow, problems arise. Especially mechanical engineering but also (micro-)electronics comprise components which are not considered in these specific classifications. As an example, mechanical engineering in Carinthia also shows important activities in manufacturing of fabricated metal products (NACE 28). Also architectural and engineering activities as well as related technical consultancy is closely related to the regional mechanical engineering sector (NACE 74.2). However, the quantitative analysis of the priority sector is based on the specific NACE-classifications (NACE 29, 30-33, 72), whereas qualitative discussions refer to a wider interpretation of the sectors.

WIBIS Carinthia: a statistical information tool provided by the KWF

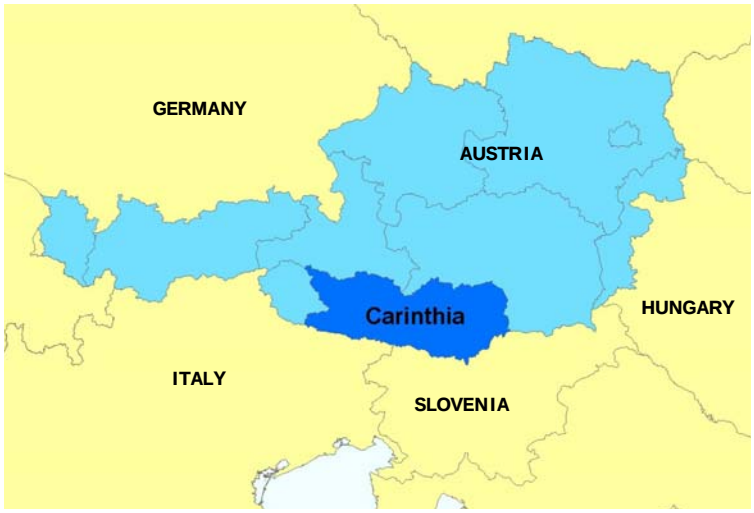
The data used in the analysis is derived from the annual economic statistic system from Carinthia (WIBIS Carinthia 2003), which is accessible by the homepage of the Carinthian Economic Promotion Funds KWF (http://www.kwf.at/wibiscd/). Employment data of WIBIS Carinthia is provided by the Austrian Social Security Agency (*Hauptverband der Sozialversicherungsträger HVSV*).

2. A first glance at the region of Carinthia

most southern region of Austria

Carinthia is the most southern province of Austria. It lies south of the main crest of the Alps. Its neighbours are Italy and Slovenia. The shared border between Carinthia and Italy is about 120 km. Carinthia and Slovenia share a 200 km long border which is currently still the external border of the European Union. Carinthia comprises an area of 9.533 square km of which 2.455 square km are permanently inhabited. The province is bounded in the north by the Tauern Alps. The boundaries in the south to Italy are the Carnic Alps and to Slovenia the Karawanken Alps. Difficult access, location on the periphery of Austrian and European centres, and the lack of its own large city centre were important factors influencing development for a long time. Access is nowadays distinctly improved with the construction of the Tauern motorway and the southern motorway. Carinthia is strongly orientated towards its neighbouring region in the East, the region of Styria, as well as to its neighbours in the South, Italy and Slovenia. In the context of the EU-enlargement the location of the region brings about great challenges due to its proximity to new dynamic markets in the South East.

Figure 1
The region of Carinthia

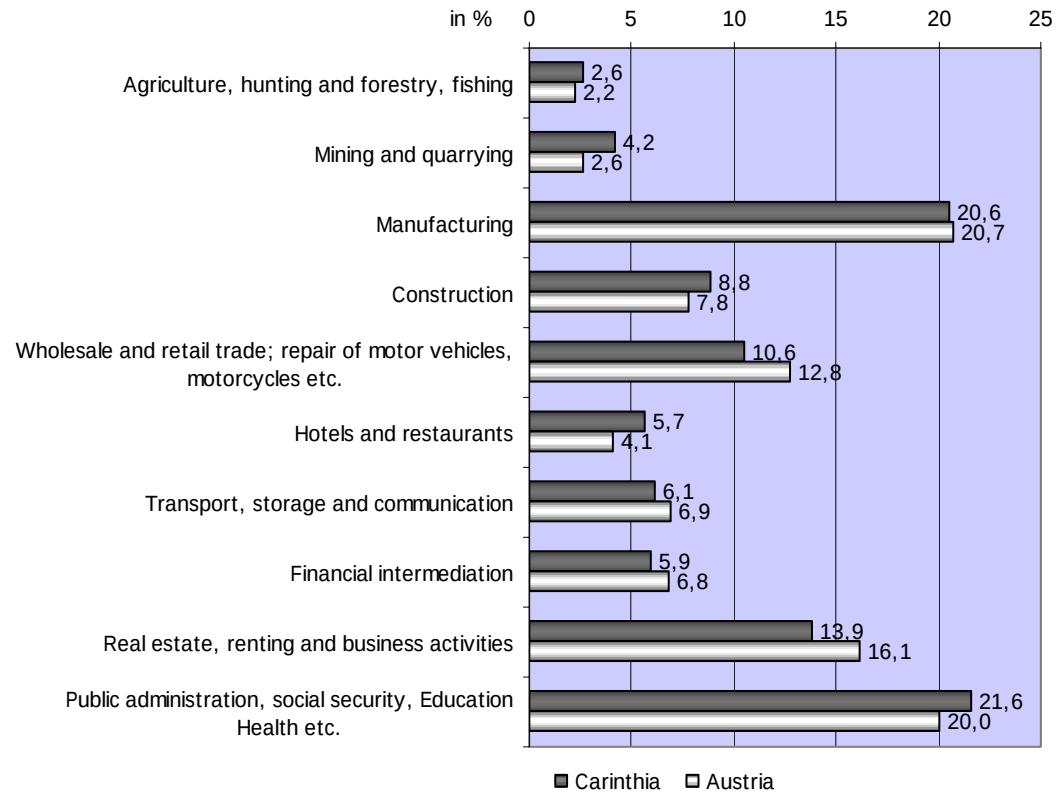


successful structural changes

As in the Austrian economy in general, also in the regional economy manufacturing is highly important. Furthermore Carinthia is a region with a tradition in tourism, in particular in summer season and for an increasing part also in winter. Another important sector is construction. The Carinthian economy successfully managed the necessary structural changes during the last decades. In the booming period between 1997 and 2001 employment increase in manufacturing was above the Austrian average. This growth was especially based on developments in technology and human capital intensive sectors, like electronics or mechanical engineering. Hence, these sectors further induced the required structural changes, during the booming period in the 90ies. This process lost its former high dynamic as a reaction to the international slowdown since 2001, which also affected the

Carinthian economy. Thus, since 2001 these sectors could no longer compensate for job-losses in traditional production fields, but in fact had to cut down employment themselves.

Figure 2
Share of value added according to sectors – 2000, Carinthia Austria



Source: Statistics Austria 2003.

predominantly SMEs

The regional economy is mainly based on small and medium sized enterprises (SME). Almost all regional enterprises have less than 249 employees and are therefore classified as SMEs. In 2002, two thirds of the regional employees were working in SMEs. There are a few large enterprises companies in the region which are of a great importance for the regional economy. These large companies work mainly in different markets and use different technologies. Therefore, relations between these companies are weak, which impedes the formation of critical mass.

intensification of R&D-activities

The region of Carinthia suffers from a traditionally low R&D-rate. However, a dynamic catching-up process has started in the 90ies. The regional R&D infrastructure – especially in relation to the regional university - is currently being upgraded. In 1993 the regional R&D-rate lay at only 0,4 %, compared to 1,5 % at the national level. In 1998[1] the regional R&D rate was already up at 1,1 % (Austrian average 1,8 %). This increase was mainly based on intensified efforts of regional companies. Regional R&D-activities remain strongly concentrated: four companies are responsible for 74 % of the total of regional R&D expenditures.

[1] More recent data are not available at the regional level.

growth rate of regional GDP of 2,7 %

In spite of all these positive trends and developments in Carinthia, there remain some critical points and challenges which are to be mentioned. Carinthia has a gross regional product per capita of 85 % of the Austrian level (1999). With an average annual growth rate in regional gross domestic product of 2,7 % (from 1996-2001), Carinthia is under the Austrian average (3,2 %). The gross regional product supplied EUR 11,7 billion to the Carinthian economy in 1999 (6 % of total Austrian value added). This economic performance is, therefore, below average in relation to the population of Carinthia at 7 % of total Austrian population.

unemployment rate of 8,1 %

Also concerning employment numbers the regional increase between 1998 and 2002 lagged the national average (+1,5 % compared to 2,2 %). On the other hand, the decrease in regional employment due to the general downturn in 2002 was comparable to the national level. In 2002 the regional unemployment rate of 8,1 % was well above the national average of 6,9 %. Nevertheless, unemployment in the region of Carinthia increased slower than at the national level.

low export orientation

The Carinthian share in the total of Austrian exports is 4,6 %, which is slightly below the regional share in the Austrian GNP. This shows that there should be some potential for increasing export activities.

Apart from these weaknesses, the regional economy performs well. Especially during the booming period the regional economy has begun to manage successfully necessary structural changes. Due to the general downturn after 2001 the regional economy faced some problems. These problems helped to identify some challenges, which have to and will be met in the coming years.

3. Mechanical engineering, (micro-)electronics and software – three important pillars of the Carinthian economy

During the structural changes in the nineties, the three sectors mechanical engineering, (micro-)electronics and software gained importance in the Carinthian economy. The economic importance of the three sectors is predominantly due to their weight, their growth-rates, their technology orientation, and their intensity in human capital. Correspondingly, also political attention as well as political support rose. New initiatives and programmes were launched aiming at a further strengthening and deepening of the existing structures.

In a first step the three sectors will be discussed with respect to the regional economy in general as well as to certain national tendencies. This analysis aims at an accentuation of the specific role, which these three sectors play in the Carinthian economy. Subsequently each sector will be described separately by its quantitative values.

3.1 The three sectors in the context of the Carinthian economy

The importance of the three sectors in terms of their employment number differs widely: Mechanical engineering and (micro-)electronics show a high employment, whereas employment in the software sector is relatively small.

important shares in regional employment

The share of mechanical engineering (2,5 %) and of (micro-)electronics (3 %) in the regional employment is above the Austrian average (2,2 %). In 2001 the difference between the regional and the national shares was even growing. It was only in the last year that the regional numbers were again slightly decreasing and herewith reconverging with the national ones. The national average of employment in each of these sectors was quite stable during the last years without any significant changes. Thus, the comparison with the national level underlines two different facts:

- at first, the regional importance of these two sectors is high since their shares in employment are higher in Carinthia than at the national level;
- secondly, their development in Carinthia is considerably more dynamic than the national one.

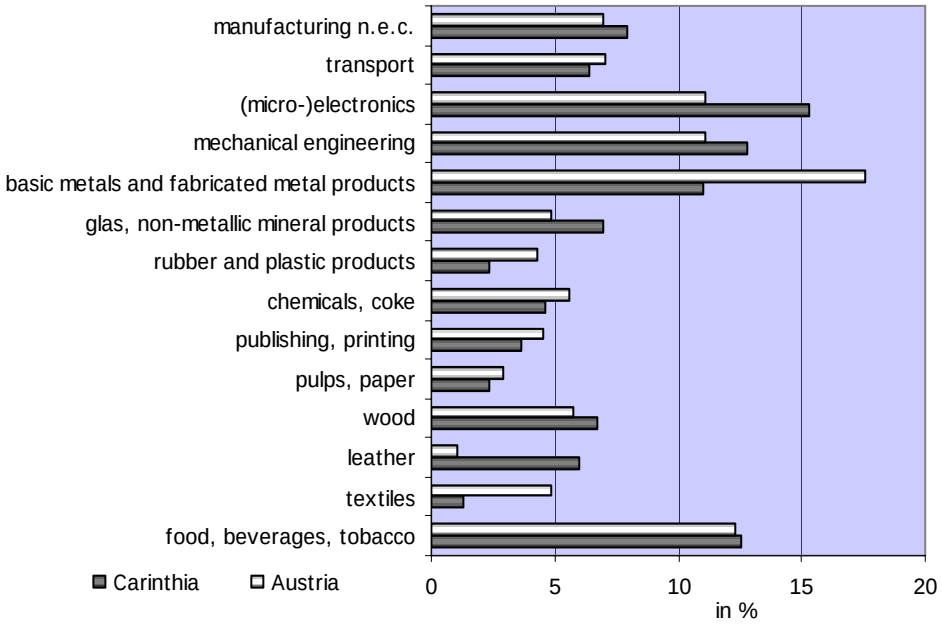
Figure 3 shows the share of mechanical engineering and (micro-)electronics in the total of manufacturing employment at the regional as well as at the national level. The data underline clearly the outstanding position of these two sectors in the regional economy of Carinthia.

small but dynamic software sector

Employment in the software sector, as part of the business services, on the other hand represents even less than 1 % of the total employment in the region. Nevertheless, while significantly lagging behind the national average in terms of shares in employment (0,48 % to 0,9 %), employment in the regional software sector showed an amazing increase over the last years. Between 1998 and 2002 employment in this sector quadrupled, whereas the

national growth rate in the sector and over this period was only 80 %. Yet, even if the development at the regional as well as the national level slowed down in the last years, especially after 2001, regional employment in the software sector still grew faster than on the national level (+9 percentage points compared to +4 percentage points 2001-2002).

