MICHAEL PENEDER

THE AUSTRIAN PARADOX: "OLD" STRUCTURES BUT HIGH PERFORMANCE?

This article addresses the familiar problem of two ambiguous empirical findings concerning the Austrian economy. On the one hand, macroeconomic indicators on productivity, growth, employment and foreign direct investment indicate that overall performance is stable and highly competitive. On the other hand, an international comparison of industrial structures reveals a severe gap in the most technologically advanced branches of manufacturing, suggesting that Austria is having problems establishing a foothold in the dynamic markets of the future.

The sectoral composition of production and trade is generally considered to be a (certainly imperfect but nevertheless) revealing indicator of a nation's level of industrial development. International comparisons of industrial structures are therefore commonly applied in addition to the usual comparisons of indicators, which are based either on inputs to the research sector (R&D expenditures, availability of a skilled work force, etc.) or on relative performance in the areas of science and technology (new patents, citations in scientific publications, etc.).

ON STRUCTURAL ANALYSIS

Of all these methods, the comparison of industrial structures is most advantageous because it comes closest to providing an effective evaluation of the extent to which economies are successful in utilising technological knowledge for business purposes. This implies that a meaningful comparison of specialisation patterns requires an economically interpretable point of reference. In particular, this point of reference should enable us to draw conclusions about the relative strengths and weaknesses regarding the most important determinants of corporate success. In practice, this requires the creation of more or less broadly defined classifications, in which different manufacturing branches or groups of products are categorised according to common analytical criteria.

The most common distinction is between the so called "high-tech" and "low-tech" sectors. The use of this terminology has been criticised, and with good reason: it

Michael Peneder (Michael.Peneder@wifo.ac.at) is an economist at the Austrian Institute of Economic Research. The data were processed and analysed with the assistance of Sonja Patsios.

The new WIFO Taxonomy of manufacturing industries

Faced with the task of evaluating the international competitiveness of European industry, the creation of two new taxonomies enabled the circumvention of major limitations associated with a lack of comprehensive data on intangible activities. The two new taxonomies group individual industries according to typical combinations of factor inputs and various requirements for skilled labour. The first classification ("Taxonomy I") differentiates between (i) exogenous competitive advantages based on *factor endowments*, such as physical capital and labour, and (ii) endogenously created advantages based on the purposeful *investment in intangible assets*, such as marketing and innovation. In contrast, the second classification ("Taxonomy II") clusters industries according to their respective skill requirements, which are both intangible and largely location related. Both classifications correspond to Eurostat's revised NACE system at the 3-digit level.

The clustering process for Taxonomy I is based on data for wages and salaries, investments in physical capital, advertising outlays, and expenditures on research and development. It is assumed that the data span four orthogonal dimensions of how to spend available units of productive inputs. Data sources are DEBA (labour and capital inputs) and COMPUSTAT (advertising and R&D). Taxonomy II reflects the human resources perspective and is based on the OECD's occupational data, which differentiates between white- and blue-collar workers on the one hand, and between high- and low-skilled labour on the other.

Compared to earlier classifications, the new WIFO taxonomies are distinguished by their application of statistical cluster analysis, designed specifically for classifying observations according to their relative similarities with respect to a multidimensional array of variables.

In the end, about 100 NACE 3-digit manufacturing industries were completely categorised under the headings given below. Like any broad classification, the new taxonomies must be interpreted with care, since industries listed in the same category can still be highly heterogeneous.

Taxonomy I: Factor inputs

Labour-intensive industries (LI)
Capital-intensive industries (CI)
Mainstream manufacturing (MM)
Marketing-driven industries (MDI)
Technology-driven industries (TDI)

Taxonomy II: Human resources

Industries with high shares of
Low-skilled labour (LS)
Medium-skilled, "blue-collar" labour (MBC)
Medium-skilled, "white-collar" labour (MWC)
High-skilled labour (HS)

conveys a strongly simplified, and from an economic viewpoint insufficiently differentiated picture. By way of contrast, a wider concept has been in use at WIFO since the late 1980s. Besides differentiating between high technology and non-high technology, it also takes into account the various uses of production factors such as labour and capital (*Schulmeister,* 1990). Building on this approach, WIFO was sponsored by the EU Commission to develop a new classification of manufacturing industries (see box). This taxonomy is distinguished by a new series of characteristics, and was applied for the first time in the 1998 European Commission Report on the Competitiveness of European Industry.

