LATVIA

Toward a Knowledge Economy: Upgrading the Investment Climate and Enhancing Technology Transfers

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Foreign Investment Advisory Service
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International Finance Corporation
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EXECUTIVE SUMMARY

i. Developing a knowledge economy has become the objective of the Latvian government, as it is today for many emerging countries around the world. The success of a few countries—Chile, Korea, Malaysia, and Taiwan—has contributed to this trend. Acquiring or developing knowledge is perceived as a panacea because it can help a country with limited natural resources generate growth, and for others, to diversify their sources of growth. Today, economic development is often viewed as a technological phenomenon; for a lagging economy, it is seen as the phenomenon of catching up with technological advancements. Still, the fact remains that the generation of knowledge is concentrated in relatively few countries—and companies—making its acquisition and assimilation a difficult and challenging task, particularly for a country like Latvia.

ii. This report focuses on the actions the government of Latvia could undertake in the next few years to transform Latvia into a knowledge economy. The main strategy that FIAS proposes is based on two key elements: improving the business environment, and enhancing the linkages between local firms, foreign partners, and customers as a way of stimulating technology transfers. These elements should help promote the development of the private sector, leading to increasing participation by foreign firms as well as small and medium-size local companies that are generally perceived as the main sources of technological growth. These companies, and their integration in the global economy, have been part of the success in Chile, Ireland, and most East Asian countries over the past decade.

iii. This report aims to complement other studies and voluntarily omits some important elements that should be included in the government’s overall strategy. It will not review the educational system, nor does it address the issue of how to finance pioneering initiatives, because these topics have been or will be covered by parallel studies.

iv. Today, Latvia is not yet a knowledge economy. The key knowledge-intensive sectors—information-communications technology, electronics, materials science, wood chemistry processing, and biotechnology and pharmacology, remain marginal in the Latvian economy. As an illustration, it is estimated that high-technology sectors represent only 2% of the total workforce in Latvia, which is lower than the average of 3.5% in existing and future EU member countries. The same conclusion emerges from foreign direct investment and export flows, which capture two important channels through which technology is diffused and enhanced in a transition economy like Latvia.

v. The relatively marginal role of the knowledge-intensive sectors in the Latvian economy should be a surprise to policymakers. In fact, it is one of the key motivations behind the government’s renewed strategy. This finding also reflects Latvia’s low ranking compared with most European countries, including other future EU members, in the four dimensions that define a knowledge economy according to the methodology developed by the World Bank Institute. Overall, Latvia ranks approximately on par with
Lithuania and Poland, behind Estonia and the Czech Republic, and, not surprisingly, far behind France, Germany, and the United Kingdom. This cross-country comparison also emphasizes the limited participation of the Latvian private sector in the knowledge economy. Not only have a few private firms been directly involved in the so-called knowledge intensive sectors but the level of R&D effort funded by the private sector remains one of the lowest in Europe, accounting for only 0.2% of GDP, which is approximately six times lower than the EU average.

*Improving the Business Environment*

vi. The business environment in Latvia has improved dramatically over the past few years as reflected by most cross-country indicators used by the international community. Still, further improvements in the overall investment climate should remain a priority for the government because the main sources of knowledge generation and diffusion are generally the firms that are the most sensitive to the quality of the business environment. Foreign firms can choose between multiple alternative locations, and SMEs can postpone their projects or simply remain in the informal sector, thereby restraining their technological development.

vii. Via direct interviews with government officials, a survey of more than 400 firms in Latvia, and through its experience around the world, FIAS has identified several main issues in the investment climate:

- A focal institution must be appointed to be responsible for developing the knowledge economy in Latvia.
- Biases exist against exporters and small and medium enterprises (SMEs), including excessive administrative costs for import/export procedures, lack of quality standards, and distortions in the tax system.
- Skilled labor is difficult to find, as indicated by 88% of the firms in the FIAS survey emphasizing the decreasing technical capacity of the local workforce, especially in the software industry.
- The private sector has limited involvement in research and development, and in knowledge-intensive sectors.
- There is limited interaction between public research and development institutions and business enterprises; this arises from the weak institutional framework and the lack of communication between the two sectors. Several ambiguities in the legal framework have been a source of concern for many companies and researchers.

viii. What can be done to address these issues? FIAS proposes a series of recommendations, which are summarized in Table 1.

**Table 1: Summary of main recommendations**
<table>
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<th>Constraints</th>
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<tr>
<td><strong>Establish an institutional focal point</strong></td>
<td>• Establish a technology council following the example of successful countries such as Estonia and Finland, which should be attached to the highest political level and include the participation of the private sector</td>
<td><strong>What Not To Do</strong></td>
<td>• Develop a patchwork approach characterized by the absence of coordination between the private and public sectors and within the public sector</td>
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<tr>
<td><strong>Remove barriers to exporters and SMEs</strong></td>
<td>• Streamline administrative barriers for exporters and SMEs, especially by reducing delays associated with export/import procedures • Support adoption of quality standards by providing information and eventually financial support, notably to SMEs.</td>
<td><strong>What Not To Do</strong></td>
<td>• Rely on distortions in the tax system and fiscal incentives by: o Granting tax rebated to large investments o Delaying VAT reimbursement to exporters</td>
</tr>
<tr>
<td><strong>Facilitate access to skilled labor</strong></td>
<td>• Implement matching grants programs that support training by firms, with a special attention on: o Keeping employers in charge o Designing programs with an emphasis on competition in provision o Earmarking funding strictly o Providing support to smaller enterprises • Facilitate the hiring of foreign workers in specific areas by accelerating immigration procedures for some skills or industries (beyond the managerial level)</td>
<td><strong>What Not To Do</strong></td>
<td>• Favor tax incentives granted to training expenses because less effective than matching grants and tend to favor large firms.</td>
</tr>
<tr>
<td><strong>Encourage private R&amp;D</strong></td>
<td>• Strengthen the application of the intellectual property rights legislation by reinforcing the court system.</td>
<td><strong>What Not To Do</strong></td>
<td>• Rely on tax incentives granted to R&amp;D expenses, which are redundant in the current Latvian tax system • Evaluate with care matching grant schemes, at least on a large scale, because it is difficult to identify the incremental value of R&amp;D expenses and they are generally less effective than similar programs for labor training.</td>
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<td><strong>Strengthen relationship between firms and research</strong></td>
<td>• Revise intellectual property rights legislation to encourage patents and commercialization by researchers and institutes • Coordinate and facilitate information flows by reinforcing the role of industry associations (or/and the Latvian Development Agency) and strengthening contacts with foreign partners/customers/markets</td>
<td><strong>What Not To Do</strong></td>
<td>• Use tax incentives aimed at stimulating more collaborative research.</td>
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ix. These recommendations should be viewed as proposals for discussion with the Latvian government. Indeed, the authorities can consider multiple actions—ranging from tax incentives to training subsidies and financial support. Yet, Latvian policymakers cannot ignore the importance of improving labor skills and training capacities in the private sector. Recent international experience has shown that a government’s intervention in this area generally leads to significant technological and productivity gains for private firms. For this reason, several options for increasing training capacities in the workplace are reviewed in the main report. These options, based on international best practices, deserve the attention of Latvian policymakers at a time when structural funds from the European Union will be made available. FIAS also emphasizes the need to revise the legal framework—by increasing incentives to researchers, and to facilitate information and marketing strategies within and across the knowledge-intensive sectors.

x. By contrast, FIAS is much more circumspect about the relevance of developing tax incentive schemes for R&D expenses. The international debate on their effectiveness is still open and, for Latvia, the generosity of the overall tax system would most probably make them redundant. For example, Belgium and Japan offer tax allowances for R&D expenses but even when accounting for these schemes, their corporate income tax rates remain higher than the current general tax rate in Latvia, which is only at 19% and is expected to decline to 15% next year.