Figure 3
Employment shares of manufacturing sectors in Carinthia and in Austria (2002)

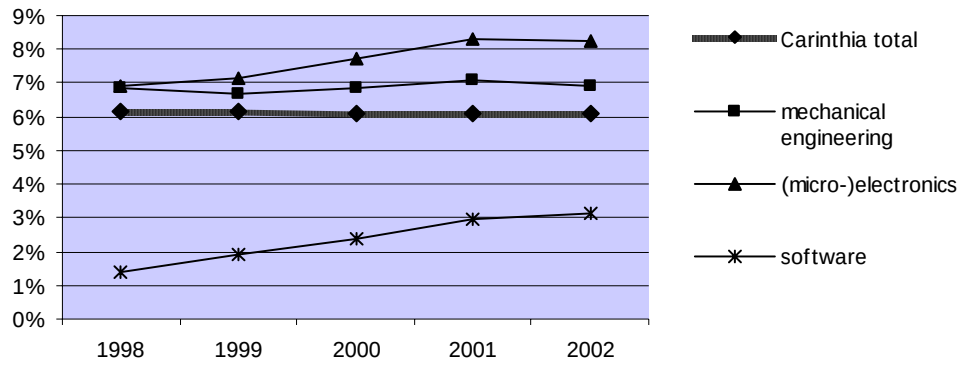


Source: WIBIS Carinthia 2003, raw data HVSV.

The importance of all three sectors for the region is however not only underlined by their shares in total employment in Carinthia, but also by their shares in the total of the specific sectoral employment in Austria (see figure 4). These data illustrate the concentration of mechanical engineering and (micro-)electronics in Carinthia. Both sectors show a share in the Austrian employment of each sector that exceeds the average share of the total Carinthian employment in the total employment of Austria. In addition, the figure again points out the growing importance of Carinthian software activities, as the regional share in the total sectoral employment has more than doubled over the last five years (from 1,4 % in 1998 to 3,1 % in 2002).

The data shown above underline the considerable dynamic of the three sectors and especially of the software sector. A comparison of the average of their annual growth-rates over the last years with the other regional sectors clearly shows their outstanding development (see figure 5). Their growth-rates are not only remarkable in comparison to the regional economy in general, but also in comparison with the specific sector, to which they belong. Considering the loss of employment in regional manufacturing in general, the growth of mechanical engineering and (micro-)electronics is even more significant. This is also true for the software sector. Even if business services in general were growing fast over the last years, the development in the software sector exceeded the growth of the whole business services sector by far.

Figure 4
Carinthian shares in the total of the specific sectoral employment in Austria (2002)

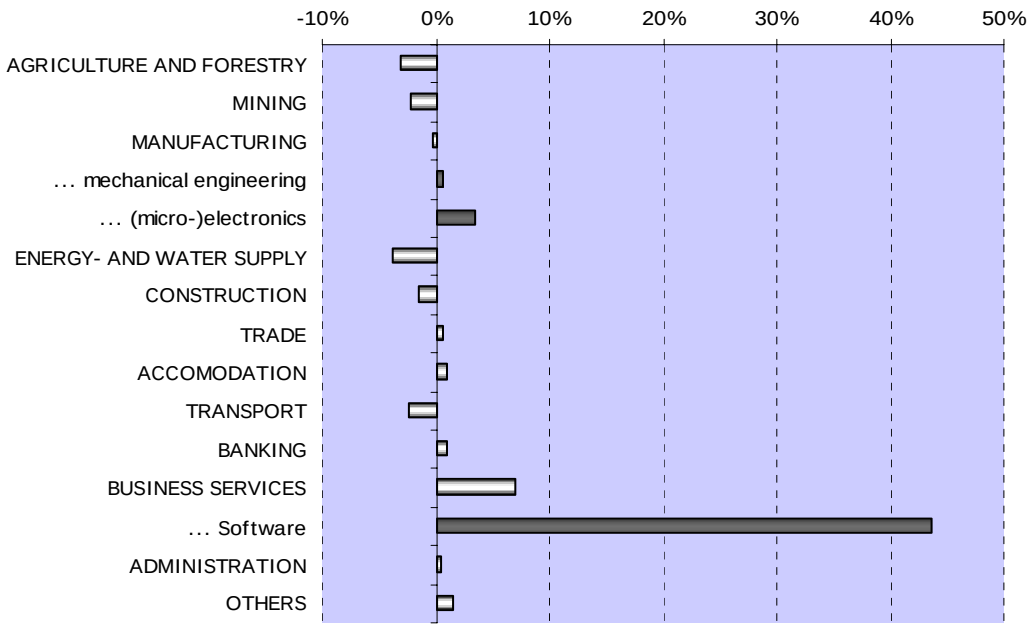


Source: WIBIS Carinthia 2003, raw data HVSV.

high growth rates in booming period

Thus, mechanical engineering and (micro-)electronics are important pillars of the regional economy with respect to their shares in employment. Even if the year 2002 brought some problems, they will nevertheless keep their outstanding position. The software sector is a forward looking sector and due to its dynamics of great significance for Carinthia. A specific analysis for each of the three sectors separately can tell more about their current trends, their actual situation as well as their potential for future challenges.

Figure 5
Annual growth-rates 1998-2002 for the economic sectors of Carinthia *



**average 1998-2002, in terms of employment, in percentage points;*
Source: WIBIS Carinthia 2003, raw data HVSV.

Summary

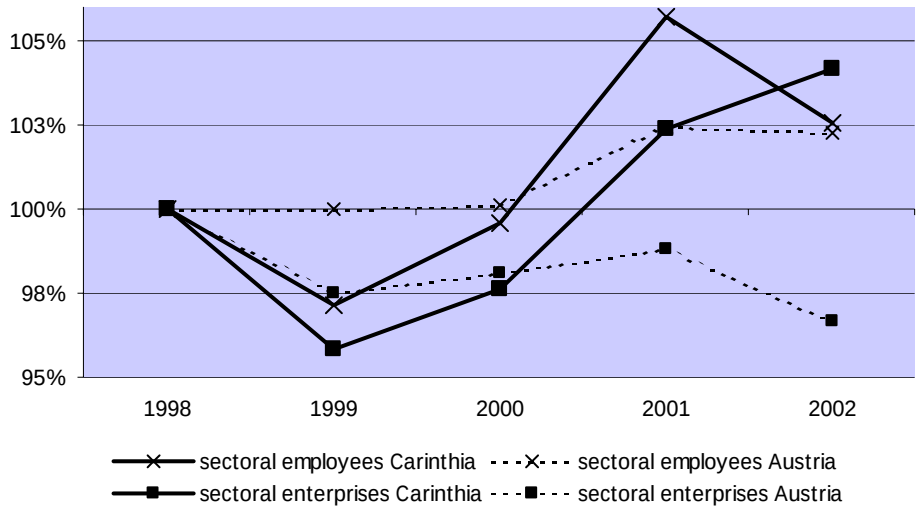
- Mechanical engineering and (micro-)electronics have important shares in the regional employment.
- (Micro-)electronics and software showed great dynamics in development over the last decade.
- Growth rates, especially in employment, exceeded clearly the growth of their superordinate sectors in general, to which they are assigned (business services, manufacturing).

3.2 Mechanical engineering

With 4.586 employees in the year 2002 mechanical engineering accounted for 12,8 % of the regional manufacturing. A look back to the developments over the last years proves that the regional proportion steadily exceeded the national over the years by about 1,5 to 2 %. This steadiness is based on the stable number of employees in the sector. In the last five years changes occurred in a quite narrow margin. After a slight increase in employment between 1999 and 2001, employment slightly decreased since then. Also the number of enterprises does not show any significant changes during the mentioned period. After facing some problems in 1999, the number of enterprises started to grow, although with dynamics inferior to those of the sectoral employment, but with a greater continuity. Even when the general downturn caused problems after 2001 and employment was decreasing, the number of enterprises in mechanical engineering maintained its growing tendency and increased by 1,75 %. Currently 175 regional enterprises work in the field of mechanical engineering (2002).

representation above average in the region

Figure 6
Developments in mechanical engineering at the regional and the national level *



** in comparison to the year 1998 (1998=100%)*
Source: WIBIS Carinthia 2003, raw data HVSV. (1998=100%)

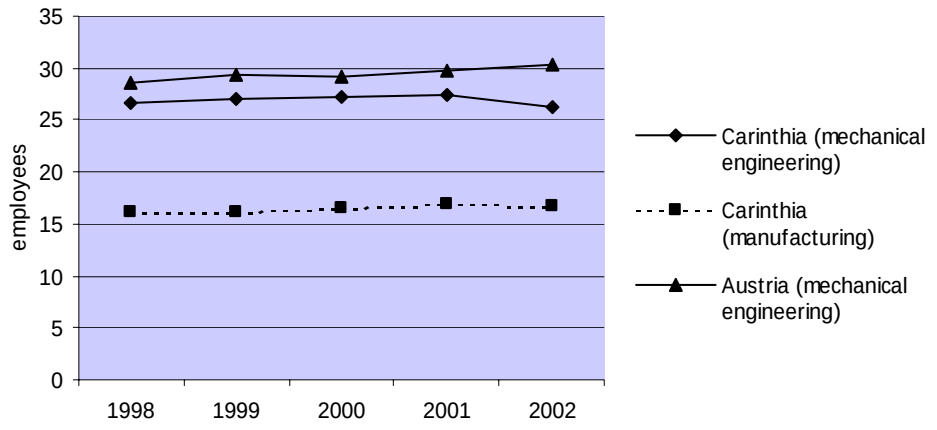
increasing number of companies

Yet, these regional developments have to be seen in relation to the national ones (see figure 6). The growing number of enterprises in the sector of mechanical engineering in Carinthia is even more surprising, because it is in contrast to the national tendency. In addition, this development entails smaller regional enterprises in the field of mechanical engineering. Data of the coming years will prove if this development constitutes either a general tendency of longer term or only a short-term phenomenon.

mainly medium sized companies

According to the sectoral average in Carinthia in 2002, 26,2 employees worked in one mechanical engineering company. Nevertheless, considering only enterprises in mechanical engineering, the regional company size is slightly below the national average (30,3). Therefore the sectoral enterprises in Carinthia are relatively small for enterprises in mechanical engineering. At the same time, the regional mechanical engineering companies are large compared to companies of other manufacturing sectors in Carinthia. Considering that the national development of the sector points to a steadily growing number of employees per enterprise, the recent decrease at the regional level astonishes (see figure 7).

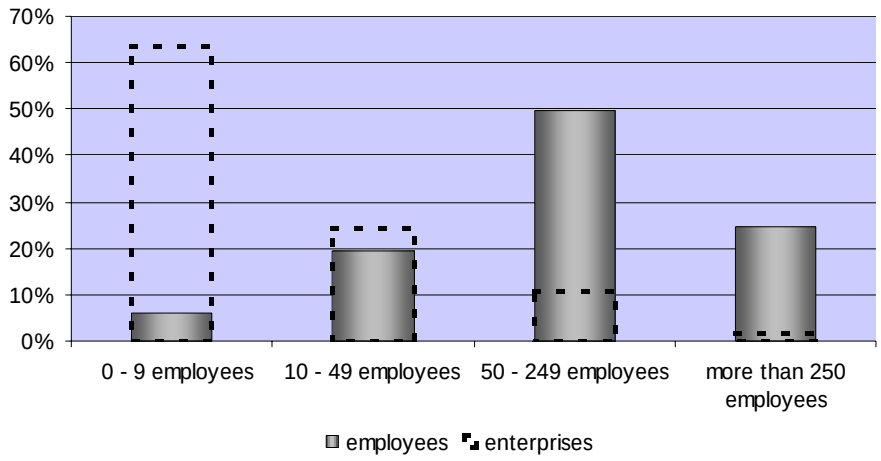
Figure 7
Average size of regional enterprises in mechanical engineering compared to the regional and national average (2002)



Source: WIBIS Carinthia 2003, raw data HVSV.

However, the regional average of employees per enterprise in the mechanical sector may be misleading, as the sectoral employment is quite inhomogenously allocated. In 2002, only three companies had more than 250 employees, but were responsible for almost a fourth of regional employment in mechanical engineering. 98,3 % of all sectoral enterprises have less than 249 employees and are therefore classified as small and medium sized enterprises (172). The share of sectoral employment in SME (75,2 %) is above the regional average (64,2 %).