THE STRUCTURAL COMPONENTS IN ECONOMIC PERFORMANCE

From the very beginning, structural analysis must deal with the question of how relevant the newly introduced categories are to the evaluation of an economy's economic and technological performance. More specifically, we must ask whether or not it makes a difference for Austrian firms to engage in, for example, more high-tech or low-skilled economic sectors, or in predominantly labour intensive, marketing- or technology-driven industries. This section summarises results supplied by three crucial indicators often used in comparative studies of competitiveness: Differences between various economic sectors related to (i) average growth performance, (ii) the degree to which the supply of goods and services can be qualitatively differentiated, and finally (iii) the productivity of labour and the average wage level as contributing factors to national income.

GROWTH INDUSTRIES

The widely used term "growth industries" is based on the inference that systematic differences in the potential for long-run growth exist between economic sectors. Often, growth industries are assumed to be particularly innovative and technology intensive. One could expect, for example,

Table 1: Industrial specialisation and economic performance: EU, Japan, USA

	Apparent consumption	Value added	Employment	Labour productivity	Export unit values	Import unit values	Labour productivity
	1989-1997				1997		1997
	Average annual percentage changes				ECU per kg		1,000 ECU
Type of Industry							
Mainstream manufacturing	+2.50	+2.92	–0.79	+3.75	4.47	3.96	61.9
Labour-intensive industries	+2.32	+2.25	–1.75	+4.07	3.16	2.76	47.4
Capital-intensive industries	+1.36	+2.67	–1.74	+4.48	0.64	0.63	109.6
Marketing-driven industries	+2.59	+3.81	–0.44	+4.27	1.74	1.58	72.3
Technology-driven industries	+3.55	+4.07	–1.59	+5.75	13.87	14.57	102.2
Industries with high shares of							
Low-skilled labour	+1.70	+2.53	–1.58	+3.12	1.35	1.36	62.3
Medium-skilled "blue collar"	+3.04	+3.25	–0.38	+3.33	4.70	3.82	60.2
Medium-skilled "white-collar"	+2.84	+3.93	–1.31	+3.99	1.24	1.14	92.3
High-skilled labour	+2.74	+3.14	–1.28	+5.15	16.66	16.21	83.9

that those economic sectors in which firms invest heavily for the establishment of a brand name or in product innovation would be more successful at expanding demand potentials than other firms. This assumption is founded on the conjecture that the incessant process of improving the quality of goods and services is an endogenous determinant of growth. In other words, market potential becomes a strategic variable of choice for the firm.

A comparison of average yearly growth rates between the EU, Japan and the USA from 1989 to 1997 confirms the above view. Technology-driven industries benefit from by far the strongest increases in demand, followed by marketing-driven industries. In contrast, the capital-intensive (mostly basic goods) industries rank lowest. Essentially, the same pattern can be found in the annual growth rates of net value added in the Triad (USA, Japan and the EU 15), although labour-intensive sectors rank lowest, due to the stronger competitive pressures stemming from low wage countries. A similar picture emerges in the average growth rates for employment, although in the technology-driven industries, the effect of strong growth in value added is compensated by disproportionately high rises in productivity. However, when making these comparisons, one should take into account that growth also depends on numerous other factors, and that technology and marketing-driven industries operate within a particularly fast paced and constantly changing environment. The result is not only an above-average rate of growth, but also greater volatility.

QUALITY COMPETITION

A second question is related to the potential level of vertical differentiation of the goods and services produced. The basic conjecture is that market pressures towards lower costs (and the according decline in factor incomes) can best be reduced in markets which properly reward product differentiation and competition for (perceived) quality.

"Unit values" currently are the best available measure of the level of vertical differentiation and the importance of quality-based competition (as opposed to competition via prices). They are expressed as the ratio of nominal market value to the quantities of goods (expressed, for example, in weight units or in the number of pieces). A comparison between types of industries shows that both technology-driven industries and the closely related group of high-skilled industries have by far the highest unit values.