*Improving the Integration of Local Firms within the Global Production Network*

xi. Two basic channels exist for firms that seek to upgrade their technological capacities: either they can develop their own R&D capability, or they can acquire new technologies from other firms and partners. In most emerging countries, the second option is essential due to the limited financial and human resources of most local firms. The recent survey of about 400 firms conducted by FIAS confirms that the acquisition of technology is the main channel for innovation in Latvia. About two-thirds of the firms surveyed indicated that they had benefitted from technology transfers over the past few years, versus one-third that reported having developed their own R&D capacities. These two options are complements rather than substitutes, because only 14% of Latvian firms reported conducting R&D without receiving any external technology transfer.

xii. From a policy perspective, the rapid pace of innovation—and the resulting promise of productivity increase—makes it even more costly for Latvian firms to insulate themselves from international trade and investment. Indeed, the survey reveals that exporting companies and local suppliers to multinational companies (operating in Latvia or abroad) are most likely to receive technological transfers from their foreign customers (Table 2). This close interaction seems to have made them more competitive, contributing to the increase of productivity of local suppliers by 50% in comparison to that of other firms. Furthermore, the main sources of technology transfers have been the purchase of equipment abroad, followed by the hiring of key staff, and agreements with multinational companies (i.e., licensing, joint ventures or other transfers of technology).
Table 2: Latvia’s experience in promoting technology transfers through international markets

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<th>Exports</th>
<th>Linkages with Multinational Companies</th>
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<td>Exporters are more likely to benefit from technology transfers (70% reported doing so in Latvia through imports of equipments and licensing technology).</td>
<td>About 80% of multinational firms reported using local suppliers because of proximity, more convenient payment structures, and more competitive prices</td>
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<td>Exporters are more prevalent in knowledge intensive sectors because about 50% of companies in these sectors do export to international markets, compared with only 35% in other industries.</td>
<td>The presence of a multinational firm leads to positive spillovers for local firms, which reported the following benefits:</td>
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<td>The decision to export is influenced by contacts with foreign partners, notably through:</td>
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<td>• Finding a foreign distributor (for 35% of Latvian exporters)</td>
<td>a. Purchase of inputs from them (15%)</td>
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<td>• Receiving technology or marketing advice (32%)</td>
<td>b. Learning about new technologies (15%)</td>
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<td>• Selling under the brand name of foreign partner (27%)</td>
<td>c. Sharing marketing strategies (10%)</td>
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<td>• Becoming a subcontractor to a foreign company (18%)</td>
<td>d. Employee turnover (4%)</td>
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xiii. In light of these findings, the agenda for the Latvian government should be relatively simple. It is to promote export-oriented activities and to strengthen the capacity of local firms to become suppliers of multinational companies. Within this vision, most of the recommendations improving the business environment remain relevant. In addition, the government may want to consider creating a support program that links domestic suppliers with multinational companies. Such programs have been developed with apparent success in the Czech Republic, Ireland, Malaysia, Taiwan, and Thailand. Although these linkage programs differ in their scope (e.g., targeting SMEs or specific sectors), they all rely on the voluntary participation of both multinational and local firms.

Information-Communications Technology and Electronics Sectors

xiv. The ICT and electronic sectors have been selected as priorities in the government’s strategy for developing a knowledge economy. Evaluating the potential of Latvian firms requires a good understanding of the technological and management developments that have led to the elimination or restructuring of most global and vertically integrated companies that existed during the 1980s. Today, most international firms operating in these two sectors focus on their core competencies, relying on complex and borderless supply chains, which not only include product manufacturing, but also front-end customer contacts and support services.

xv. The emergence of international supply chains in the ICT and electronics sectors offers both an opportunity and a challenge for Latvian firms: an opportunity because an increasingly higher number of original providers seek to outsource part of their production or distribution to other firms; a challenge because it is a competitive market. Most Latvian firms operating in these two sectors are not able to compete solely on the
basis of their costs, at least in comparison with the firms in Asia and even in some CIS countries. Their comparative advantage primarily lies in their technological capacities and in their efforts to upgrade them over time.

xvi. Based on this assessment, FIAS suggests the general rule of assessing which companies have already been growing in these sectors and then applying the principle of “if something moves, push it.” Almost invariably, such companies exist in Latvia, and they provide an appropriate list of firms to try to develop in the country. The most successful Latvian companies operating in the ICT and electronics sectors are those that have already been able to integrate into the global production network through a combination of technology transfers and their own R&D efforts. These firms have benefited from imports of materials and equipment (Siemens and ABB), training (Exigen, Microlink), or customer networks (Alise, Dati, Exigen).

xvii. The role of the government and industry associations in these two sectors is also discussed in light of the recent experience of a few successful countries, leading to a series of recommendations that are detailed in the main report and can be summarized as follows:

- Implementation of training programs that involve the private sector in their management (such as LITTA), stress competition among providers of services, and rely on matching grants between the public and private sectors. Many firms in these sectors have complained about the shortage of skilled labor and the costs of training local workers to use new technologies.

- Linkages with foreign partners by stimulating export activities as well linkages with foreign companies established abroad or within Latvia.

- Coordinated strategies between public and private firms or associations, located both within and outside Latvia, for promoting the ICT and electronics sectors. Following the successful examples of Ireland and a few other small countries (or regions), such strategies should help address the information gap faced by most Latvian firms that do not have the initial resources or size to be present in international markets.
INTRODUCTION

A. BACKGROUND

1. The Latvian economy has performed well following a brief recession in the aftermath of the Russian economic crisis in the late 1990s. The authorities have continued to follow prudent macroeconomic policies, trade liberalization and privatization are almost complete, and real GDP growth averaged 5% per annum during 1999–2001. Despite the weak external environment, growth reached 6.1% in 2002, one of the highest among EU accession countries. Inflation has been low in recent years, and was less than 2% in 2002. The fiscal policy has been relatively tight and the deficit declined to 2.5% in 2002, down from 3.9% of GDP in 1999. The current account deficit had risen to about 8% of GDP in 2002, and continues to pose a threat to Latvia’s external sustainability. The prudential framework has been aligned with international standards and the authorities have made progress in fighting corruption.