Figure 8
Size of enterprises in the sector of mechanical engineering (2002)

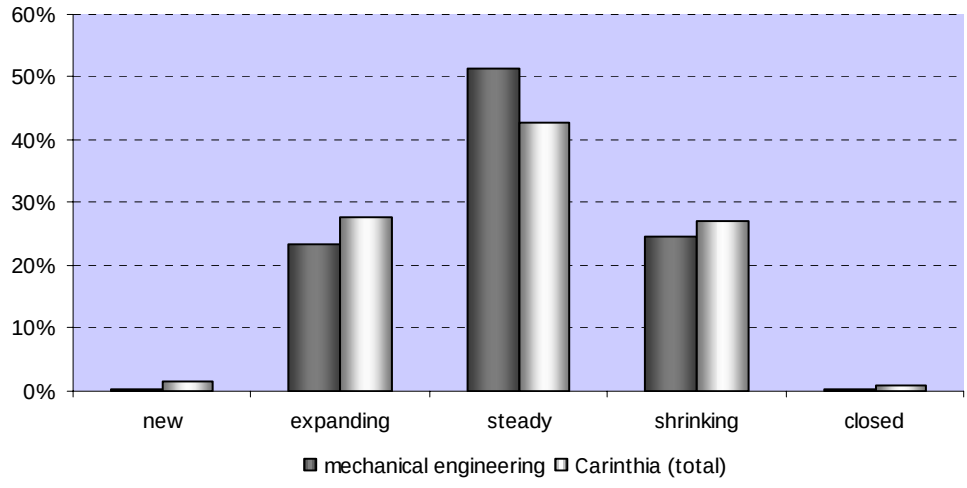


Source: WIBIS Carinthia 2003, raw data HVSV.

great stability of the sector

Regarding the dynamics of the regional sector, the year 2002 does not paint a very positive picture. Although more than half of the sectoral employment worked in enterprises which can be classified as stable with a steady development, more than one third of the sectoral employment worked in shrinking or even closing enterprises. For both latter shares, mechanical engineering exceeded the regional average. This was mainly due to the difficult environment after 2001, as this picture has significantly changed over the last years. In 2000, still 36,3 % of the employment in mechanical engineering was in new or growing enterprises, this proportion slumped already in 2001 to only 23,7 % and in 2002 to the current small proportion of only 11,7 %.

Figure 9
Employees differentiated by the dynamics of their enterprises (1999-2002)*



**average rate of the years 1999 to 2002;*
Source: WIBIS Carinthia 2003, raw data HVSV.

Regarding the average over the last four years, the ratio is quite different (figure 9). Over this longer period the share of employment in steady companies is dominant. More than half of all employees in the mechanical engineering sector in Carinthia worked in steady companies. This share is very high, and exceeds the regional average clearly, whereas the sectoral shares of employment in all other groups are below the regional average.

Thus, the proportion of employment in steady enterprises is considerably above the regional average. Consequently, mechanical engineering is an important sector in Carinthia, not only in terms of its employment but also with respect to its stability.

Summary

- The manufacturing sector in Carinthia comprises 4586 employees and 175 companies (2002).
- Employment in mechanical engineering constitutes 12,8 % of manufacturing employment in Carinthia.
- The numbers of employment and enterprises have not changed significantly over the last years.
- Over the last years most of the sectoral employees worked for companies with a stable development.
- Mechanical engineering companies are relatively big for Carinthian companies but relatively small for mechanical engineering companies in Austria.
- Most of sectoral companies in Carinthia are classified as medium sized companies.

3.3 (Micro-)Electronics

regional concentration of the sector

With 5.497 employees (2002) (micro-)electronics is responsible for 15,3 % of the manufacturing employment in Carinthia, and for about 2,9 % of the total employment in the region. Both values are above the national average and therefore underline the regional importance of the sector[2].

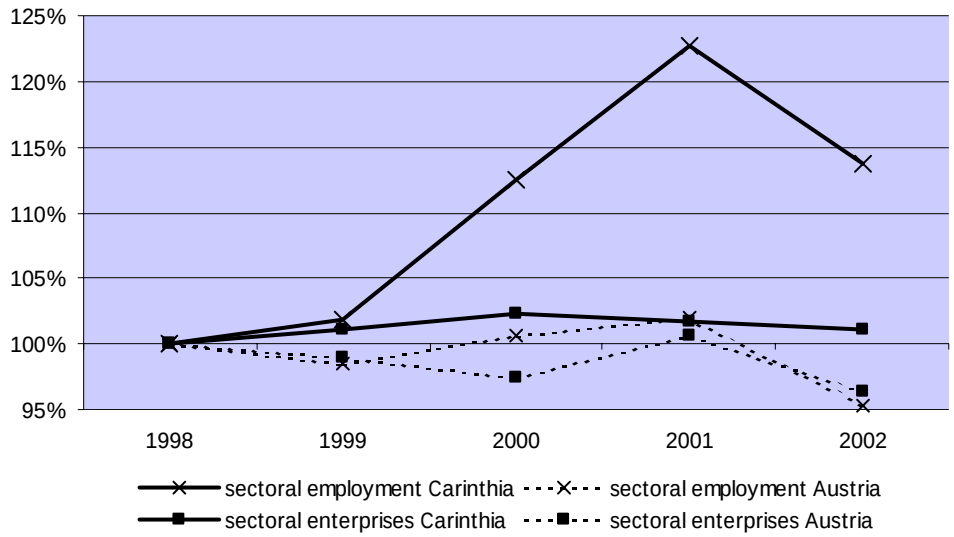
Over the last years, regional employment in the sector was rapidly growing. Between 1998 and 2001 the average growth-rate per year was at 5,3 %. Despite the expansion in terms of employment, the number of sectoral enterprises remained almost the same (average of annual growth rates 1998-2001: 0,42 %). The strong increase in sectoral employment stopped in the year 2001. Since then, employment in the (micro-)electronic sector in Carinthia was cut down, but the number of enterprises remained stable. Currently, 181 regional enterprises work in the field of (micro-)electronics.

[2] The share of electronic employment in the total of Austrian manufacturing employment is at 11,1 % and its share in the total employment in Austria at 2.2 %.

rapid growth till 2001, since then decrease

Yet, these regional developments have to be put in relation to the national ones (see figure 10). Thus, corresponding to the expansion during the booming period far above the national average, the regional sector is also more concerned by the general downturn. From 2001 to 2002 sectoral employment decreased on the regional level by 7,3 percentage points, but at the national level only by 6,6 percentage points. After all, the number of sectoral enterprises remained approximately the same in Carinthia, whereas it decreased at the national level by more than 4 percentage points.

Figure 10
Developments in the (micro-)electronic sector at the regional and the national level*



** in comparison to the year 1998 (1998=100%)*
Source: WIBIS Carinthia 2003, raw data HVSV.

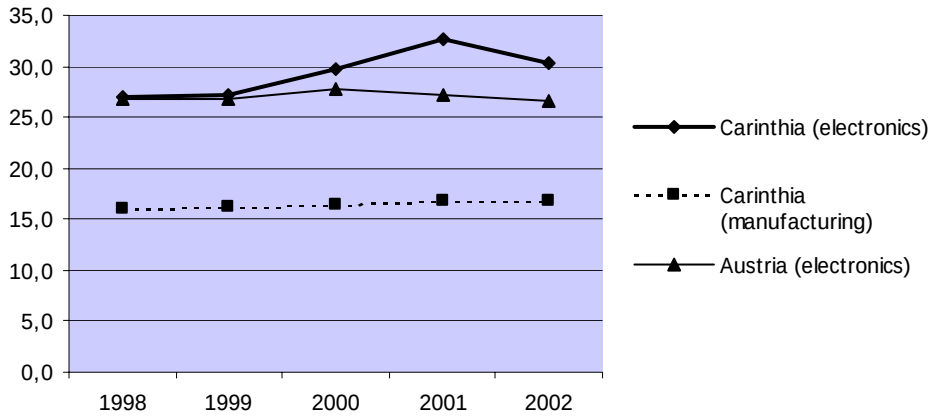
30,4 employees per (micro-)electronic company

As employment increased while the number of enterprises remained quite stable, the average size of the sectoral enterprises in Carinthia rose. Even if employment was cut down in the last year, the average number of employees per enterprise in the regional (micro-) electronic sector remains high. In 2002 an average of 30,4 employees worked in one (micro-)electronic company. This is far above the average of regional company sizes in general (12,2 employees). It even exceeds the national average in (micro-)electronics (26,5 employees) (see figure 11). Starting from about the same company size in 1998 Carinthian companies showed a greater expansion during the last booming years. Again however, the average of the companies' size may be misleading as sectoral employment is very unevenly distributed.

few very big and many very small companies

(Micro-)electronics in Carinthia is characterised by a strong contrast between a small number of very big enterprises on one hand and a huge number of very small enterprises on the other hand. Only three companies have more than 250 employees, nevertheless these three companies are responsible for almost 6 0% of the sectoral employment in the region. On the other side, more than two thirds of all sectoral enterprises in the region can be classified as very small with less than ten employees, but they do not even account for 8 % of regional employment in (micro-)electronics.

Figure 11
Size of regional enterprises in (micro-)electronics compared to the regional and national average (2002)

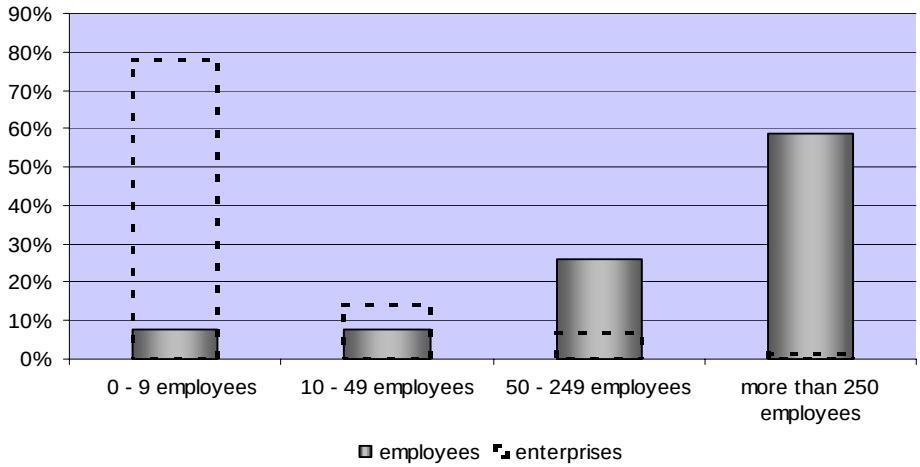


Source: WIBIS Carinthia 2003, raw data HVSV.

slump in the sectoral dynamics in 2001

During the booming period (micro-)electronics in general had strongly invested in new infrastructure. When the general economic slowdown started, the sector had to deal with important overcapacities and therefore was strongly concerned by the degrading economic conditions. The (micro-)electronic sector in Carinthia was also affected by these general developments. The massive job-losses of the year 2002 affected not only the few big companies but companies of all different sizes. In total, nine small enterprises had to close, and the whole sector lost its former dynamics. Almost 70 % of all employees in (micro-)electronics worked for enterprises, which were shrinking in that year.

Figure 12
Size of enterprises in the (micro-)electronic sector (2002)



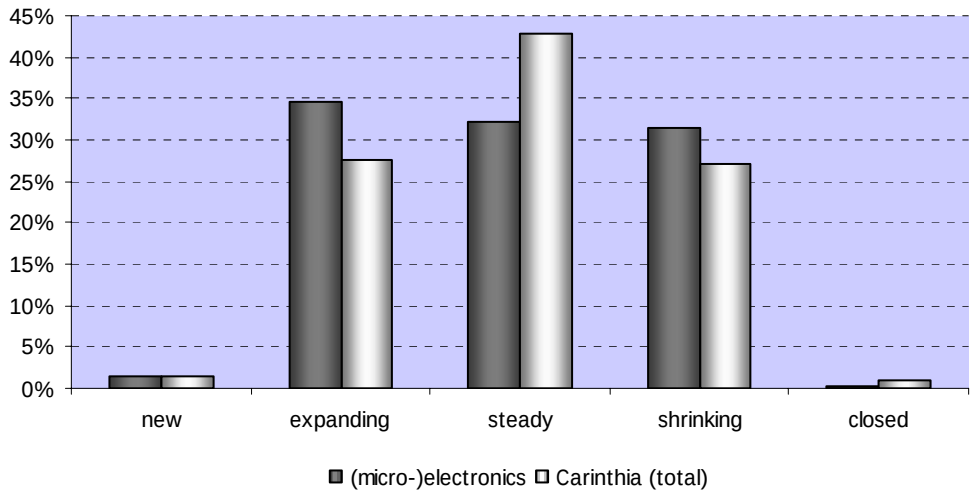
Source: WIBIS Carinthia 2003, raw data HVSV.