LABOUR PRODUCTIVITY

Generally, one can expect labour productivity to increase when labour is complemented by additional input factors, such as investments in plant and equipment, research, advertising or a better-qualified workforce. Actually, a comparison of aggregate values shows that labour productivity is much higher in capital-intensive and technology-driven industries and that it is lowest in purely labour-intensive production. If industries are additionally classified according to the skill level of the workforce, a differentiated picture again emerges. In short, the productivity of labour is highest in high-skilled and medium-skilled industries, especially those with a large share of white-collar labour.

Peneder (1999B) analyses the impact of tangible and intangible factors of production on the productivity of labour. Using cross sectional regressions, his findings essentially confirm the above view: the employment of skilled labour has by far the greatest impact on average labour productivity, followed by investments in physical capital, research outlays and advertising. The coefficients for all four factors are positive and significant in explaining the differences in labour productivity which arise between various industries. *Peneder* (1999B) also provides a detailed interpretation and extensive documentation of this analysis and a number of other statistical tests conducted.

On the basis of this evidence, it is safe to conclude that the new taxonomies have proven their economic relevance. However, before applying them to a comparative study on industrial structures, I want to cite some recent findings concerning the overall performance of the Austrian economy, and more specifically, its manufacturing sector.

AN IMPRESSIVE OVERALL PERFORMANCE . . .

Overall assessments of Austria's macroeconomic performance, which have appeared on a regular basis, have generally been quite positive. The latest OECD Economic Sur-

vey on Austria (*OECD,* 1999, p. 20) was particularly encouraging, summarising that "the recent macroeconomic performance of the Austrian economy has been impressive, based on relatively rapid growth, low inflation and rising employment. . . . wages, prices and productivity are projected to continue to develop favourably – in great part due to the major changes in the structure and the operation of the economy in recent years. With macroeconomic policy supportive, the medium-term prospects are sound" (*OECD,* 1999).

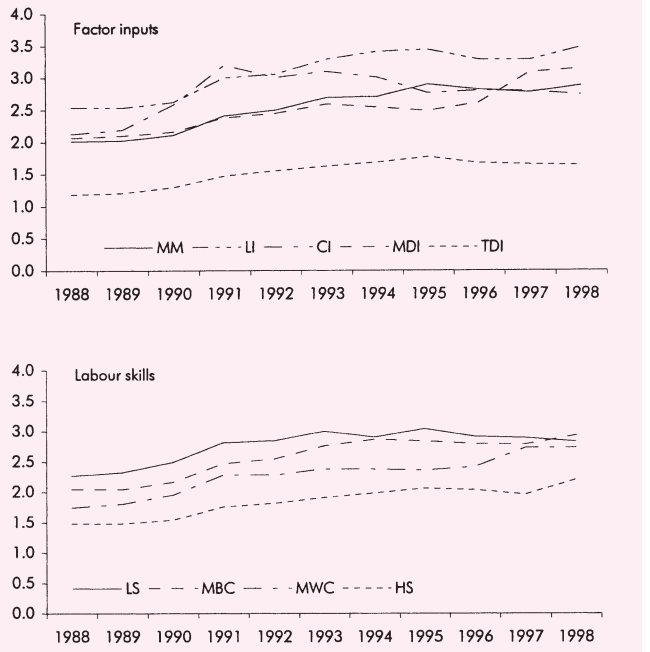
In WIFO's annual "Standortbericht" *Pfaffermayr* (1999) gives a current evaluation of Austria's performance/attractiveness as a location for business. He concludes that Austria offers industries substantial location-related advantages. One indicator of these advantages is the large volume of direct investment that Austria was able to attract during recent years. Direct investment flows into Austria increased significantly and were consistently larger than the corresponding outward flows. This signals that foreign investors still consider Austria to be a highly desirable location for their businesses.

Of related interest, *Aiginger – Peneder* (1997) conducted a large survey among top executives of national and international enterprises located in Austria. Among their findings were the following explanations for the generally positive attitude: membership in both the European Union and the European Monetary Union has clearly upgraded Austria's attractiveness as a business location. In combination with the ongoing integration of Eastern European countries, this situation is providing firms with access to larger and increasingly more integrated markets. Other favourable factors are a high quality of life, a stable macroeconomic environment and a reliable legal system. But what is most important, top executives generally considered the qualifications and motivation of Austrian employees to be an essential asset and a positive argument in favour of doing business here.