2. Significant challenges to expanding Latvia’s economy remain. The Ministry of Economy has noted that, “Provided the current pace of economic growth, Latvia has little hope to move towards the group of economically developed countries.” There is a need to grow at a faster rate—possibly 7% to 8% per year, so that living standards in Latvia will approach those of its neighbors in Western Europe in the next few decades.

3. The Government of Latvia envisions that in 15–20 years, Latvia will be a member of the European Union, and that knowledge-intensive business sectors will be the catalyst to achieve this. The prime argument used by authorities to justify their vision is that Latvia simply cannot pursue a traditional economic development model. “Taking into account the limited natural resources, small capacity of the economy and small scale of the market as well as the unfavorable demographic conditions the most realistic development path for the economy which can ensure the necessary GDP growth rate is active use of knowledge and high technology, moving emphasis from the labor-intensive towards a knowledge-intensive economy.” Today, the government believes strongly in promoting the development of foreign and domestic companies in knowledge-intensive sectors, such as information-communications technology (ICT), electronics, materials sciences, pharmaceuticals and biotechnology, and wood chemistry.

B. OBJECTIVES AND SCOPE OF THE REPORT

4. The objective of this report is to assist the Government of Latvia in its effort to develop economic policies that will promote knowledge-intensive business sectors. The report will outline specific issues and policy options needed in the short term to achieve the objectives outlined in a variety of recent national strategy documents.

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2 Op. cit, p.4
5. FIAS assistance is part of a larger, global effort the government is undertaking, with support from several stakeholders. The government has already developed its own ideas for pursuing its vision, and it benefited from recent studies such as those that were sponsored by the European Union. The World Bank has reviewed the educational system; it is currently studying the labor market, and is initiating a global analysis of the so-called knowledge economy. As a result, this study voluntarily omits some important elements that should be included in the government’s overall strategy. It will not, for example, review the educational system, although the report includes a brief examination of the basic links between Latvia’s business community and its educational system. Nor does it examine the issue of how to finance joint venture initiatives or pioneering companies. While these issues are crucial in the development of knowledge-intensive sectors, they have been or will be covered by other studies.

6. This report focuses on what can be done in the business environment to enhance the development of knowledge-intensive sectors. Such a focus is justified on the grounds that the quality of the business climate affects private sector behavior, which in turn, influences its propensity to finance and conduct research and training activities. The focus is also justified on the grounds that an attractive investment climate will attract foreign firms, and small and medium enterprises (SMEs), which are sensitive to the quality of national policies that affect business. In the absence of an attractive business climate, foreign firms will choose to locate elsewhere, and SMEs will remain in the informal sector, and will result in restrained technological development.

7. Throughout the report, special attention is given to the role of foreign direct investment, or, more generally, to the need of integrating the local economy into the world economy. Recent international experience has proven that such integration is crucial for countries such as Latvia that are not at the top of the technological frontier (Box 1). Foreign direct investment (FDI) has been well documented as being a determinant in the development histories of Chile, Malaysia, and Singapore. Exports also played a crucial role in these countries, providing an opportunity to exchange purchased imported technology, which was otherwise unavailable in the local economy. South Korea, for example, sought development in the 1960s and 1970s partly by authorizing the licensing of strategic alliances with international businesses. South Korea was the beneficiary of direct policies by the United States and Japan that made technologies available to South Korea as part of a larger geopolitical strategy, and

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Box 1: FDI as a source of technology

FDI can provide technological transfers if local companies can copy and imitate technology used by affiliates of foreign firms operating in the local market, or if backward or forward linkages with the foreign firm lead to inter-industry technology upgrading (vertical spillovers), or by labor turnover. In Malaysia, about 40% of the affiliates of multinationals operating in the country have developed backward linkages with local suppliers, leading to significant technology transfers and productivity gains.


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3 PHARE, Support to Industrial Cluster Restructuring, 2002.
South Korea began pursuing its development strategy long before the new era of intellectual property rights protection that we now live in. It may not be possible to seek such a development strategy nowadays.

8. Regardless of the whether Latvia’s development is spurred by foreign investors or local partners who transfer technology, functionally, the development of an attractive business climate must follow the same track—that is, integrating the local economy into the global production system. The development of linkages with foreign partners, markets, or both should lie at the essence of Latvia’s development strategy.

9. The report first assesses the current state of technological development in Latvia. Chapter II examines what the government can do to improve the business environment and, thus, enhance knowledge-intensive activities. Chapter III examines the complementarities between foreign and local capital. Recent international experience has shown that technology transfer is the most important channel for local companies to upgrade their technological capacities. Chapters IV and V discuss ICT and the electronic sectors. Because Latvia is a small economy with limited resources, the government has adopted a strategy similar to that of Chile and Finland, for example, which is to select a few priority sectors (i.e., ICT, electronics, materials science, biotechnology, and wood chemistry).
CHAPTER I
WHERE DOES LATVIA STAND? CHALLENGES AND PERSPECTIVES

10. The Latvian government has developed a strategy to become a knowledge-intensive economy by 2010. As a starting point, it is useful to assess the current state of technological development in Latvia, and the potentials for the development of such future activities by examining a few key characteristics that have been identified in the current economic literature—labor, education, technological infrastructure, research and development efforts, and the degree of economic openness. Such an assessment should help identify the challenges and opportunities faced by the Latvian government.

A. KNOWLEDGE-INTENSIVE SECTORS IN LATVIA

11. First, it is necessary to define these sectors. Although it is somewhat difficult to define the sectors because knowledge of different degrees is included in all economic activities, FIAS has adopted the government’s definition of knowledge-intensive sectors: a) ICT, b) electronics, c) materials science, d) wood chemistry processing, and e) biotechnology/pharmacology.

12. For the most part, these sectors remain marginal in the Latvian economy. A recent estimate by the Ministry of Economy notes that the knowledge-intensive economy constitutes about 17% of GDP.\(^4\) Although FIAS has not been able to confirm this evaluation, the figure is probably high because it includes the privatized telecommunications company. The relative marginal contribution of the knowledge-intensive sectors is further confirmed by the relative low employment in the high-technology sectors, which is estimated at about 2.2% of the total Latvian workforce, against an average of 3.6% among existing and future EU member countries (Figure I-1).

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\(^4\) Ministry of Economy, op. cit, p.22
13. Whereas the high-tech sectors appear relatively marginal in the Latvian economy, it is difficult to gauge whether there has been a strong push toward developing them. In terms of GDP growth between 1995 and 2001, the most dynamic sectors have been those associated with natural resources, such as wood and its derived products (e.g., the pulp and paper manufacturing industries grew by 210%, wood processing grew by 176%). Nevertheless, it is worth noting that a few knowledge intensive sectors such as electrical machinery and apparatus manufacturing, and publishing, printing, and reproduction of recorded media have grown by more than 50% in the past 5 years.