Nevertheless those enterprises, which had to face job-cuts, were of a bigger size, since only 22,1 % of the enterprises had to be classified as shrinking. The group of shrinking enterprises (in terms of its employment as well as its number of enterprises) is far above the regional average in 2002.

These data reflect the problematic situation of the (micro-)electronic sector after 2001. The slump in the sectoral dynamic is even more obvious considering the shares of the previous years. In 2000, 73,8 % of the sectoral employment could be attributed to new or growing enterprises. One year later, the share was down to 21,9 % and fell further in 2002 to only 19 %.

The figure 13 shows the average over the last four years, the ratio is quite different. Over this longer period the shares of employment in expanding, in steady as well as in shrinking companies are quite evenly distributed. Yet, over these four years, the group of expanding companies is even the strongest. Its share exceeds the regional average clearly.

Figure 13
Employees in (micro-)electronics differentiated by the dynamics of their enterprises*



** average of the years 1999-2002;*
Source: WIBIS Carinthia 2003, raw data HVSV.

Considering the amazing growth in employment in the previous years and the immediately following job-cuts after 2001, (micro-)electronics in Carinthia presents itself as a turbulent sector. Nevertheless, over the last years the sector paved its way to one of the most important sectors for the regional economy of Carinthia.

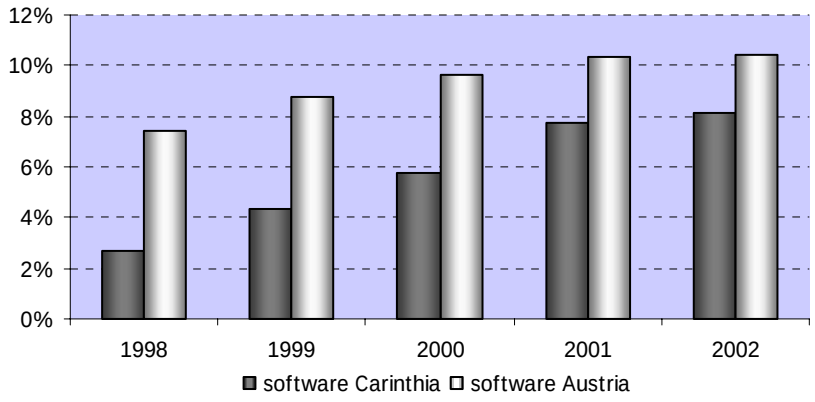
Summary

- The (micro-)electronic sector in Carinthia comprises 5497 employees and 181 companies (2002).
- Employment in (micro-)electronics constitutes 15,3 % of manufacturing employment in Carinthia.
- The number of employment as well as of enterprises showed a significant growth till 2001, since then the sector faced severe job losses.
- At an average, 30,4 employees work in one (micro-)electronic company.
- A few major companies are dominant, but most of (micro-)electronic companies are very small.
- The dynamics of (micro-)electronic companies was changing very fast in the last years.

3.4 Software

With 900 employees and 217 enterprises (2002), the absolute weight of the software sector in Carinthia is small compared to the two other priority sectors discussed before. Since 1998 however, the region caught up and the margin between the regional and the national share was more than halved. Thus, the importance of the sector is mostly based on its dynamic and steady growth over the last years, which exceeded regional and national tendencies by far. Due to these dynamics the sector is considered as a looking forward sector for the regional economy.

Figure 14
Share of the software sector in the regional and national total of business services

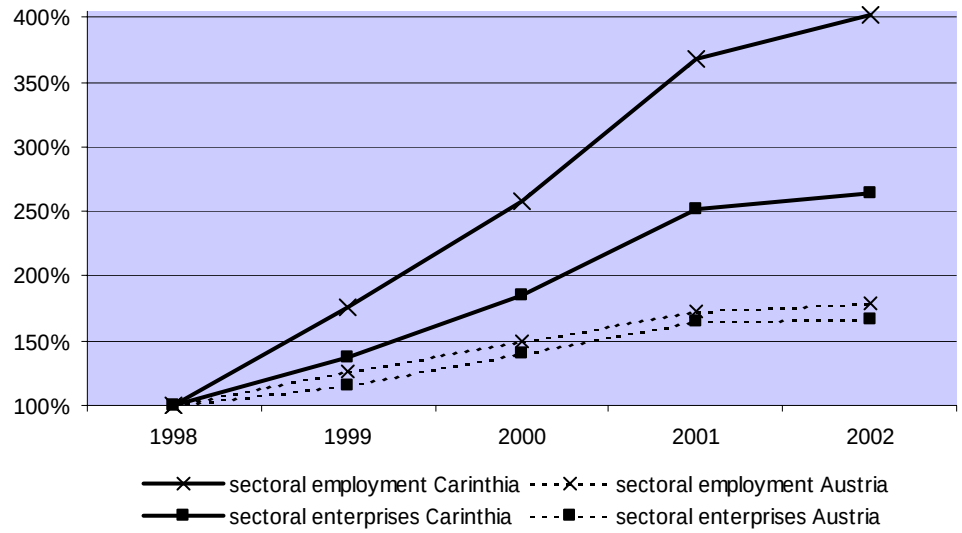


Source: WIBIS Carinthia 2003, raw data HVSV.

small but growing employment

This growth manifested itself in terms of employment as well as in the number of sectoral enterprises. While in 1998 only 224 regional employees worked in the sector, in 2002 the sectoral employment had more than quadrupled. The annual growth-rate of the sector between 1998 and 2002 in terms of employment was at an average of 40 percentage points.

Figure 15
Developments in the software sector at the regional and national level*

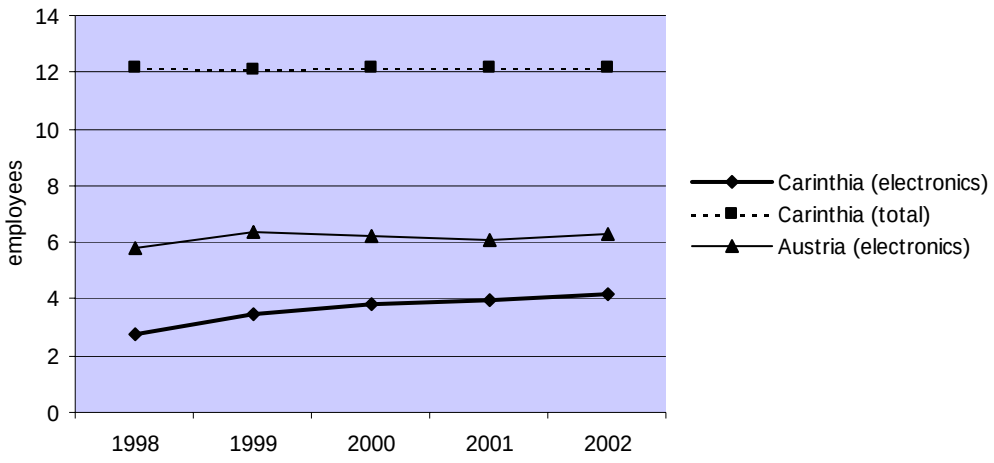


** in comparison to 1998 (1998=100%);*
Source: WIBIS Carinthia 2003, raw data HVSV.

4,1 employees per software company

Even in the last year, when growth slowed down in general, the regional software sector still grew by 9 percentage points. The number of enterprises also showed an enormous increase over the last years, even if its development was not as dynamic as the one in employment. Over all these last years regional developments in the software-sector exceeded the national ones by far.

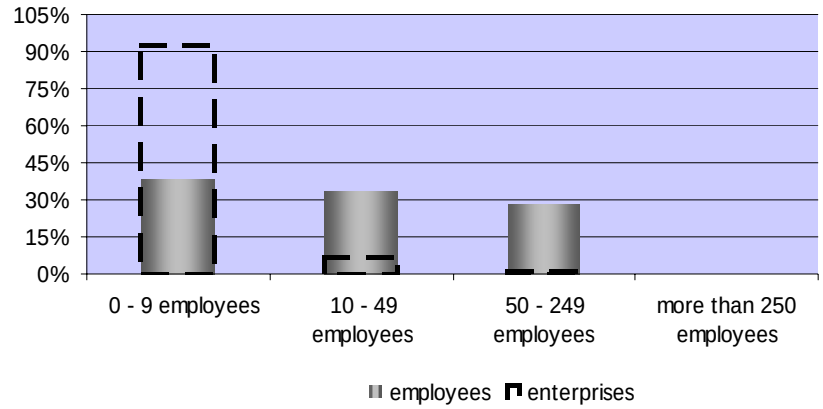
Figure 16
Size of regional enterprises in the software sector compared to the regional and national average (2002)



Source: WIBIS Carinthia 2003, raw data HVSV.

As employment grew faster than the number of sectoral enterprises, the size of the software enterprises in the region increased. The average size of software companies in Carinthia grew over the last years, from 2,7 employees per company in 1998 to 4,1 employees in 2002. However, in spite of this growth, regional software companies remain relatively small. Their average size is still below the regional average as well as below the average size of software companies at the national level (6,3).

Figure 17
Size of enterprises in the software sector of Carinthia (2002)

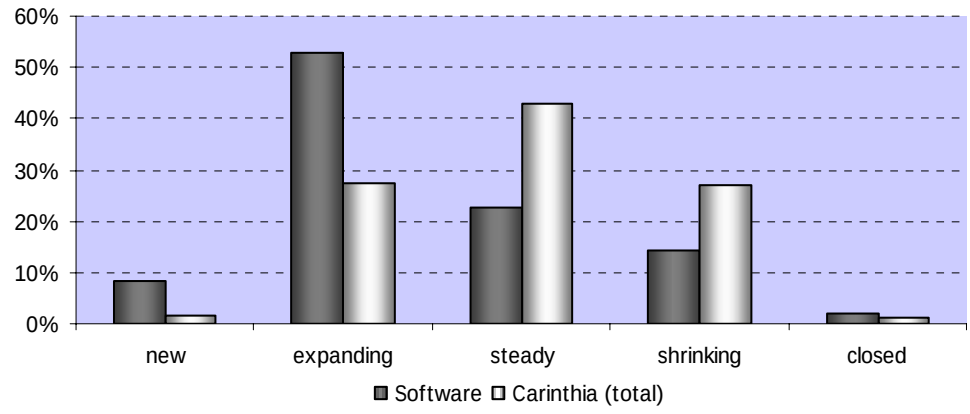


Source: WIBIS Carinthia 2003, raw data HVSV.

most companies are very small

All software enterprises of the region are SMEs, as none of them has more than 250 employees. Most of them have even less than 10 employees (92,6 %), whereas only two enterprises are medium-sized with 50 to 249 employees. Nevertheless, these two are responsible for more than a quarter of software employment in Carinthia.

Figure 18
Employees differentiated by the dynamics of their enterprises in Carinthia*



** average of the years 1999-2002;*
Source: WIBIS Carinthia 2003, raw data HVSV.

most companies are expanding

As the steady growth of the regional sector implies, the sector is very dynamic. Over the last years, but also after 2001, when other sectors faced severe problems, the regional software sector enjoyed quite positive developments. Most of the sectoral employment took place in growing or at least steady enterprises. The share in shrinking enterprises was clearly below the regional average, which is also due to the small size of the enterprises and their small capacity to shrink. Subsequently the share in closing enterprises was relatively high. In total 38 software enterprises had to close in 2002.

Thus, the regional software sector maintained a strong growth over the last years. Its dynamics are remarkable, new companies are founded, others are expanding. These facts underline the importance of the sector for the regional economy.

Summary

- The software sector in Carinthia comprises 900 employees and 217 companies (2002).
- Employment in the software sector in Carinthia is marginal, but it is continuously growing.
- The sector showed a faster growth in Carinthia than at the national level.
- All companies are SMEs, most of them are very small. The average size is 4,2 employees per company.
- Most companies are expanding. The dynamics of the sector is unbroken.

4 Challenges by the EU-enlargement and export structures of the three priority sectors

The economic environment has changed fundamentally in the last decade. Beside the EU accession of Austria in 1995, the collapse of the former centrally planned economies of Central and East European Countries (CEEC) is regarded as another cornerstone in this development. The subsequent process of economic liberalisation in the CEEC brought about important transformations in terms of economic integration and external trade.

The EU accession of ten new countries in 2004 arises the question of possible economic consequences for Carinthian firms. Is the enlargement a chance for the economy of Carinthia or are there some fields of problems? Which industries will benefit? Which sectors do have less favourable conditions? Starting from these questions this chapter[3] gives a short overview

- of the consequences of the enlargement on international trade in manufacturing and service sector. The legal framework changed in 1990 and therefore trade conditions have altered dramatically.
- of the economic growth effect that the new market of the CEEC already has caused during the last decade. The question, which industries in Austria have benefited from the liberalisation of the last few years, will be answered.
- the export structure of Carinthia and of the Carinthian mechanical engineering, electronic and software sector in particular.