The development of nominal value added shares between 1988 and 1998 further underscores the consistently competitive position of Austrian manufacturing: in 1988, Austria produced 1.94 percent of the value added in the EU's manufacturing sector, but succeeded in increasing its share to 2.72 percent in 1998. Considering shifts in exchange rates relative to the EU average, the more remarkable observation might be that within the same period, Austria's foreign trade position was not affected at all. This is illustrated by Austria's stable shares in EU's total exports to the rest of the world, which amounted to 2.73 percent in 1988 and 2.77 percent in 1999.

More surprisingly, recent surveys indicate that relative to other European countries, the innovative stance of Austrian firms – when evaluated within the given industrial structures – is much better than initially anticipated. Utilising the most recent results of the Community Innovation Survey (CIS), *Leo* (1999) shows that the rate at which Austrian firms introduce innovations is significantly higher than the European average. Although the rate for the introduction of entirely new products is much lower, it still corresponds to EU averages, when measurements are made within the same industry. Similar evidence from patent statistics has been collected by *Polt et al.* (1999).

Figure 1: Austria's percentage shares in total EU value added

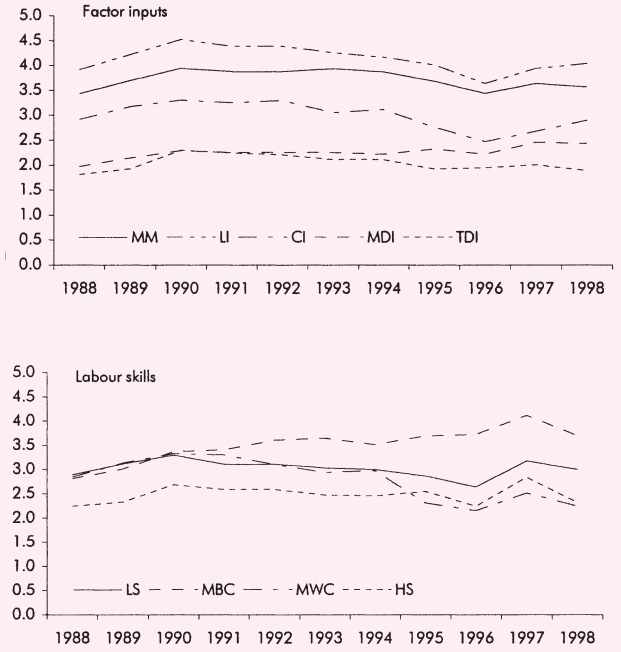


These new results undermine the common presumption (which has repeatedly led to much public criticism) that Austrian firms have a deficit in innovative activities. Indeed, as soon as we look at the enterprises in the context of where they actually operate, i.e., within their proper industries, we see, for example, that the notorious deficit in aggregate research expenditures (in 1997 1.63 percent of GDP as compared to 1.83 percent in the EU and 2.21 percent in the OECD) turns out primarily to be a consequence of differences in industrial specialisation. As the following section demonstrates, in Austria, the share of industries which typically make large investments in research and development is considerably below the EU average.

. . . BUT A SUBSTANTIAL STRUCTURAL GAP IN NEW TECHNOLOGIES

In a striking contradiction to Austria's generally satisfactory economic performance, an international comparison of

Figure 2: Austria's percentage shares in total EU exports



MM . . . mainstream manufacturing industries, LI . . . labour-intensive industries, CI . . . capital-intensive industries, MDI . . . marketing-driven industries, TDI . . . technology-driven industries, LS . . . low-skilled labour industries, MBC . . . medium-skilled "blue-collar" industries, MWC . . . medium-skilled "white-collar" industries, HS . . . high-skilled labour industries.

specialisation patterns exposes a long-standing and significant "technology gap" relative to the typical industry structures in other highly developed countries. In Austrian manufacturing, the share of technology-driven industries in value added and EU exports is only 1.64 and 1.88 percent, respectively, which is by far the lowest value of any of the various types of industry. Although less pronounced, the same picture emerges for sectors requiring a high-skilled workforce. In neither category is there evidence of a catching-up process towards the average for total manufacturing.