14. The comparisons made in the previous paragraph could be misleading because they are based on aggregate figures. It takes time for production values to capture new trends and technological advances. For these reasons, FDI is potentially one of the most important channels through which knowledge can be diffused and enhanced in Latvia. Furthermore, foreign firms are expected to be among the first to capture opportunities in the knowledge-intensive sectors in Latvia’s new, liberal economy.
Table I-1: FDI stock in knowledge-intensive sectors, 2001

<table>
<thead>
<tr>
<th>Sector</th>
<th>In Millions of Lat</th>
<th>Total FDI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publishing/Printing</td>
<td>1.4</td>
<td>0.1%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>22.9</td>
<td>1.5%</td>
</tr>
<tr>
<td>Rubber/Plastic products</td>
<td>4.3</td>
<td>0.3%</td>
</tr>
<tr>
<td>Electrical/Electronic equip.</td>
<td>4.1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Precision instruments</td>
<td>1.1</td>
<td>0.1%</td>
</tr>
<tr>
<td>Post/Telecommunications</td>
<td>117.2</td>
<td>7.8%</td>
</tr>
<tr>
<td>Computers</td>
<td>9.3</td>
<td>0.6%</td>
</tr>
<tr>
<td>Research &amp; Development</td>
<td>1.0</td>
<td>0.1%</td>
</tr>
<tr>
<td>Education</td>
<td>0.3</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>161.6</strong></td>
<td><strong>10.8%</strong></td>
</tr>
<tr>
<td>Excl. telecommunications</td>
<td>44.4</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

Source: UNCTAD

15. Overall FDI flows have increased 10-fold in Latvia over the past decade, reaching about US$400 million in 2000. Using FDI as a percentage of GDP as a regional comparison shows that Latvia is in the middle range of Central European countries, at par with Hungary and Poland, greater than Lithuania but lower than the Czech Republic and Estonia. A closer examination by sector reveals that the bulk of FDI has been allocated to low-technology sectors (Table I-1). As of 2001, apart from the telecommunications sector (which mainly reflects the privatization of the telecommunications company—Lettelkom), only a few foreign investments have been made in Latvia’s knowledge-intensive sectors, and those accounted for only 3.0% of total FDI.

16. The relative marginal importance of the knowledge-intensive sectors also emerges from an examination of export data. FIAS estimates that high-tech sectors represented only 12.7%\(^5\) of total exports from Latvia in 2001, much lower than the average of 30%–50% in EU countries (Table I-2). The bright side of the story, however, is that export penetration of the sectors grew about twice as fast as total exports between 1999 and 2001, and they have gained competitiveness in the past few years.

17. This rapid assessment indicates that Latvia is not yet a knowledge economy, yet the knowledge-intensive sectors in Latvia offer some advantages, as will be reviewed in the next section.

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\(^5\) The Government of Latvia notes that this figure is lower, not exceeding 6% of total exports. See National Concept on Innovation, p.2.
Table I-2: High-tech exports in Latvia

<table>
<thead>
<tr>
<th></th>
<th>2001 Share in Total Exports (%)</th>
<th>2001 Growth (1999=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical machinery/ apparatus</td>
<td>3.3</td>
<td>127.6</td>
</tr>
<tr>
<td>Machinery, other than electrical</td>
<td>3.1</td>
<td>151.5</td>
</tr>
<tr>
<td>Medicinal/pharmaceutical products</td>
<td>2.8</td>
<td>106.2</td>
</tr>
<tr>
<td>Transport equipment</td>
<td>1.7</td>
<td>175.3</td>
</tr>
<tr>
<td>Chemical materials and products</td>
<td>0.9</td>
<td>134.8</td>
</tr>
<tr>
<td>Scientific/control instruments</td>
<td>0.5</td>
<td>114.3</td>
</tr>
<tr>
<td>Chemical elements/compounds</td>
<td>0.4</td>
<td>115.5</td>
</tr>
<tr>
<td>Explosives/pyrotechnic products</td>
<td>0.01</td>
<td>89.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12.7</td>
<td>130.9</td>
</tr>
</tbody>
</table>

Source: The World Bank

B. KNOWLEDGE ECONOMY: POTENTIALS

18. International experience has emphasized four key pillars for developing a knowledge economy: a labor force with a high education, a system that favors research and development, easily accessible information technologies, and an open economy that leads to greater trade and foreign investment. Latvia’s relative position as a knowledge economy can be assessed with a benchmarking methodology using 70 quantitative and qualitative variables developed by the World Bank Institute. The main results are summarized in Annex A.

19. The Latvian economy is not yet on par with those of the most developed economies (Table I-3). For example, France and Germany are uniformly ranked higher than Latvia in the four dimensions mentioned above. Another comparison reveals that Ireland and Malaysia have been able to achieve technological development as indicated by their levels of high-tech exports, without being ranked clearly higher than Latvia in all four dimensions. Malaysia, for example, has higher education and communication rankings, but Malaysia spends much less than Latvia on research and development. Similarly, Ireland receives a higher ranking for its information technology and research and development sectors, but it is far above Latvia in terms of educational attainment (and ranks approximately at the level of Russia, for example). These examples demonstrate that a significant development in knowledge intensive sectors can be achieved without offering necessarily the best conditions in all dimensions. It might be sufficient to reach a good level in all of them and, then to offer at least one strong comparative advantage.

---

6 See Kevin Cleaver, A Preliminary Study to Develop a Knowledge Economy in EU Accession Countries January 2002.
Table I-3: Comparison of international indicators

<table>
<thead>
<tr>
<th></th>
<th>Scientific education</th>
<th>Research &amp; development</th>
<th>Communications technology</th>
<th>High-technology total exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>117</td>
<td>133</td>
<td>200</td>
<td>133</td>
</tr>
<tr>
<td>Estonia</td>
<td>167</td>
<td>100</td>
<td>233</td>
<td>233</td>
</tr>
<tr>
<td>France</td>
<td>200</td>
<td>467</td>
<td>433</td>
<td>367</td>
</tr>
<tr>
<td>Germany</td>
<td>217</td>
<td>633</td>
<td>533</td>
<td>233</td>
</tr>
<tr>
<td>Hungary</td>
<td>100</td>
<td>100</td>
<td>167</td>
<td>233</td>
</tr>
<tr>
<td>Ireland</td>
<td>150</td>
<td>200</td>
<td>267</td>
<td>800</td>
</tr>
<tr>
<td>Latvia</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Lithuania</td>
<td>100</td>
<td>133</td>
<td>167</td>
<td>67</td>
</tr>
<tr>
<td>Malaysia</td>
<td>450</td>
<td>33</td>
<td>467</td>
<td>867</td>
</tr>
<tr>
<td>Poland</td>
<td>83</td>
<td>133</td>
<td>167</td>
<td>33</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>150</td>
<td>300</td>
<td>300</td>
<td>200</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>183</td>
<td>500</td>
<td>433</td>
<td>467</td>
</tr>
<tr>
<td>United States</td>
<td>317</td>
<td>1367</td>
<td>1000</td>
<td>567</td>
</tr>
</tbody>
</table>

Source: The World Bank and FIAS calculations.