4.1 The consequences of the EU-enlargement on trade[4]

trade with CEEC based on "Europe Agreements"

... free trade zone

During the 1990s, the European Community and its member-states progressively concluded Association Agreements, so called "Europe Agreements", with ten countries of Central and Eastern Europe[5]. These agreements provide the legal basis for bilateral relations between these countries and the EU. The Europe Agreements aim to establish free trade of industrial goods between EU and associated countries over a maximum period of ten years. Beside the liberalisation of good-trade the Europe Agreements provide for progressive alignment with Community rules of competition, intellectual and industrial property and public

[3] This chapter is focused on Carinthia, where possible. However in some reasonable cases the national level is addressed e.g. when discussing legal frameworks. Unfortunately, the data base used is sometimes not available on a regional level. In these cases national data had to be used. Whenever possible, regional data are presented.

[4] This and the next chapter are mainly based on a recent study on the impacts of the EU-Enlargement on Austrian Economy, MAYERHOFER, P; PALME, G. (2001) Teilprojekt 8: Aspekte der regionalen Wettbewerbsfähigkeit, Preparity WIFO, Vienna.

[5] Poland, Hungary, Slovenia, Slovakia, Czech Republic, Latvia, Lithuania, Estonia, Bulgaria, and Romania.

procurement. However, the impact of the EU-enlargement on the manufacturing and service sector has to be analysed separately, as the current degrees of liberalisation strongly differ between these three sectors.

no fundamental changes in manufacturing

Due to the fact that for most products of the manufacturing sector free trade zones will already be fully established when these countries become members of the EU in 2004, no fundamental changes in the competition position of Austrian and (Carinthian) enterprises are to be expected. The direct effects of the integration therefore will be moderate. However, a reasonable enforcement of the already existing trends is expected. In particular the sectors with low technology and human capital intensity will be confronted with enhanced price competition due to comparable low labour costs in the accession countries. Most of the impacts will result from the European Single Market, which led to positive gains in productivity as a consequence of economies of scales and increased competition.

service sector confronted with more competition

The consequences for the service sector will be somewhat stronger, insofar as the Austrian service industry will be confronted with a new legislative fundament. Until now, the liberalisation of trade of services is only established in parts. An open market comparable with industrial products does not yet exist. Austrian law has partly been very restrictive concerning trade of the service sector. Therefore the consequences will vary among the different types of services:

- Direct export of services, which are transferable over distance, is similar to those of product trade. Therefore no major changes are expected.
- In contrast, direct import of products by consumers will provoke changes in competition especially for retail industries due to the abolishment of border controls.
- Furthermore, in the field of service supply through commercial presence in the territory of sales the new legislation of the Single Market will lead to an intensification of mergers.
- Liberalisations of service supply through the presence of natural persons enhance the competition as well as regional service markets, which until now were restricted strongly by national legislations. The latter field opens new possibilities for cross-border services, respectively for SMEs.

4.2 Impact of Liberalisation on East Trade

trade with CEEC has augmented growth

As empirically proved, the effects of trade liberalisation in the 90ies have been very positive for Austria. In many industries, the East Trade has remarkably enforced the economy in terms of production (and employment). The quantified impact, which was calculated by Mayerhofer/Palme[6] shows that the real value of production exceeds 3,7 % to a (fictive) situation in which there would have been no trade to the CEEC 5[7] countries.

[6] MAYERHOFER, P; PALME, G. (2001) Teilprojekt 8: Aspekte der regionalen Wettbewerbsfähigkeit, Preparity WIFO, Vienna.

[7] Slovenia, Hungary, Poland, Czech Republic, Slovak Republic.

...especially in electronics and mechanical engineering

Table 1 shows that not only the manufacturing sector but also the service sector has gained from the opening of eastern markets. In the former group electronics and mechanical engineering belong to the biggest beneficiaries (apart from chemical industries), whereas in the service sector construction and business services grew considerable.

Table 1
Effects of Austrian gross-exports to the CEEC 5 on value of production (1999)

Products	Value of Production	
	Mio. €	in %*
basic metals	348,9	5,0
other non-metallic mineral products, mining	102,0	2,2
chemicals, chemical products and man-made fibres	849,4	9,1
fabricated metal products, except machinery and equipment	323,0	5,3
machinery and equipment n.e.c.	784,5	9,6
office machinery and computers	183,4	20,6
electrical machinery and apparatus n.e.c.	1.133,1	11
transport equipment	244,3	5,6
food products, beverages and tobacco	162,9	1,4
textiles and textile products	163,4	5,5
pulp, paper and paper products; publishing and printing	554,0	6,1
rubber and plastic products	209,4	9,3
recycling	1,3	2,0
other manufacturing	504,2	5,0
manufacturing total	**5.563,8**	
construction	1.087,7	4,3
trade, storage	915,5	2,6
hotels and restaurants	235,6	2,5
land transport	118,1	1,8
water and air transport	168,2	5,3
supporting transport activities	199,3	2,5
post and telecommunications	92,4	1,8
financial intermediation	388,1	2,8
other business activities	735,2	2,6
services total	**3.941,4**	
total	**9.503,9**	**3,7**

**compared situation without export in CEEC 5*
Source: WIFO 2001.

human capital intensive regions are the winner of the enlargement

Analysing different types of regions according to their basic endowment factors like human capital, share of capital intensive industries etc.[8] in particular human capital intensive regions (especially agglomerations and their hinterland) are structurally favoured by the EU-enlargement, due to their high share of industries which potentially have good opportunities in the enlargement process. These industries are characterised by (i) a high qualifica-

[8] For detailed explanations see: MAYERHOFER, P; PALME, G. (2001) Teilprojekt 8: Aspekte der regionalen Wettbewerbsfähigkeit, Preparity WIFO, Vienna.

tion structure of their employees and (ii) by products which are sold in markets with high quality competition. In contrast, regional competitiveness of areas with low endowments of competitive advantage factors is poor. Such regions, like rural areas, are dominated by (labour intensive) industries which operate in "contestable" markets with high price competition, and low skill structure. Due to the differences in the labour-cost structure of Austria and the new member states the EU-enlargement will be a challenge for these regions. Primarily indirect positive effects - due to a trickle down effect - of the rural regions are to be expected, if the bigger cities can take the chance of the EU-enlargement.

no regional structural shock caused by EU-enlargement expected

For Carinthia two types of regions can be identified: While the two main cities of the region, Klagenfurt and Villach together with their hinterland, can be qualified as structural favoured areas with good chances of expansions within the enlargement process, the rural regions, with low qualification structures and many products in highly price competitive markets belong to the more disadvantaged regions. All in all, regional structural interruption caused by the EU-enlargement are not to be expected. This process will rather push tendencies further on which are rooted in the fall of the iron curtain, the EU-accession of Austria and the Globalisation (GATS, WTO).

4.3 Export structure of Carinthia[9]

As already shown, the foreign trade with CEEC has caused remarkable growth effects during the 1990s. Analysing the export of 2000 the data reveal that the share of Carinthian exports in Austria (4,6 %) is slightly below the Carinthian share in the Austrian GNP (5,8 %) which shows an existing potential for a higher degree of internationalisation of the region.

Table 2
Exports Carinthia/Austria in selected Industries, 2000

CPA	Export (in Mio. €)		Export (% of Region)	
	Carinthia	Austria	Carinthia	Austria
Mechanical Engineering	562	9.518	17,5	13,7
Electronics	900	11.322	28,1	16,2
manufacturing	3.079	67.602	96,0	97,0
Total (all industries)	3.207	69.693	100,0	100,0

Source: Statistik Austria, own calculation.

mechanical engineering and micro-electronic 50 % of all exports in Carinthia

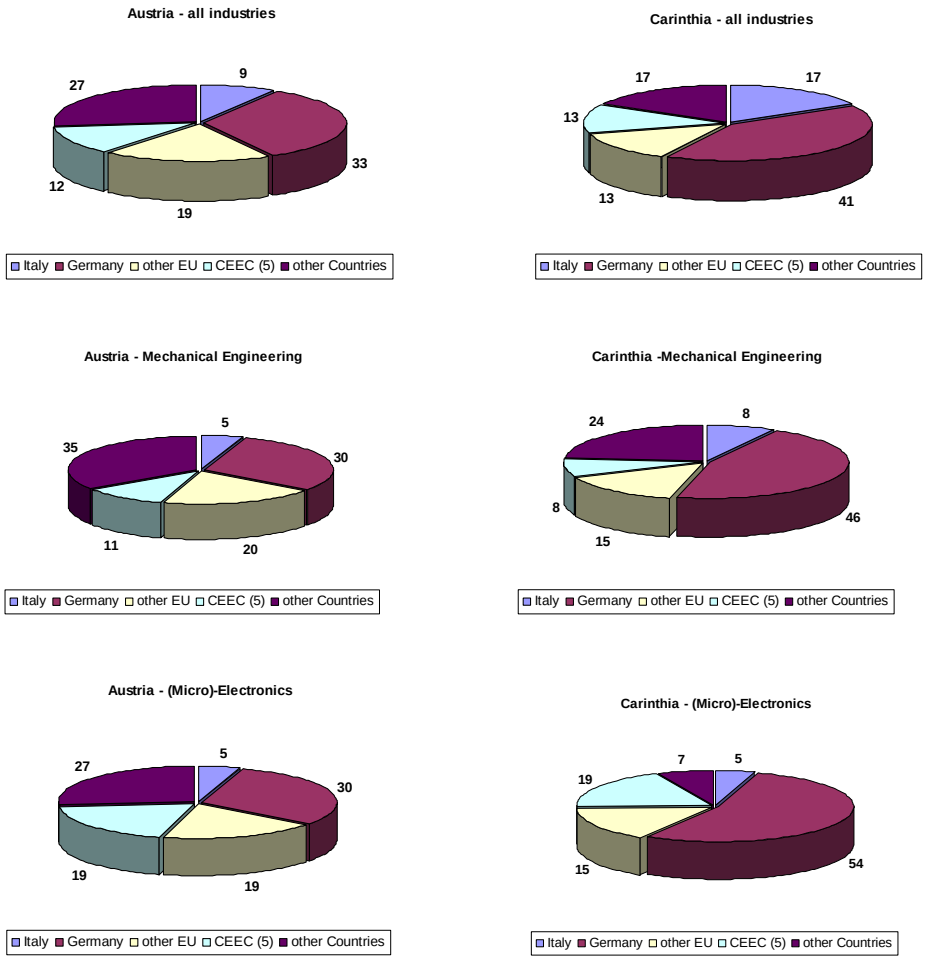
The share of export in the Carinthian manufacturing sector is similar to the Austrian one, whereas differences can be identified within the industries. The branches mechanical engineering (NACE 29) and electronics (NACE 30-33) cover more than the half of all exports in the manufacturing sector, while at the national level these industries encompass only one

[9] The data used are based on the foreign trade statistics published by Statisics Austria. For methodological and statistical problems regarding these data see WIFO/JOANNEUM RESEARCH (2003): Wirtschaftsraum Südösterreich. Teil I, pp.167, Vienna, 2003.

third. The importance of these sectors for the Carinthian economy with respect to employment (see chapters 3.2, 3.3, 3.4) is further underlined by these export data[10].

Figure 19
Carinthian exports to specific countries in comparison to the Austrian shares (in %, 2000)

high export concentration of Italy and Germany



Source: Statistics Austria, own calculations.

Concerning the destination countries of exports, Carinthia shows a high concentration on EU countries. Especially the near located markets within the EU like Germany and Italy cover an remarkable higher export share than at the national level. In contrast to expectations, currently no higher shares are observed for other "frontdoor" markets like the CEEC 5. As a consequence to the focus on EU-countries other export countries are less important than at the Austrian average.

The main pattern for all Carinthian industries also holds true for the mechanical engineering sector and the electronic sector as well, however some variations are notable. For example,

[10] Due to statistical problems referring to the registration of exports in the Service Sector and generally to the small proportion of export volumes in the Service Sector, data on the export structure of this sector are not presented.

the importance of Germany for exports in mechanical engineering as well as in the electronic sector is impressive and exceeds the Austrian share by far. The importance of Germany is also underlined by the export structure of the software sector, which in quantitative terms is quite small, as mentioned before.

Summary

- All in all, EU-enlargement will not cause fundamental changes for the Carinthian economy but will enforce competition. This development is primarily rooted in the Single Market Process of the EU and the Globalisation and not in the EU-enlargement itself.
- In the manufacturing sector only moderate changes in the competition-position of Austrian firms are expected since a free trade zone for manufacturing commodities already has been established with new countries in the 1990s.
- However, the service sector will be confronted with new legislative fundaments and therefore with more competition.
- The ongoing liberalisation of trade with the CEEC during the 90ies has remarkably enforced growth.
- Mechanical engineering and (micro-)electronics cover more than 50 % of all regional exports.
- Exports are highly concentrated towards Germany and Italy as near located markets within the EU.