Over the past years, significant structural change in Austria has only been detected in the group of marketing-driven industries. Within the same period, their share in total EU value added increased from 2.06 percent in 1988 to 3.14 percent in 1998. With respect to EU exports to the rest of the world, their share grew from 1.97 to 2.43 percent. An important factor in this development has been the rapid growth in printing and publishing, as well as in recordable media (CDs, etc.). Nevertheless, within the same category, the share of the sporting goods industry – which is still very large for European standards – decreased. Within the category of technology-driven industries, audio-visual goods (TV, radio and recording apparatus) constituted the only industry with higher shares in EU value added than total manufacturing. In addition, industrial process control equipment, telecommunication technologies,

Table 2: Factor inputs 1997

	Mainstream manu-facturing	Labour-intensive industries	Capital-intensive industries	Marketing-driven industries	Technology-driven industries	Total value added
	Percentage shares					
Belgium	22.12	15.63	22.24	21.08	18.93	100.00
Denmark	29.50	14.68	12.08	28.60	15.13	100.00
Germany	28.06	14.13	15.46	16.22	26.13	100.00
Finland	22.82	14.98	28.59	17.54	16.07	100.00
France	21.94	13.57	14.69	22.10	27.69	100.00
Greece	19.61	17.71	19.26	35.36	8.06	100.00
U.K.	22.85	13.21	14.33	25.52	24.08	100.00
Ireland	12.06	6.25	12.56	31.48	37.66	100.00
Italy	28.88	19.84	15.90	17.65	17.73	100.00
Japan	24.86	16.00	16.01	21.00	22.13	100.00
The Netherlands	21.50	11.75	19.23	31.20	16.32	100.00
Austria	26.39	18.83	16.29	24.61	13.88	100.00
Portugal	21.92	23.65	13.94	29.77	10.72	100.00
Sweden	21.95	12.07	21.25	16.16	28.57	100.00
Spain	21.17	20.78	16.47	26.73	14.84	100.00
USA	21.26	12.22	13.51	23.17	29.84	100.00

pharmaceuticals and automotive industries gained in importance.

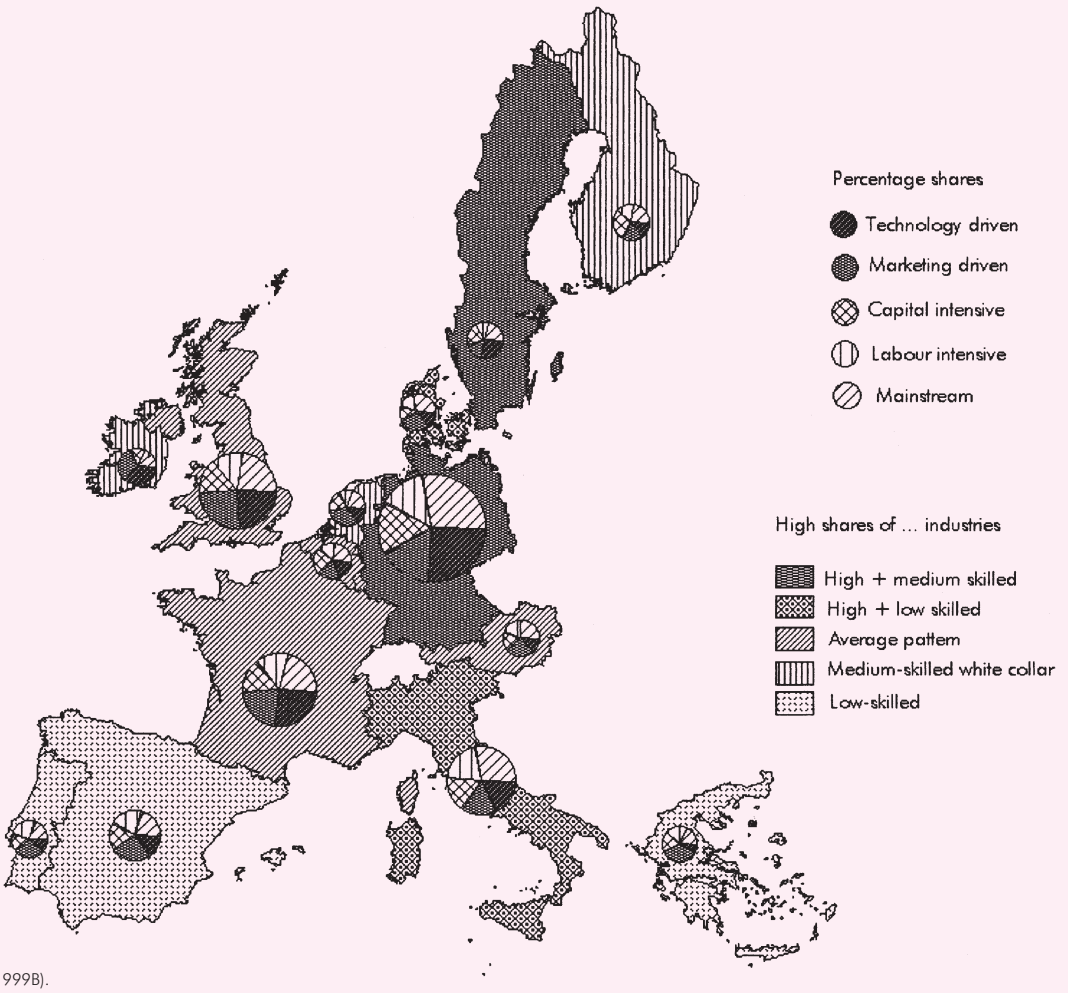
The map in Figure 3 was originally produced on behalf of the European Commission and provides a highly condensed illustration of the most pronounced patterns in European industrial specialisation. The geographical areas are shaded to indicate differences in industrial structure characterised by typical occupations and skill types (Taxonomy II). In addition, the pie-charts indicate the value added shares contributed by each type of typical factor input combination (Taxonomy I).