Note: The indicators have been normalized around Latvia (100) to facilitate the comparison.

20. Another comparison of Latvia and the other Baltic countries is useful. Basically, Latvia appears to be slightly more advanced than Lithuania in terms of hi-tech exports, but weaker in communication technology and R&D efforts. Estonia ranks higher than either Latvia or Lithuania in its education and communications infrastructure, and in total high-technology exports.

21. The private sector has not played an active role in the development of Latvia’s knowledge economy. Furthermore, private sector financing for R&D activities in Latvia is among the lowest in Europe, accounting for only 0.2% of GDP, against an average of 1.3% in EU member and candidate countries (Figure I-2). The level of registered patents is also relatively low, at 2.5 per million persons in Latvia in 2000, compared with 152.6 per million persons in the EU. The patent indicator captures new knowledge created anywhere within a firm, not just within a formal R&D laboratory.
Figure I-2: R& D business expenditures in Europe (% of GDP)

Source: EU Scorecard.
CHAPTER II
IMPROVING THE BUSINESS CLIMATE
TO ENHANCE THE KNOWLEDGE ECONOMY

22. The Latvian government envisions that the knowledge economy will be the engine for its diversified, future growth. Although this focus is partially justified in view of Latvia’s current comparative advantages, authorities are aware that to achieve the vision requires a better education system, an ICT infrastructure, and the institutional framework to promote research and development. The level of private sector research and development in Latvia is one of the lowest in Europe. Linkages between research activities and business have been rare, and the paucity of private participation in the knowledge economy needs to be addressed quickly.

23. The focus of the chapter is to review the obstacles that impede the development of a knowledge economy. FIAS believes that the marginal involvement of private firms in R&D and training activities is partially explained by the business environment. For example, many investors reported that export activities remain stifled by administrative obstacles and tax asymmetries. Similarly, access to skilled labor is complicated by the absence of training policies and restrictions on the use of expatriates.

A. OVERALL BUSINESS CLIMATE: GENERAL DIAGNOSIS

24. Latvia has made considerable advances to ensure a stable macroeconomy in the past few years; these have been described in recent studies. When measured by a variety of indicators used by the international business community (Table II-1), Latvia ranks higher than most former CIS countries, about even with Lithuania, and slightly lower than Estonia, Hungary, and the Czech Republic. Corruption appears to be greater in Latvia than in all the countries included in our sample, and the Latvian authorities have initiated legal and institutional reforms to address the issue.

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7 For example, see FIAS and Latvian Development Authority (LDA), Update of the Administrative Barrier Study, January 2003.
Table II-1: Indicator comparison of the investment climate, 2001

<table>
<thead>
<tr>
<th>Country</th>
<th>Overall Economic Intelligence Unit Score</th>
<th>Overall Score Heritage Foundation Economic Freedom Index</th>
<th>Overall Political Stability (World Bank Institute)</th>
<th>Absence of Corruption (World Bank Institute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Rep.</td>
<td>33</td>
<td>3.8</td>
<td>62.8</td>
<td>21.1</td>
</tr>
<tr>
<td>Estonia</td>
<td>43</td>
<td>3.7</td>
<td>61.8</td>
<td>50.2</td>
</tr>
<tr>
<td>Finland</td>
<td>—</td>
<td>3.8</td>
<td>136.3</td>
<td>155.0</td>
</tr>
<tr>
<td>France</td>
<td>—</td>
<td>3.65</td>
<td>88.5</td>
<td>79.0</td>
</tr>
<tr>
<td>Germany</td>
<td>—</td>
<td>3.8</td>
<td>102.5</td>
<td>95.0</td>
</tr>
<tr>
<td>Hungary</td>
<td>39</td>
<td>3.1</td>
<td>63.4</td>
<td>45.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>—</td>
<td>4.1</td>
<td>105.2</td>
<td>80.1</td>
</tr>
<tr>
<td>Latvia</td>
<td>53</td>
<td>3.3</td>
<td>42.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Lithuania</td>
<td>60</td>
<td>3.0</td>
<td>24.6</td>
<td>13.5</td>
</tr>
<tr>
<td>Malaysia</td>
<td>33</td>
<td>3.4</td>
<td>25.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Poland</td>
<td>34</td>
<td>3.2</td>
<td>58.4</td>
<td>29.9</td>
</tr>
<tr>
<td>Singapore</td>
<td>13</td>
<td>4.6</td>
<td>122.3</td>
<td>147.2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>—</td>
<td>4.2</td>
<td>93.6</td>
<td>128.6</td>
</tr>
<tr>
<td>United States</td>
<td>—</td>
<td>4.2</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: A higher figure indicates a better score, except for overall economic intelligence.

25. Improving the overall business environment should remain a priority for the Latvian government because the firms that are likely to be the main sources of knowledge development and diffusion are also the most sensitive to the quality of the business environment. Foreign firms can choose between multiple locations and will opt to establish a business in the country that offers the best returns for the lowest risk. Competition for business is especially keen in the knowledge industries because multinational firms are relatively mobile and tend to relocate rapidly in a short period of time. Another source of knowledge is small local firms that emerge from academic research or government sponsored activities. These firms are notably unequipped to face a difficult investment environment. Excessive administrative barriers can discourage them, forcing them to remain in the informal sector, or simply canceling their investment plans.

26. Recent experience reveals that governments need to encourage private firms to operate in the knowledge industry. A case can be made for government involvement because of the positive externalities associated with technology innovations or transfers (Box II-1).

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8 For additional information, see, for example, C. Fine, “Benchmarking the Fruit Flies: Clockspeed-Based Principles for Supply Chain Design,” MIT Sloan School; 1998.
B. **OBSTACLES IN THE INVESTMENT CLIMATE THAT HINDER THE DEVELOPMENT OF KNOWLEDGE-INTENSIVE SECTORS**

27. In a series of interviews with private operators and government officials, FIAS has identified two issues that need to be addressed in the investment climate. The first consists of barriers against the development of small and medium enterprises as well as exporters—including foreign firms. The second focuses on market failures that have been identified by the private sector, including the lack of coordination between partners and the absence of government support for training programs and R&D expenses.

1. **Lack of a Focal Institution**

28. Developing a knowledge economy requires a prolonged and transversal effort that involves multiple partners, including the government, research institutes, as well as private and possibly multinational organizations. This multilevel effort is difficult to design and sustain over a long period of time.