5 Strengths and weaknesses, opportunities and threats for the three key-sectors

As the quantitative data have shown, mechanical engineering, (micro-)electronics and software are among the most important economic sectors in Carinthia. Their developments showed remarkable dynamics over the last years, even if these were slowed down since 2001 due to the overall business cycle. In general, the dynamic development did not remain restricted to the sectoral enterprises themselves. Also in complementary fields a variety of activities took place. In this context the regional competence-centre Carinthia Tech Research (CTR) with its applied research activities is an important example. The dynamics led to specific structures and developments in each of the three sectors, which constitute specific opportunities and advantages for the future.

specific development conditions of the three sectors

At the same time, Carinthia suffers from a lack in critical masses. Carinthia in general, is characterised by several strong and internationally positioned major companies. They are specialised in different technologies and serve different markets. (Micro-)electronic is the sector which disposes over the most developed structures in the region. But this sector as well suffers from the cyclical slump and from global overcapacities in the sector. These specific weaknesses and threats will also be discussed in the following chapter for each of the three sectors separately.

The analysis aims at highlighting development conditions as well as expectations and challenges of each sector that the quantitative data have not been able to seize.

5.1 The situation of mechanical engineering in Carinthia

several companies are market leaders

As shown before, mechanical engineering is of a steady importance in the regional economy. Even while facing a more difficult environment during the last year, the sector maintained its stability and performed well. This stability is mainly due to the fact that mechanical engineering companies in Carinthia specialised in specific niches and could in that way secure themselves a good market-position. Some of them even rank among the world market leaders in their field.

specialisations in niches

As successful examples for such niches may be mentioned the field of wood-transport or concrete pumps. Other specialisations encompass flexible manufacturing of small and medium sized batches, high-tech welding, blockmolds, preexpanders, shape molding machines, or machines for the textile and printing industry. One important field of regional mechanical engineering developed in the context of steel construction. These activities are mainly focused on large industrial facilities, piping constructions are for example among the most important regional products. In addition, a new tendency emerged in the last years and gained influence: more and more mechanical engineering companies focus on chemical and environmental engineering, like on biomass energy.

close contact with customers

In general, mechanical engineering companies in Carinthia developed from traditional standard-producers to suppliers of specialised know-how. Thus, production mainly concentrates on singular products, whereas mass production is rare. Products are mostly developed in close contact with the specific customers. The customers' needs are considered as important inputs for innovations. More traditional, basic parts of the production processes, for example welding, are often outsourced, mostly even out of the region.

low co-operation intensity within the sector

Thus, mechanical engineering in Carinthia may be characterised as heterogeneous. The strong specialisations of mechanical engineering companies open access to global customers, while at the same time impede the development of strong co-operation within the region. In addition, the specialisation implies a low integration of the companies into the region. Contacts to other mechanical engineering companies in Carinthia are rare, also competition inside the region is low. The companies use a different technology base as well as different customers or suppliers. Due to the production of singular goods (contract manufacturing), most of the companies cover a broad range of the production process by themselves. Their supply chain is short, and their regional network of suppliers is small.

This regional independence of mechanical engineering companies is underlined by their size. In Carinthia only three companies are to be classified as major companies with more than 250 employees (see chapter 3.2) (2002). The majority of sectoral companies is medium sized with quite a lot of employees, whereas the number of very small companies is far below the regional average. Thus, these medium-sized companies with their different fields of activities dominate the structure of mechanical engineering in Carinthia.

high spatial concentration of firms

Even if co-operation between the sectoral enterprises in the region is low, mechanical engineering shows a strong spatial concentration. A lot of enterprises specialised in the field of mechanical engineering are gathered in the East of Carinthia, around Wolfsberg in the area of the so called Lavanttal. Nevertheless, - as mentioned above - relations between the companies remain quite scarce.

low R&D rate

Most of the medium sized companies have their own small R&D-departments, even if their capacities are limited. Inputs for the development of new products mostly come from customer-side, since the development of customised products requires already in the development phase a close contact between company and customer. In addition, this focus on "one-off innovation" implies a low R&D-rate of the sector. The Carinthian share in the total of Austrian mechanical engineering employment is 6,8 %. Per contra, the regional share in the Austrian total of R&D-expenditures in mechanical engineering is only 4,6 % (1998). Regarding the regional share in national R&D-employment in the sector, the share is even lower (3,4 %).

R&D co-operations with other sectoral companies as well as with research institutions or universities are rare. This is amongst others due to the lack of adequate research institutions in the region, which could represent potential and interesting co-operation partners in the field. This problem is aggravated by the heterogeneous specialisations of the sectoral companies that raise very specific research problems. In the region of Carinthia directly, there are no research institutions specialised in issues concerning the sector of mechanical engineering, but within a close distance in Carinthia's neighbouring regions several institutions with R&D activities in the field of mechanical engineering are to be found, e.g. the universities in Styria.

There is no mechanical engineering department at the regional university of Carinthia. However, an analysis of the employees working for regional mechanical engineering companies shows that the need in the sector for employees with highest qualifications is rather low, at least for the time being. In 2001 only 29 Diplomingenieure (equivalent to enchartered engineers) were employed in the field of mechanical engineering in Carinthia. Therefore only 0,62 % of the sectoral employment disposed of specific qualifications of a technical university. This share is similar to the total in the Carinthian manufacturing sector (0,61 %). Nevertheless, regarding the total share of all employees with a university degree (- not only in technical studies), mechanical engineering is below the regional average in manufacturing (2,4 % to 3,2 %). Furthermore, the Carinthian share is also far below the Austrian share in employees with the highest qualification profile in mechanical engineering.

In contrast, two thirds of all sectoral employees in Carinthia served an apprenticeship training (foremen and master craftsmen courses). Also the share of employees, who were at a college or at a secondary technical and vocational education-college, is high. These facts underline that the sector especially needs medium qualified people, whereas the need of highest qualified human resources is low.

important role of the HTL Wolfsberg

Of importance for the regional sector of mechanical engineering is therefore the secondary technical and vocational education college (HTL) in Wolfsberg. Some companies consider the college as their main source for human capital of this level. Many former students work in important positions in the region. The HTL serves as a network and as a basis for an intensification of intercompany contacts. Though, some companies also mention difficulties in recruiting high qualified people and ascribe their low share in sectoral employment to shortcomings in available human resources. They also see the need for appropriate qualification institutions in Carinthia.

summer school innovation engineering

Summer school for innovation engineering

The summer-school is organised in co-operation with the Swedish university of Halmstad and will start in July 2004. About 40 international students will work on the subject of innovation engineering. Teaching language will be English. The summer school offers a combination of theory, workshops, and work on concrete projects.

Of great interest is the fact, that some mechanical engineering companies became active themselves to foster the qualification offer in the region. The foundation of a regional university of applied sciences (Fachhochschule) with two master programs in the field of innovation engineering was planned. Since the national approval for the specific Fachhochschule is considered as quite improbable, efforts are now focusing on a specific summer-school. These efforts are mainly undertaken and coordinated by the Association of Innovation Engineering in the area of the Lavanttal (Innovation Engineering GmbH.)[11], which started a qualification and research initiative for the mechanical engineering sector Lavanttal. Beside private companies also the city of Wolfsberg is dedicated to that initiative. Amongst other measures a park for R&D-activities is planned. Furthermore a successful

[11] See also http://www.ie-wolfsberg.com/index.html

private apprentice training academy in the fields of electrical and mechanical engineering hast been set up by a regional company (Elmont Academy).

All these initiatives are mainly concentrated on a few companies, which commit themselves to regional issues and issues of general concern for the future development of the sector. These initiatives also concentrate on Lower Carinthia, and – as mentioned before - especially in the area of the so called Lavanttal. In this area first approaches tend to shape the environment for mechanical engineering in a way that fosters future innovations and growth. In this context also the Lavanttaler Innovation Center (LIZ) may be mentioned, that offers service, help and information for young and new companies. Amongst others one main focus of the centre is on mechanical engineering.

great opportunities in the enlargement process

Many enterprises of the sector are already operating to a high extent at an international level. This fact is especially due to the specific specialisations of mechanical engineering companies in the region, which partly requires an orientation towards global markets. As mentioned before, several firms have even reached market leadership in small market niches, which therefore are dominated by quality competition. As a consequence the enlargement will increase the potential market-size for these companies and will enhance their chances to expand. Combined with a relatively small threat of new competitors from the candidate countries due to the specialisation of the produced products, the mechanical engineering industry is expected to be a sector with great opportunities in the enlargement process.

optimistic forecasts

Concluding, the sector of mechanical engineering shows a great stability in the region. Its companies are performing well. Deficiencies are to be found in the field of R&D and in institutions for higher qualification. In addition, the low co-operation between the sectoral companies is a challenge for the future. On the other hand, perspectives with respect to the EU-enlargement are quite positive. Thus, at the moment forecasts for the regional sector of mechanical engineering are quite optimistic. They foresee that the sector will continue its good performance of the last years and maintain its stability over the coming years.

Summary

- ❒ Companies in mechanical engineering in Carinthia show different specialisations in specific niches, in which they obtained good market-positions.
- ❒ Customers in these niches come from all over the world. Many regional companies in mechanical engineering are strongly internationally orientated.
- ❒ Co-operation between regional companies is low, since they are using different technologies.
- ❒ Mechanical engineering in the region is spatially concentrated in Lower Carinthia, in the area of the Lavanttal.
- ❒ The R&D rate of the sector is low. Complementary research institutions are to be found in the neighbouring regions.
- ❒ Directly in the region is no higher education institution for mechanical engineering. Private companies started interesting initiatives with respect to qualification in mechanical engineering.
- ❒ Forecasts are optimistic, that the sector will maintain its stability.

5.2 The situation of (micro-)electronics in Carinthia

(Micro-)electronics is seen as one of the most important sectors of the regional economy in Carinthia. Its importance with respect to employment is high. In addition, the regional sector also comprises a specific research institution (CTR) as well as education institutions. Therefore a nucleus exists that provides the necessary prerequisites and opportunities for a long-lasting innovative development and increased future dynamics of the sector. However, the structure of the sector also implies risks and challenges that have to be taken into account.

micro-electronics and electronics

In principle the (micro-)electronic sector in Carinthia is divided into two fields of activities: microelectronics with three major companies (Infineon, SEZ, AT+S) and their supply chain, and classical electronic activities, which are likewise dominated by only a few companies. The number of explicit (micro-)electronic companies in the region is about 35. These companies in turn induce a huge range of suppliers and connected companies which perform a great variety of different activities, which are more or less related to the core of (micro-)electronics. Therefore, the delimitation of the sector against other fields of activities, especially the software sector, is extremely difficult and the borders are fuzzy. Overlappings with the software sector increase. Especially in the field of embedded systems, but also in the field of medical-techniques, software support is required and constitutes an integral part of the production processes.

a few strong major companies

A common characteristic of the broad variety of activities in the field of (micro-)electronics in general is their strong orientation towards a few major companies. These companies mostly belong to international groups, even if the regional plants possess an extensive autonomy. In the region, they concentrate sectoral employment. Their presence is essential for the regional (micro-)electronic sector as it entails the necessary impetus for its economic performance in Carinthia. During the last decade, these companies paved the way to the current important position of (micro-)electronics in Carinthia. The regional sector and especially the small and medium sized companies in (micro-)electronics strongly depend on those major companies. This dependence bears risks, which have to be kept in mind. Most of the major companies are considered to be well integrated in the regional economy, not only due to their regional supply-chain, but also concerning their engagement in regional issues, e.g. stimulating the regional (micro-)electronic cluster.

lack of a similar technology base

Yet, the orientation towards the few major companies implies that enterprises in the field of (micro-)electronics in Carinthia are not so much linked by their similar technology base, but more by the major companies as common markets. Co-operation and exchange are therefore predominately conducted with customers and suppliers and to a lesser extent with other enterprises at the same horizontal level of the production chain. Between regional enterprises in (micro-)electronics there is little tradition of working together. A survey of those enterprises, which were member of the regional (micro-)electronic cluster in 2002, underlined that distrust and the fear of free-riders are the biggest barriers for co-operation[12]. It also reflects the fact, that regional (micro-)electronic companies expect a greater benefit by co-operations and strategic alliances with customers and suppliers than with other sectoral companies or research institutions. This fact is also due to their self-

[12] JÖRG, L./ OHLER, F. (2003): Evaluierung des [micro-]electronic Cluster. Im Auftrag des Kärntner Wirtschaftsförderungsfonds (KWF), Technopolis, Wien.

assessment: they consider the quality of their products and their technical standards as being high, but see deficiencies in their capacities of marketing and accessing new markets. Contacts to potential customers are therefore considered as very important.

very high R&D rate

The major companies of the region are also very active in research and development. In general, research activities in the field of micro-electronics are relatively important in Carinthia. The Carinthian share in the total of Austrian R&D-expenditures in the sector of (micro-)electronics especially the field of electronic components (44,5 %), is significantly above average. This is particularly true if it is put in relation to the share of regional employment in the total of national employment in the sector (8,3 % in 2002). Sectoral R&D activities are mainly concentrated on the few major companies of the region, which also participate frequently in European and international research projects. Nevertheless, Carinthian (micro-)electronic enterprises in general show intensive investment in R&D. In the survey mentioned above half of the enterprises surveyed indicated to put an emphasis on R&D. Those enterprises however also indicated that they co-operate only every once in a while with R&D-institutions and universities. Yet, the marginal contact with research institutions probably is partly due to the limited or for SMEs inadequate R&D capacities in the region.