Concerning the human resources dimension, Germany and Sweden are most distinguished by their large shares of high-skill, as well as both types of medium-skilled industries. In contrast, Italy and Denmark have equal shares in high-skill industries, but perform less well in medium-skill categories. Finland, Ireland and the Netherlands constitute a heterogeneous group, with the common characteristic of particularly small shares of typically blue-collar, as opposed to high shares of typically white-collar industries. Applying cluster techniques in mapping the relative similarities in overall industrial structures, Austria, Belgium, France and the U.K. broadly represent the average pattern, whereas Spain, Portugal and Greece have the greatest specialisation in low-skilled industries (*Peneder,* 1999B).

When industries are grouped according to the required skill level of the workforce, Austria's performance seems unexceptional by international standards. However, a different picture emerges with the implementation of Taxonomy I (based on the distinction between tangible and intangible factors of production).

Figure 4 uses a hierarchical cluster analysis to illustrate major similarities in the specialisation patterns of several countries. Beginning from a global perspective, two

Figure 3: European patterns of specialisation by types of industry in 1997



Source: *Peneder* (1999B).

groups with rather similar specialisation patterns are evident. France and the U.K., as well as the USA, all have particularly high shares in technology and to a lesser extent also in marketing-driven industries. In contrast, Japan, Germany and Sweden exhibit similar specialisation patterns, with high shares in technology-driven industries, but low shares in marketing-driven industries. High shares in mainstream manufacturing and capital-intensive industries compensate for the latter.

Among European countries, *Austria* stands out as having a particularly low share of EU value added in technology-driven industries, which repeatedly (i.e., in the application of different statistical methods to measure distances) suggests that Austria is most similar to countries such as Spain and Portugal. This tendency is mirrored by a high and above-average share in mainstream manufacturing and labour-intensive industries. Even the share of marketing-driven industries is significantly higher in Austria than in countries such as Germany, Sweden, Italy or Finland.

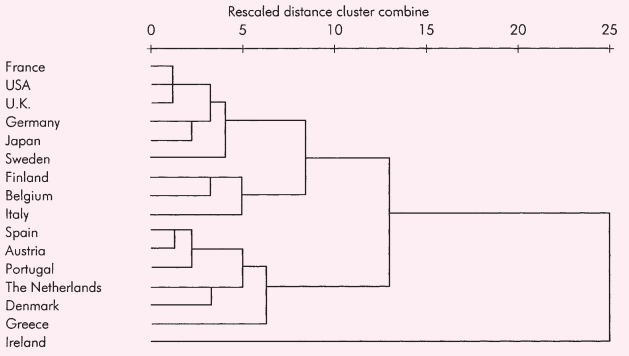
The fact that in 1997, the labour productivity of total manufacturing in Austria was 46 percent above that of Spain and 69 percent above that of Portugal illustrates that similar patterns of specialisation can still comprise very different kinds of activities. But given the otherwise strong statistical relationship between structural characteristics and labour productivity (presented, e.g., in *Peneder,* 1999B), it seems fair to conclude that when compared internationally, Austria constitutes a highly paradoxical case.