29. Although Latvia offers important elements of an innovation system, including universities, state research institutions, a business community, and a set of institutions that aim to support technology applications, it has so far not managed to bring the various elements of its innovation infrastructure to effectively interact and cooperate in a systematic way within a coherent and coordinated framework that links the research and development community with the enterprise community. Latvia is thus forgoing considerable potential to translate knowledge into commercial, wealth-generating activities.

30. Today, the private sector complains about the absence of a focal institution that could lead the development of the knowledge economy in Latvia. There is no clear perception of which institution should lead in this effort, nor is there a sense of whether the private sector is directly involved in the process. There have been a few initiatives such as the Technology or Science Park, but it is not yet clear to what extent

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9 See for example the report from Latvian-Swedish Phare on the concept of the Latvian Science Park, with a focus on a multimedia Institute. This report emphasizes the need to improve interactions between Latvian enterprises and representatives of higher education.
these initiatives will result in a coordinated and participative approach that includes all the major stakeholders in Latvia.

2. Biases against SMEs and Exporters

31. Small and medium enterprises and export-oriented companies have pointed to several issues that affect the cost of doing business in Latvia. Many exporters report serious delays at the Russian border and a lack of cooperation by Russian customs officials. Similarly, many firms complain about the need to modernize the roads and the Riga port, which is still not up to the standards of most modern ports. The Latvian government cannot do much to remove these obstacles in the immediate future, and its incapacity to do so reinforces the urgency to address other issues that were raised by the Latvian private sector.

32. Among one of the most important obstacles are the administrative difficulties associated with exports and imports; this issue has been raised by many investors and has been described in a recent FIAS report on administrative barriers. Export/import processes take excessive time compared with those in Scandinavia or East Asia. The knowledge-intensive sectors will be especially sensitive to these delays because of the nature of their operations—requiring just-in-time delivery and adaptability. There is an increasing demand from private entrepreneurs for a more rapid service, and the responsible institutions (i.e., customs, SBI, and border guards) must satisfy the demand if Latvia is to realize its geographical advantage and economic potential. To illustrate the growing speed of transactions, the port of Rotterdam, for example, clears a container every 6 seconds, whereas the customs service at the Brussels airport clears 50,000 express parcels each night.

33. Exporting activities are also burdened by the excessive time required by firms to obtain a VAT reimbursement. Authorities have become aware of this additional cost for exporters and are now providing a VAT exemption to firms that import equipment and capital goods. This exception, while reducing the cost for these firms, introduces a bias against capital goods produced locally that continue to be subject to the VAT.

34. In a survey by FIAS of about 400 firms in Latvia, many exporting companies complained about their lack of reputation on international markets and the difficult of accessing information on foreign markets and potential partners (Table II-2). These issues are apparently more important than improving access to financing or reducing trade barriers.

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11 In order to limit the negative impact on local goods, the authorities must approve the exemption before the operation and they have listed the goods that do not qualify for the exemption.
Table II-2: Factors preventing firms from entering Scandinavian, EU, and US markets or from expanding exports

<table>
<thead>
<tr>
<th>Factors</th>
<th>Firms that rated the factor as somewhat or very important (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of experience and marketing skills</td>
<td>48.4</td>
</tr>
<tr>
<td>Lack of information about the markets/potential customers</td>
<td>46.9</td>
</tr>
<tr>
<td>Lack of a recognized brand name</td>
<td>43.2</td>
</tr>
<tr>
<td>Lack of access to new technologies</td>
<td>38.5</td>
</tr>
<tr>
<td>Lack of export credit</td>
<td>37.5</td>
</tr>
<tr>
<td>Technical/sanitary standards</td>
<td>31.8</td>
</tr>
<tr>
<td>The price of our product is too high</td>
<td>29.1</td>
</tr>
<tr>
<td>Trade barriers imposed by other countries</td>
<td>28.3</td>
</tr>
</tbody>
</table>

Source: FIAS survey.

35. Most government officials recognize the importance of using a well respected certification process to enhance a firm’s reputation on international markets, and they agree that it is also a relatively expensive, at least for small firms. Several observers indicated that most Latvian entrepreneurs seem to lack a general understanding of the need for certifying their production processes according to international standards. Adopting quality standards that are highly recognized in the business world has become critically important in the knowledge-intensive sectors because it contributes to greater credibility and a better reputation in international markets.

36. Several obstacles exist in the development of SMEs, including the tax system. If the tax system appears relatively efficient, with a corporate income tax of only 19% (since early 2003), it provides disproportionate tax incentives to large projects (greater than US$15 million). In the view of FIAS, there is no reason to favor large projects, because two projects worth US$7.5 million are as good as one project worth US$15 million.

3. Access to Skilled Labor

37. While overall indicators show that the general level of education is good in Latvia, the private sector has raised three potential dangers that may prevent the development of a knowledge-intensive sector:

- Decreasing technical capacity. Latvia had developed a long tradition of research when it was part of the Soviet Union, but its capacity has been diminishing in recent years. More lucrative opportunities in business and law have been attracting younger students at the expense of technical and science careers.

- Excess demand in a few sectors. The recent boom in the software industry has led to a significant increase in the salary costs of engineers and technicians. Several local and foreign firms have reported that local wages are already not
competitive with those in Belarus and Ukraine, and some firms have begun or are considering outsourcing some of their activities to these countries.12

- Language. Although Latvia has the largest Russian minority of any Baltic country, the Russian language is being used less and less by the younger generation, which might become a problem for companies that are interested in expanding in the former CIS markets. Simultaneously, the English language, while improving rapidly among the youngest employees, is not yet well used in the general workforce.

38. The difficulties of hiring qualified staff in the domestic market was confirmed by more than 88% of firms in the FIAS survey, which was conducted January through April 2003 (Figure II-1).13 Respondents in knowledge-intensive sectors were much more concerned with their inability to find technical workers, managers, and information technology staff than were companies in other sectors. About one-third of firms mentioned problems with finding employees who speak foreign languages.

![Figure II-1: Difficulties in hiring qualified staff](image)

Source: FIAS survey.

39. These issues will need to be addressed by education policies, and recent international experience has shown that two main channels exist to help alleviate them. The first consists of training opportunities for the local workforce by firms, whereas the second emphasizes the importance of bringing in skilled workers from abroad. Latvian companies must recognize that in order to bridge the skill gaps, they must themselves

---

12 The existing pressures on the labor market for knowledge intensive activities reflect the higher net employment changes over the past few years. It can be estimated that the net job creation rate exceeded the job destruction rate by about 4.6% in the chemical sector and by about 2.6% in the computer and related activities between 2000 and 2001. By comparison, the net employment change was only 0.3% in all sectors of the economy.

13 See next chapter for details on the survey.
invest in education and training. Currently, only a few companies are actively involved in training activities. Among them, Dati, an ICT company, has opened a technical school for engineers and software developers.

40. The role of multinational firms that offer direct training to their workers cannot be underestimated. Knowledge will accumulate as human capital diffuses internally into the local market when an employee leaves a foreign firm to work with a local firm or to start up a new business. In this context, the flexibility of the labor market and the efficiency of financial markets play a crucial role in determining internal knowledge diffusion.