CTR: a specific public competence-centre

In addition to the industrial research, a public research institution and the university of applied sciences undertake research and development projects in the field of (micro-)electronics. The public research institution in this field, Carinthian Tech Research (CTR)[13] is specialised in applied research in the area of smart sensor and actuator systems and focuses especially on delivering innovative solutions to problems in automation, process and quality control. Its business areas comprise optical sensors and imaging, smart automation and simulation as well as microsystem technologies. CTR works in close co-operation with the German Fraunhofer Institute, especially with the Fraunhofer Institute for Microelectronic Circuits and Systems (IPMS) in Dresden, and other national and international research institutions. CTR perceives its regional role as a stimulus for innovation of the regional industry. At the moment its co-operation projects are mainly concentrated on the major companies of the region, while contacts and support for regional SMEs could be increased.

master programs in electronics

Besides, also the regional university of applied sciences (Fachhochschule Technikum Kärnten) with its master program in electronics undertakes research projects. Activities are focused on microelectronic (digital, mixed signals), communication engineering and signal processing. Compared to other programs at the Fachhochschule, electronics is one of the most active one in the field of applied research. In addition the Fachhochschule plays an important role for the regional (micro-)electronic sector as it offers a master program in electronics. In the year 2002/2003 164 students participated in this program, and since its foundation in 1995/96 already more than 100 persons graduated. Also other master programs of the Fachhochschule are of interest for the regional (micro-)electronic sector.

The sector of (micro-)electronics in Carinthia shows a strong need for highly qualified labour forces, that means for employees with university degrees. Yet, (micro-)electronics in Carinthia strongly focuses on technical trained human resources. Graduated engineers make up for 1,66 % of total employment in (micro-)electronics in the region (2001). This

[13] See also http://www.ctr.at/

share is far above the regional average in the manufacturing sector in general (0,61 %). An important share of the sectoral employment constitutes of employees with apprenticeship training, and also graduates of technical and vocational education-colleges.

contacts to research and qualification institutions outside the region

Of importance in the spectrum of regional education institutions is also Silicon WIFI, which offers specific training programs for regional employees and defines its offer in close exchange with regional enterprises. Despite these examples, the regional qualification and training supply in the field of (micro-)electronics is restricted, and shortages in highly qualified labour are possible. Thus, contacts are maintained with other academic and non-academic research and education institutes in neighbouring regions. In this context the institutes of JOANNEUM RESEARCH, a Styrian research institution, the Graz University of Technology, the university for applied sciences with its master program in industrial electronics in Graz or the LCM Linz Center of Competence in Mechatronic in Austria as well as the EIDON spa-4c laboratory, the ELCON Elettronica srl in Italy and the Jozef Stefan Institute for Electronics and Information Technology in Slovenia offer interesting portfolios within only a small distance.

These contacts are intensified by the work of the regional (micro-)electronic cluster me²c, whose efforts amongst others focus on strengthening the (regional) research and qualification in the field. The cluster understands its role in fostering innovation-capacity and competitiveness in (micro-)electronics and therefore puts an emphasis on the triad of production, research, and qualification.

regional (micro-)electronic cluster

The regional (micro-)electronic cluster me²c

Me²c was bottom-up initiated in 1997 by local companies in Villach. In 2000 the cluster was officially transformed into a formal society by 45 regional companies, and in 2001 a limited liability company was founded, financed by national ministries, the regional economy funds (60 %) as well as membership fees (12 %). Currently me²c counts 91 members with about 8.000 employees and an annual turn-over of about 900 million Euros. In addition to sectoral enterprises also the research institution CTR and educational institutions are represented. The members of the cluster can be classified into three groups: 35 of them build up the inner circle of the cluster, they are working directly in the field of (micro-)electronics. A differentiation between those companies which work in the field of microelectronics and mainly constitute one or two major companies with their supply-chain on one side and different electronic companies on the other side can be made. Also CTR as well as the Fachhochschule are part of the inner circle. The approximately 20 companies of the second group maintain strong supplier and customer relations to the inner circle. They are however not active in the field of (micro-)electronics themselves. And the third group comprises all the other participants of the cluster, which may also maintain supplier relations to the first two groups, but whose production is completely independent of the (micro-)electronic sector. As examples business services, banks, marketing companies or translation offices may be mentioned. Considering these different groups of members, it is obvious that in some way the cluster may be classified as a broad supply-chain, since a common base of technology is lacking.

As the cluster was initiated in Carinthia, about 60 % of its members come from the region. Nevertheless, some members already come from other Austrian regions, especially Styria, as well as from abroad (e.g Germany, France, Italy, Hungary and Slove-

nia). For all companies the cluster initiates and coordinates projects that concern central questions of the (micro-)electronic sector. It acts internally as a coach for participating enterprises and externally as a lobbyist. The cluster strategy, which encompasses all these different activities, is based on four different business areas:

- Technology and innovation (amongst others in medical-techniques, automotive electronics, embedded systems, packaging, microsystems, e-diagnostics)
- Human Resources Management (training, resource management, etc.)
- Support (R&D-platform, certification, business excellence, benchmarking, knowledge-management, etc.)
- Marketing (information, co-operations, contacts to new customers, participation at trade fairs e.g. SEMICON 2003 in Munich)

Currently me²c endeavours to expand. Firstly, it wants to reach out for (micro-)electronic potentials in neighbouring regions. Here it already maintains close exchanges with existing structures in these regions. Currently, strategic alliances are intensified with partners in EU-accession states. Secondly, the expansion has a strong dimension with respect to the issues and areas dealt with within the cluster. Especially the stepwise integration of software components is seen as important, as it offers broad synergies and complementarities.

positive effects by the EU-enlargement are expected

The (micro-)electronic sector in Carinthia, like in Austria in general, is characterised by a high degree of export orientation. Thus, the EU-enlargement will not dramatically change the position of the sector. Nevertheless, the sector can be identified as a clearly favoured industry because of several reasons, which were already mentioned before: First the qualification of the employees is comparably high, secondly there is a good R&D base, thirdly - strongly related with the first two points - the market competition of this sector is clearly quality dominated (in contrast to markets with a high degree of price competition). Therefore the cost gap concerning labour between the new EU countries and Austria does not heavily affect the competition position of (micro-)electronic enterprises. In addition, - due to the enlarged market - economies of scale which improve the cost structure probably can be utilised for enhancing the competitive position.

Although the sector is already internationally integrated, this development probably will deepen with the EU-enlargement. As an example for this ongoing process the Strampamo Project AuHuCoop can be highlighted.

Austrian Hungarian co-operation in microelectronics

STRAPAMO: Austrian Hungarian Cooperation in the field of microelectronics (AuHuCoop)

The program STRAPAMO initially is launched and partly financed by the Ministry of Economy and Labour of Austria to foster (enterprise-)networks between Austrians clusters and research institutions with similar institutions in the CEEC.

The motivation for the project AuHuCoop, which already has been approved by the ministry, is to stimulate the development of Hungarian and Austrian networks within the field of microelectronics and thereafter pave the way to future cooperation in eastern countries. This will come true by using RTD networks. Furthermore this project will

initiate joint participation in the 6th Framework Programme of the European Union and cross-border research programmes in the sense of Art. 169 of the EU-Treaty. In particular the following goals can be summarised:

- to build bridges of research infrastructure between the participants in the project by finding out who is who in microelectronics within the consortium,
- to start production networks by providing a comprehensive overview of available technologies, R&D, companies, research institutions, services, competences, qualification structures and needs and networks on micro-electronics and their current use by the addressed parties of the project members region,
- to visualise the current as well as the future impact of the global movement in the region,
- to identify best practice models, which show co operations in the fields of research and development,
- to identify possibilities and overcome problems and shortcomings in all aspects such as, qualification, information networks within the consortium, so that a future co operations will work more efficiently,
- to locate and seed potential synergies to overcome the identified deficits and strengthen future participation in European projects and transnational research programs,
- to find out the infrastructure of R&D within the consortium (nanotechnology, e-diagnostics and embedded systems).

stabilisation in the coming years

Considering all these facts, forecasts for the regional (micro-)electronic sector are quite positive. Even if the sector faced problems in the last year, its importance in the regional economy is still far above average in terms of employment as well as in terms of companies. It will probably not be possible for the regional (micro-)electronic sector to repeat the dynamics of former years, especially of the second half of the nineties with its enormous boost in employment. However, some of the major companies restarted to gradually award more contracts to regional suppliers. Thus the situation will stabilise, or even upturn and show a slight growth in the next year. Yet, an important challenge has to be mastered in the coming years and remains a great risk: the dominant position of only a few major foreign owned companies and the strong dependence of the regional sector on them. A development to a greater independence of the regional (micro-)electronic activities is considered as one of the main objectives on the long run.

Summary

- ❒ Activities are undertaken in microelectronics as well as in electronics.
- ❒ A few major international companies dominate the regional sector.
- ❒ They comprise an extensive network of suppliers and differently connected companies. Thus, the dependence of the regional (micro-)electronic sector on the few major companies is significant.

- ❒ The sectoral R&D rate is high, research activities are especially undertaken by the companies themselves.
- ❒ Additional research activities are undertaken by CTR and the regional university of applied sciences.
- ❒ Weaknesses exist in qualification and educational possibilities in the region, which imply shortages in highly qualified labour.
- ❒ The me2c (micro-)electronic cluster constitutes an important institution in development.
- ❒ Forecasts are optimistic that the sector will stabilise in the next years.

5.3 The situation of the regional software sector

As already shown before, the regional software sector is relatively small. Nevertheless, its dynamics are considerable. Employment as well as the number of enterprises was and still is continuously growing. The developments of the last years induced intraregional concentrations. Regional software activities are mainly undertaken in the two main cities of Carinthia, Klagenfurt and Villach, and their surroundings. Even if the bulk of regional software enterprises is quite small, some of them may be classified as central to regional software activities and are of a great influence. In 2000 only five companies produced 17 % of the regional turnover in the software sector[14]. These companies often serve international markets and show intensive R&D-activities.

heterogeneity of software activities

Interestingly, specialisations and competencies of the regional sector differ widely. The regional software sector shows a broad variety of different fields of activities and is considered as very heterogeneous. Together with the small size of the companies this aggravates the problem of lacking critical masses. According to the interviews, four different groups of activities may be distinguished, which not only differ in the issues that they are dealing with. The different specialisation also determines the companies' potential for synergies with other regional sectors and therefore their possibility to integrate into the region. The software sector constitutes an industry that needs working in the context of other sectors as it mostly creates specific application systems for them. The four groups of activities are:

embedded systems

- Embedded systems related to the chip production as well as e-processing tools for the production of semi-conductors: Companies specialised in these issues work in close connection with the regional microelectronic industry. Due to these synergies the number of software companies in this field grew strongly over the last years. Some of them are already integrated in the regional microelectronic cluster. They also benefit from the regional master program of electronics at the university of applied sciences.

[14] SOUTHERN INFORMATION TECHNOLOGIES (2000): Software and IT Database. (http://www.sit.or.at/firmendatenbank/index.php). See also the regional Software Internet Cluster (SIC) (http://www.sic.or.at/).

geographical information systems

- Geographical information systems (GIS): This field developed fast over the last years and took up an important position in the regional software sector – even if competition by the Austrian main centre of geographical information systems in the region of Salzburg is high. Demand for these services is strong, but also very specific. Some companies were growing fast and currently dispose of important capacities. In that way, they could provide themselves quite secure market positions. Their international orientation is strong. Even if the majority of the turnover is made in Austria, Germany and Switzerland, several companies maintain also good market relations with the United States as well as with Asian countries. Synergies with other economic sectors in the region are limited. However, connections are to be found with the regional university of applied sciences (master program geoinformatics). Overlappings with (micro-)electronic activities do not really exist. Nevertheless companies specialised in geographical information systems regularly use the offer of the (micro-)electronic cluster in Carinthia, especially in the field of marketing events (e.g. a co-operative marketing journey to Vancouver) as well as of training possibilities.

medical informatics

- Medical informatics: A few small companies took up this quite young field in Carinthia and put it amongst the other important groups of software activities. A specific company was founded as a spin off of a major company in the region and therefore had the background and the capacities to consequently strengthen and deepen the broad field of medical informatics. In this context, the master program for medical informatics at the university of applied sciences in Carinthia is of great importance. Like the software group of embedded systems and e-processing, also the group of medical informatics is stepwise integrated into the regional (micro-)electronic cluster.