THE "SO WHAT?" OBJECTIONS

What is the meaning of these findings, if despite them, overall performance is still considered satisfactory? Naturally, the first reaction would be to cast doubts about the correctness of the above results. However, it must be stressed that the existence of an Austrian technology gap was also confirmed by earlier studies, in which numerous alternative classifications were applied (see, e.g., *Hut-*

Figure 4: Dendrogram of relative similarity in industry structure

Linkage between groups, squared euclidean distances



Source: *Peneder* (1999B). – Countries are revealed to be more similar with respect to industrial structures the closer to the left hand origin lines connect.

schenreiter – Peneder, 1997). We are therefore forced to accept the "technology gap", which has been consistently observed, as a robust empirical trait of Austria's industrial structure (and most certainly not an artificial product resulting from the use of the new classifications).

A natural second reaction would be to cast doubt on the economic relevance of industrial structures as such. Somewhat contrary to popular beliefs, this raises serious concerns regarding many important questions still unsettled. Traditional general equilibrium theory, for example, hardly gives us any clue as to why sectoral structures should make any difference in a country's overall economic performance at all. But in addition to the empirical evidence summarised in the prior sections, *Pfaffermayr* (1999), for example, reports that firms in technology-driven industries have not only been more dynamic and more profitable; they have also been able to generate above-average labour productivity gains in spite of moderate lay-offs. In addition, they have invested more than the industrial average and have been more export-oriented.

It is hard to imagine that all these effects, which are significantly dependent on structural characteristics, should be completely "feed-backed" away into the aggregate performance of an economy. As a consequence, we cannot honestly resolve the puzzle by treating the underlying structural dimensions as irrelevant. It is too easy to feel complacent about the positive findings on overall performance, as these certainly concern the most immediately felt consequences. Instead, we must be aware that in a world of increasing returns and path dependency, the underlying economic structures might largely shape an economy's prospects for future development.

It is becoming more and more urgent for empirical studies to clarify the nature and extent of the interaction between macroeconomic performance and different patterns of specialisation. What can be said about the existing leeway and chances of success for distinct national development strategies? Will it be possible for a country like Austria to maintain its high standard of living over the long run, by making the best of its own technological base within the predominantly traditional production sectors? All these questions are associated with numerous plausible hypotheses and speculations. What remains lacking is a sound empirical analysis.

As long as we do not have a better understanding of the dynamic implications, the "Austrian paradox" of "old" structures but nevertheless good performance must be taken seriously. It cannot be easily done away with the kind of common "so what?" arguments.

THE PARADOX REMAINS

The main results indicate that Austria's manufacturing sector is nestled for the most part in traditional industries, characterised by an average or even low level of R&D activity. In contrast, Austria's positive macroeconomic development and the steady increase in nominal value added shares and stable export shares within the EU show that Austria's manufacturing sector is doing well within these markets. Similarly, the most recent survey data on innovation lead to the conclusion that the low national level of research inputs (as measured by the lag in per-capita R&D expenditures compared to other countries) does not signify a problem for innovation in the narrow sense. Rather, it must be understood as a direct consequence of the low level of specialisation in technology-driven industries.

This view puts the targets of technology policy and industrial policy in a totally new perspective. The one-sided fixation on achieving an increase in R&D expenditure ratios entirely fails to capture the economic point.

The consequences regarding the formulation of more particular strategies for economic policy are equally far-reaching, but should not be mistakenly understood as advocating pro-active political interventions benefiting specific branches. The target is essentially to create a propitious business environment. As Austria's low R&D ratio can no longer be attributed to a failing innovation system in the narrow sense (consisting of lacking financial support payments, tax incentives, etc.), it appears increasingly related to the farther-reaching institutional factors influencing the firm's capabilities to adjust rapidly in fast-moving business environments. Such examples are the regulation of crucial infrastructures, the labour and capital markets, or the university system.