41. Since 1999, significant administrative streamlining has been achieved in the issuance of immigration permits. Today, it seems relatively easy for most firms operating in Latvia to hire expatriates, especially at the management level. Still, several companies have reported that it remains difficult to contract workers who are not at the management level, even for short period of time. This constraint penalizes them because these workers are also those who are likely to bring the highest expertise and training to local workers.

4. Limited Involvement of the Private Sector in R&D

42. Only a limited number of private enterprises are directly involved in R&D activities in Latvia. Only one-third of the firms in the FIAS survey (about 120 enterprises) have developed some kind of internal R&D capacity. There have been a few successful cases; for example, Siemens has developed two regional centers of excellence for microwave data transmission and indoor networking solutions. More examples in the ICT and electronic sectors are described in the last two chapters of this report.

Table II-3: Total R&D expenditures: difference between Latvia and a few other countries

<table>
<thead>
<tr>
<th></th>
<th>Latvia</th>
<th>United States</th>
<th>Germany</th>
<th>Switzerland</th>
<th>Czech Republic</th>
<th>Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public R&amp;D</td>
<td>1</td>
<td>3151</td>
<td>651</td>
<td>80</td>
<td>13</td>
<td>56</td>
</tr>
<tr>
<td>Private R&amp;D</td>
<td>1</td>
<td>14122</td>
<td>2358</td>
<td>328</td>
<td>28</td>
<td>224</td>
</tr>
<tr>
<td>Total R&amp;D</td>
<td>1</td>
<td>7629</td>
<td>1348</td>
<td>181</td>
<td>19</td>
<td>125</td>
</tr>
</tbody>
</table>

Source: EU.

Note: R&D amounts were calculated in US dollars and then normalized to 1 for Latvia. For example, the amount spent on public R&D was 651 times higher in Germany than it was in Latvia.

43. Research in Latvia is insufficiently funded. Even considering relative size of the economy in GDP, total R&D expenditures are among the lowest in Europe, reaching only 0.4% of GDP, of which private funding accounts for half. As a comparison, EU countries spend, on average, 2.0% of GDP on total R&D and 1.3% on private R&D (i.e., 4–6 times more than Latvia using GDP for comparison). It is also revealing to compare spending in

\[14\] Currently a new Immigration Law is being drafted to replace the 1992 Law and it will govern immigration procedures, including expatriate employment and residency. This draft law has been prepared in the context of aligning Latvian legislation with that of the EU.
absolute values because many experts believe that a country needs to reach a critical level of R&D expenditures to become a player in a particular field due to associated high entry costs. In terms of U.S. dollars, it is estimated that Latvia spends about 7,600 times less than the United States, the world’s R&D leader. Smaller countries, such as Finland and Switzerland, spend approximately 181 and 130 times more in absolute values than Latvia. At the regional level, even the Czech Republic spends approximately 19 times more than Latvia (almost 30 times more if one compares only private R&D expenses).

5. Weak Relations between Public R&D and Business

44. Not only has the private sector played a relatively minor role in research activities, but many observers have also noted the near absence of relations between the academic and business communities. Today, there is no contact point for a private investor who wants to fund research and to link it to a business activity. Private investors have also emphasized that developing, acquiring, or funding research activities is arduous because of high transaction costs for private firms. It can be difficult, for example, to find the appropriate suppliers of a certain technology. The cost of finding these suppliers may be so high that they actually represent a barrier to the acquisition of the technology. Furthermore, information about the quality of a technology or the risks associated with it is often unavailable or asymmetric.

45. These obstacles are not unique to Latvia. For these reasons, many countries have implemented an institution or a web of institutions that aim to improve the coordination and diffusion of research efforts. Such an institutional framework does not yet exist in Latvia. Another factor in the lack of coordination has been is that researchers or academic institutions have few incentives to implement their innovations. Practically all research in universities is financed by state budget funds, which are allocated to universities as lump sums. These funds are allocated further to established departments, largely on the basis of historically established norms (based on the number of students and past allocations). Funding is generally given to institutions and not to individuals, and as such, it is often used for heavy infrastructure. This allocation system contributes to making university research unresponsive to industry demands. In addition, there is insufficient management ability within existing research institutions. This has resulted in a failure to fully and effectively commercialize results, attract funding from non-public sources, and support commercially viable applied research.

46. Despite the harmonization of the legal framework in an effort to protect intellectual property rights, many entrepreneurs and researchers still do not see the value of such protection. An example can be found in the limited use of patents, which have been rarely used by research institutes. The number of patents registered by residents in Latvia averages around 160 per year, versus 600 in the Czech Republic and 800 in Hungary.15 Ambiguities still exist as to who owns the intellectual property rights for government-funded research and development projects. Many representatives of research institutes are unclear on who holds the responsibility for patenting innovations and their

15 Latvia ranks higher than Estonia and Lithuania.
potential commercial use. This ambiguous ownership status hampers commercialization and deters potential foreign investments in Latvia’s intellectual resources.

C. RECOMMENDATIONS FOR IMPROVING THE BUSINESS CLIMATE

47. What can be done to improve private sector involvement in the development of Latvia’s knowledge economy? Preliminary guidance can be found in the results of a survey of the private sector (Table II-4). These views are indicative but not conclusive because they reflect the interests of the private firms, which are not necessarily those of the economy as a whole. The most obvious example lies in their request to get additional tax incentives, which are of course beneficial to the firm but might be detrimental to the State because of fiscal losses and economic distortions.

Table II-4: Views from the private sector—government actions

<table>
<thead>
<tr>
<th>Knowledge-intensive sectors*</th>
<th>Other sectors*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create tax incentives for R&amp;D</td>
<td>56</td>
</tr>
<tr>
<td>Lower tariffs on intermediate inputs</td>
<td>46</td>
</tr>
<tr>
<td>Subsidize participation in international trade shows</td>
<td>44</td>
</tr>
<tr>
<td>Offer grants to acquire technologies</td>
<td>44</td>
</tr>
<tr>
<td>Provide financial support for ISO certifications</td>
<td>44</td>
</tr>
<tr>
<td>Offer grants for R&amp;D</td>
<td>41</td>
</tr>
<tr>
<td>Subsidize employee training</td>
<td>41</td>
</tr>
<tr>
<td>Provide financial support to obtain patents abroad</td>
<td>38</td>
</tr>
<tr>
<td>Provide financial support to obtain patents in Latvia</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: FIAS survey.
*Percent of domestic firms indicating a desire for this type of assistance

48. The main recommendations for improving the business climate are summarized in Table II-5, and should be viewed as proposals for further discussions. Using international best practices, FIAS has developed several options with an emphasis on the costs and the benefits associated with each of them. When EU structural funds become an important funding instrument to develop the knowledge economy, the policymakers must be able to guide the new economy’s formulation and implementation. FIAS suggests that these funds should be used first to support training programs in the workplace, because their absence is a crucial missing element in the government’s strategy.