- All different kinds of other specialisations: amongst others software solutions for the financial service sector, clinical software-products, insurance software as well as document management systems. Even if this group is quite heterogeneous, some large companies emerged, which exert an important influence of the regional software sector in general.

The overview highlights the heterogeneity of software activities in Carinthia. It also gives evidence of a lack of companies in the field of “production technology oriented software” such as automation. However, current analyses define specific fields in which the regional software sector is considered as disposing of important potentials for future innovative developments. Amongst others innovative multimedia, software-modules and application systems, operations research and statistics are mentioned. Furthermore, opportunities can be identified in the field of public health management, e-health and e-government, where the stepwise liberalisation opens up new possibilities. It should also be mentioned that there may be a future chance for the Carinthian software sector in IT training and adult education (post-doc courses etc.) supported by regional tourism knowledge and infrastructure. However, the development and fostering of synergies with other regional key-sectors as (micro-)electronics/sensors and mechanical engineering (for example in robotic or medical techniques) should be of highest priority.

The regional software sector benefits of intensive research and development activities. The regional service sector in general shows a high concentration of R&D activities: More than

high R&D intensity

one third of all regional R&D-efforts in Carinthia takes place in this sector. In a comparison to other Austrian regions this share ranks highest. Unfortunately, no data could be found about the total of the software sector, the only data available are about the R&D rate of companies working in software consultancy and supply. However, these information strongly suggest that software in general performs a high R&D-rate: R&D-expenditures in regional software consultancy and supply accounted for 14,9 % (1998) of all sectoral R&D-expenditures in Austria, whereas the regional share in software employment in Austria is only 2,4 %. Carinthian software activities are therefore to be characterised as very R&D-intensive.

applied software research by the CTR

Nevertheless, the traditionally weak R&D-orientation of the region is also noticeable for the software sector, as regional infrastructure with relevance for technology and innovation is still quite small but growing. The public competence-centre CTR (Carinthian Tech Research) and research activities of university departments complement private R&D activities of the software companies. The CTR (see also chapter 5.2) performs applied research and specialises amongst others in the field of informatics. The competence centre CTR was founded in the second half of the nineties. Till now its connection to the regional economy is limited to co-operation projects with a few large enterprises. For the small software companies it is therefore hard to get in contact and to co-operate with the CTR.

contacts to R&D institutions outside the region

Research institutions of neighbouring regions offer further possibilities for co-operation projects in R&D. Amongst others departments of the Graz University of Technology as well as institutes of the JOANNEUM RESEARCH show strong activities in the field of software development. Other opportunities that are to be found in a marginal distance are the Jozef Stefan Institute for Electronics and Information Technologies, especially its departments of Computer Systems and of Intelligent Systems, in Slovenia as well as some interesting institutions in the Sciencepark AREA in the north of Triest in Italy.

need of highly qualified human resources

As mentioned above, the regional university plays an important role for the software sector - not only because of its specific research activities. It is also important to overcome shortages in highly qualified human resources. The need for highly qualified human resources is enormous. In 2001, the software sector employed more graduated engineers (36) than the sector of mechanical engineering (29), although its employment is significantly smaller. Therefore, 4,4 % of the sectoral employment were kept by graduates from technical universities. This share is far above the regional average in business services in general (2,4 %). With respect to all employees with an university degree, not only technically orientated, the share in software employment is up at 16,1% (2002), whereas the share in the business services in general is only 7,6 %. Thus, highly qualified labour is of great importance for the regional software sector. The Carinthian share even exceeds the Austrian share of employees with university degree in the software sector. These data underline the significance that the presence of the regional university and the regional university of applied sciences (Fachhochschule) exerts. The regional university recently built up a new faculty specialised on informatics. Currently three departments work in the fields of

- business informatics and application systems (practical informatics, computer science and manufacturing, system security),
- informatics systems (information and communication systems for companies, interaction systems, informatics considering operational applications,) and

- information technologies (distributed systems, system integration).

different qualification possibilities in software issues

In addition, also the work of the institute of mathematics is of importance for the regional software sector. Numerous efforts are undertaken to link university activities to the regional economy. Also the regional university for applied sciences (Fachhochschule Technikum Kärnten) offers master programs in geoinformatics, in medical information technology as well as in telematics/network engineering. The master program geoinformatics was founded in 2000/2001 in Villach, currently the program has 44 students. Medical information technology is also a master program in Klagenfurt since 2000/2001. At the moment 100 students are registered. The master program telematics/network engineering was established in 1997/98 in Klagenfurt. More than forty students already graduated, 122 are actually involved in the program. In addition, a spin-off centre was established to foster the creation of new software companies out of the academic research activities.

Not only higher education institutions focus on IT-issues. Already colleges offer specialisations in the field of information technologies. Moreover, specific IT-colleges were established which offer an additional qualification for college graduates. Different programs are offered, amongst others:

- electronic data processing and organisation with focus on network techniques in Klagenfurt;
- electronic data processing and organisation with focus on commercial data processing in Villach;
- entrepreneurship and management with focus on digital business in Klagenfurt;

Beside the efforts in the colleges also apprenticeship training programs were improved with respect to software issues. Since the year 2000 so called *"Technologiewerkstätten"* (technology labs) are established which offer trainings in the fields of informatics, IT-electronics as well as IT-business.

Software Internet Cluster

All these facts underline that the software sector is considered important for the regional economy and efforts are concentrated to strengthen existing structures. The sector is well embedded in quite favourable conditions and infrastructural offers, especially with respect to research and qualification issues. To further improve the conditions political strategies were defined that aim at deepening the co-operation in the sector and foster co-operative activities. To bring together the great variety of different software activities the Software Internet Cluster was founded[15]. In 2000 the former Software Industry Community was changed into the cluster, with a more formal structure and new initiatives. Nevertheless, the cluster misses certain dynamics. This is especially true as the regional (micro-) electronic sector is expanding and integrating more and more software companies which work in the context of (micro-)electronics.

However, the conditions for a genuine software cluster are quite favourable: the number of IT- and software enterprises in the area is relatively high and the regional university as well as the University for Applied Sciences with their research activities could be integrated. For the further implementation of this political priority another project is of greatest importance: the "Lakeside Science and Technology Park".

[15] See also http://www.sic.or.at/

Lakeside Science and Technology Park

The Lakeside Science and Technology Park

The Park will link research activities, training and education in the field as well as development orientated enterprises - not only to create mutually beneficial synergies, but also to establish a national and international visible and competitive centre of competence. The *"Lakeside Science and Technology Park"* is being constructed immediately next to the site of the regional university and financed by the technology funds of Carinthia. The park aims at an independently running, highly innovative technology-site. Technologies concentrated in the park shall bring about regional economic effects. Nevertheless, descriptions and definitions, which sectors are invited to come, were very broad. As technology competencies in Carinthia are quite narrow and specifically focused, a fertile mix of different technologies was intended to broaden the existing structures. At the same time the mix will guarantee the necessary condition for the development of applications in the software sector, as the software sector needs to be near to other fields of activities to develop successful applications for them.

In autumn 2004 the first phase of construction with 800 m² will be finished which will create about 500 new jobs. Contracts with 10 companies are signed and the capacities of the site exploited. In total, when the whole project will be realised (23 ha), about 2000 new jobs are foreseen. The new rector of the regional university called the Park *"(..) a nucleus for fruitful co-operations"*.

The university also plans to actively take part in the Lakeside Science and Technology Park, especially with the institute for e-commerce, financed by private companies, as well as with the centre for start-up companies called BUILD. This centre was financed by the KWF and the Austrian government in the framework of the AplusB-program which concentrates on support for the foundation of new companies. BUILD (Business Idea Lab and Development) is considered as incubator for graduates of the regional universities to lead them on the way to their own (IT-) business. In addition to the BUILD-centre further co-operation projects between the regional university and the regional economy are planned. Three competence centres, financed by the national ministry of economy and work, are in preparation. Their applied research activities will deal with problems in the field of software production, electronic business planning and innovation factors in the software sector. Further more a technical and vocational education college with specialisation in IT-issues is planned as well as bachelor-programs to informatics–management.

To conclude, these facts show clearly that the dynamics in the software sector are accompanied by a great number of different initiatives in complementary fields, especially in research and qualification. These efforts generate favourable conditions that will foster further positive developments of the sector in Carinthia. At the moment foresights are optimistic.

Summary

- The sector developed with great dynamics over the last years.
- The sector lacks critical masses as its companies are very small and their fields of activities are quite heterogeneous.
- Four different groups of activities are to be differentiated: embedded systems and e-processing, geographical information systems, medical informatics and a forth group of different kind of specialisations (e.g. software solutions for financial service sector).
- Regional software companies show a high intensity in R&D activities.
- The sector benefits from a favourable regional environment (research activities, qualification institutions).
- A lot of initiatives aim at deepening co-operation within the software sector: e.g. regional Software Internet Cluster (SIC), the new project “Lakeside Science and Technology Park”.
- Forecasts for the short term future are optimistic.

6 Conclusions

The region of Carinthia has begun to successfully manage structural changes. During these changes the technology and human capital intensive sectors, like (micro-)electronics or mechanical engineering, played an important role. In this context especially the regional efforts to strengthen research and development activities have been of great importance. Amongst others, these efforts improved the innovation potentials of the regional economy in general and of the three priority sectors in particular.

The importance of the three priority sectors is due to different characteristics. Therefore their development conditions as well as their challenges and risks in the face of the EU-enlargement differ clearly:

mechanical engineering

- Mechanical engineering showed a great stability over the last years with respect to employment as well as to the number of sectoral companies in the region. Its share in regional employment is far above average compared with the share of this sector at national level. Its regional structure is based on a few strong, medium sized companies, which specialised in market niches and maintain international market relations. Several companies even reached world market leader positions. The regional innovation system with respect to the sector of mechanical engineering is improving, as initiatives and efforts aiming at the installation of specific qualification and research institutions increase. Due to their strong specialisations mechanical engineering companies in Carinthia are mainly confronted by competition on the basis of quality. As a consequence the EU-enlargement will increase the potential market-size for these companies, risks and threats will probably remain limited.

(micro-)electronics

- The regional importance of (micro-)electronics in Carinthia is mainly based on the important share of the sector in the regional employment. In addition, the sector showed an amazing growth in the second half of the nineties, especially with respect to employment. Even if this growth was stopped in 2001, the regional weight of the sector is still remarkable. The former dynamics were especially induced by a few major foreign owned companies which enhanced the regional supplier structures in the sector. They are actually regaining stability and forecasts for the coming years are quite optimistic. Since the regional (micro-)electronic cluster me²c took up its activities in 2000 the co-operation between regional companies is enforced. The cluster management takes measures to improve the regional development conditions in the field of (micro-)electronics. Amongst others, training programs or marketing events are organised. Another aim of the cluster is the improvement of external relations of the regional (micro-)electronic sector to other Austrian regions as well as to regions in neighbouring countries. Therefore, specific projects with international partners are initiated. As the sector already shows a high export-orientation the EU-enlargement will probably not induce serious changes. The high qualification of its employees, the R&D intensity as well as its competition based on quality criteria ensure the regional (micro-)electronic sector a good position for the forthcoming developments.

software

- The software sector in turn is classified as a regional priority sector because of its outstanding dynamics. The sector showed a remarkable and uninterrupted growth over the last decade. The vast majority of its companies is very small, nevertheless several of them managed to achieve good market-positions in emerging software fields. Especially the strong synergies with the regional (micro-)electronic sector are of a great benefit for regional software companies. But also in other fields of activities Carinthian software companies are performing well. A quite diverse offer of research and qualification institutions in the region is enhancing the sector's strength for further innovations and growth. Several companies are quite export-orientated, some even obtain important shares of their turnover by contracts with Asian or American customers. Nevertheless, with respect to the majority of regional software companies the scopes of activities as well as the volumes of exports are (still) quite small.

For all three priority sectors forecasts are quite positive. All three sectors possess good basic conditions and therefore favourable development potentials. Their position is additionally enforced by the political awareness from which they are currently benefiting. Initiatives and efforts aim at creating favourable development conditions as well as fostering innovation potentials. The perspective of the three priority sectors of Carinthia for the coming challenges is therefore to be considered as quite good.