In short, when evaluating economic policy alternatives related to structural change, the pertinent question does not concern specific public support schemes, but rather asks whether current conditions allow firms to react rapidly to changing market conditions and to generate competitive knowledge that can be used commercially.

In this respect, *Teufelsbauer* (1999, p. 294) makes an interesting point about a related and similarly striking Austrian paradox, which he describes as an apparent ambiguity between the favourable actual performance of the Austrian economy and the popular conjectures about mistaken policies and insufficient means of the Austrian institutional system to achieve such a performance.

What is usually much criticised, and documented, e.g., in the survey of business executives by *Aiginger – Peneder* (1997), is the presumed over-regulation of markets and a corresponding lack of timely adjustment to new challenges. Teufelsbauer takes some considerable edges off these arguments in his reference to the high degree of flexibility, which is built into the actual operations of the Austrian social partnership, although it often escapes the public consciousness. In particular, the system of wage negotiations has enabled rather flexible responses both to macroeconomic developments and to the needs of individual markets (*Teufelsbauer,* 1999, p. 295).

This flexibility is exercised in the actual operations of the Austrian social partnership more generally, and in the process of wage determination more specifically. It might also explain at least part of the "old structure vs. good performance paradox". The flexibility in dealing with the more cost-based challenges of international competition is consistent with both a good overall macroeconomic performance and an unusually high share of labour-intensive industries, able to maintain at least a foothold in Austria. Additionally, the well-trained and highly motivated work force, together with a favourable geo-economic location, enable Austria to maintain a competitive edge, explaining the high productivity levels within rather traditional industrial structures[1].

These observations recall the common images of repeated, "self-similar" patterns at different levels of a system, as displayed in fractal geometry: at the micro-level, the results reported in the WIFO Community Innovation Survey have already implied that, broadly speaking, Austrian firms have taken a strong stance towards contin-

[1] Certainly this is yet too simple to constitute a fully satisfactory explanation for the Austrian "structure-performance paradox". Many other aspects deserve special attention. One such example, which is highly specific to Austria, comprises the potential benefits to overall employment created by the large tourism sector. This sector regularly absorbs much of the less-trained workforce, which usually faces the most severe difficulties in entering the labour market.

The Austrian Paradox: "Old" Structures but High Performance – Summary

This article addresses the familiar problem of two ambiguous empirical findings concerning the Austrian economy. On the one hand, macroeconomic indicators on productivity, growth, employment and foreign direct investment indicate that overall performance is stable and highly competitive. On the other hand, an international comparison of industrial structures reveals a severe gap in the most technologically advanced branches of manufacturing, suggesting that Austria is having problems establishing a foothold in the dynamic markets of the future.

The main results indicate that Austria's manufacturing sector is nestled for the most part in traditional industries, characterised by a rather average or even low level of R&D activity. In contrast, Austria's positive macroeconomic development and the steady increase in nominal value added shares and stable export shares within the EU show that Austria's manufacturing sector is doing well within these markets. Similarly, the most recent survey data on innovation lead to the conclusion that the low national level of research inputs (as measured by the lag in per-capita R&D expenditures compared to other countries) does not signify a problem for innovation in the narrow sense. Rather, it must be understood as a direct consequence of the low level of specialisation in technology-driven industries.

This view puts the targets of technology policy and industrial policy in a totally new perspective. The one-sided fixation on achieving an increase in R&D expenditure ratios entirely fails to capture the economic point. The consequences regarding the formulation of more particular strategies for economic policy are equally far-reaching. As Austria's low R&D ratio can no longer be attributed to a failing innovation system in the narrow sense (consisting of lacking financial support payments, tax incentives, etc.), it appears increasingly related to the farther-reaching institutional factors influencing the firm's capabilities to adjust rapidly in fast-moving business environments. Such examples are the regulation of crucial infrastructures, the labour and capital markets, or the university system.

uously improving existing products and processes instead of bringing entirely new designs on the market. But at the macro-level, the Austrian institutional system appears to behave in a similar way. It (rightly) emphasises the importance of economic stability and is highly efficient in its support of adjustments to traditional problems of cost-based competitiveness. However, it is much less successful in enabling the larger, more radical transformations, to which it must actively aspire, if it is to become an important player in the most dynamic markets of the future.

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