16 For details of the survey, see Chapter III.
Table II-5: Summary of main recommendations

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish an Institutional focal point</td>
<td>• Establish a technology council</td>
</tr>
<tr>
<td>Remove barriers to exporters and SMEs</td>
<td>• Streamline administrative barriers for exporters and SMEs • Eliminate distortions in the tax system and fiscal incentives • Support adoption of quality standards</td>
</tr>
<tr>
<td>Facilitate access to skilled labor</td>
<td>• Implement training support by firms • Facilitate hiring of foreign workers in specific positions and areas</td>
</tr>
<tr>
<td>Encourage private R&amp;D</td>
<td>• Strengthen the application of intellectual property rights legislation • Avoid using tax incentives • Exercise caution in using matching grant schemes on large scale</td>
</tr>
<tr>
<td>Strengthen relationship between firms and research</td>
<td>• Coordinate and facilitate information flows • Revise intellectual property rights legislation to encourage patents and commercialization by researchers and institutes • Avoid use of tax incentives</td>
</tr>
</tbody>
</table>

49. Although recent experience around the world reveals that many governments play an active role in promoting knowledge and technological innovations, FIAS remains prudent in defining and developing such a role for Latvia. First, innovations must avoid increasing the complexity of the current system and they must not offer additional opportunities for corruption in the private and public sectors. When the authorities seek to reduce corruption, this consideration must not be ignored. Second, the authorities have multiple options and tools at their disposal, ranging from tax incentives, to training subsidies, to financial support. These options have differentiated effects, and so they must be carefully evaluated by the policymakers. FIAS strongly recommends that Latvia first focus on improving the training and skills development of its citizens for a variety of reasons that are detailed in the remainder of this chapter.

1. Establish an Institutional Focal Point

Recommendation 1: Establish a council for the development of a knowledge economy with strong participation from the private sector and a clear institutional attachment to the highest policy level.

50. There is a need to create an institution to better coordinate the effort to develop a knowledge economy in Latvia. Although several diverse stakeholders have been involved in the work, no focal or strategic institution has yet taken the lead in elaborating and implementing the actions that would pave the way toward a knowledge economy.
51. The government has been considering implementing the national program on innovation under the responsibility of the Minister of Economy, or, alternatively, the Minister of Education and Science. FIAS believes that if these two ministries become major players, that they should not become the focal institution. Creating a knowledge economy will involve multiple ministries and agencies as well as diverse partners from the private sector and the academic community, all of which requires a higher institutional attachment.

52. Most European countries have created national science and technology councils that provide advice to the prime minister, the parliament, or the government as whole on strategic issues associated with research and development, or more generally, the national innovation system (Box II-2). In most countries, the science and technology councils have proven to be effective instruments in preparing innovative plans, proposals, and statements for the highest political levels. Such councils are intended to build a common understanding and consensus on basic guidelines for innovation policy, on enhancing research-business community partnerships, and increasing awareness and the visibility of the role of innovation.

53. FIAS recommends establishing a National and Technology Council in Latvia because it would send a strong message to the business and academic communities that the government is committed to improving the country’s knowledge economy. Because the council should be an interface mechanism for several players, its composition should include representatives of the government, the business community, and the research community. The private sector should be invited to join the agency not only as users of the expertise and services, but also as owners, financiers, and contributors to research.

54. The council should be chaired by the prime minister, and it should include representatives from ministries that have a major stake in R&D and innovations (e.g., Ministry of Higher Education and Science, Ministry of Economy, Ministry of Finance, Ministry of Interior). Ministry and agency representatives from the highest levels would be necessary for the government to reinforce its message. Because such a strategy would involve several ministries and agencies—from economy to education—it is important that the chairman be at a high enough level to able to arbitrate among participants.

17 The National Concept for Innovation, p. 7. There have also been discussions of creating an Innovation Forum, which would include some of the functions emphasized by FIAS.
Box II-2: Experiences of technology councils

Technology councils exist in many countries around the world. For example, Austria has a Council for Research and Technological Development, Belgium has its Federal Council for Science Policy, Denmark has the Council for Research Policy, Finland has its the Science and Technology Policy Council, France has the High Council for Research and Technology, Germany has the Science Council, Ireland has the Irish Council for Science, Technology and Innovation, The Netherlands has the Dutch Advisory Council for Science and Technology, and the United Kingdom has the British Council for Science and Technology.

Finland

Finland has had very good experiences with its Science and Technology Policy Council of Finland. The council was established in the 1960s and was re-organized in the late 1980s. The council is chaired by the prime minister, and it advises the government and its ministries on questions of science and technology. The council is responsible for the strategic development and coordination of Finnish science and technology policy and for the development of the national innovation system as a whole. Membership on the council consists of seven ministries and ten other members who are well versed in science and technology. The Council of the State appoints the members for a three-year term. The council’s secretariat consists of two full-time chief planning officers.

The council has brought high status to R&D and innovation on political agendas, guaranteed continued attention to R&D issues (even over periods of changing governments), and has helped to achieve consensus on strategic guidelines concerned with the growth and use of R&D resources. It has ensured a wide-based commitment to the implementation of strategic decisions. As a significant single act after Finland’s economic recession in the early 1990s, the council initiated a program in 1996 to increase government investments in R&D in the period 1997–1999 by a total of $250 million, which resulted in an increase of about 25% in the state’s annual research appropriations from 1997 levels. The funds necessary for these additional appropriations were obtained primarily from the partial privatization of state-owned companies.

Estonia

The Research and Development Council (TAN) in Estonia was recently reorganized. The idea has been to link the council firmly with the Ministry of Economic Affairs and the Ministry of Education, similar to the organization of the Science and Technology Policy Council in Finland. Both central ministries have R&D advisory bodies of their own. The council is chaired by the prime minister, and consists of ministers and high-level experts. In December 2001, the Estonian Parliament approved the Estonian strategy for R&D for the years 2002–2006. The principles of the strategy will be reviewed and updated by the government every three years, on the basis of proposals submitted by the Research and Development Council. This means that the council has become a central actor in the construction of the Estonian innovation system.

2. Removing Barriers against SME and Exporters

55. To address the obstacles that make it difficult for export-oriented and small and medium enterprises to expand their investments and ultimately contribute to the development of the knowledge economy, FIAS proposes a set of three actions.
**Recommendation 2:** Streamline administrative barriers to reduce delays in import/export transactions.

56. The recommendation is to accelerate the procedures associated with export and import activities. The pressures on businesses to compete for a share of the global market have placed greater demands on customs. The move by business to multi-sourcing and the adoption of just-in-time inventories require fast and assured clearance at the border. The challenge facing the customs administration is to construct an environment that fosters investment and trade while at the same time effectively addressing the growing contraband problem.

57. FIAS recognizes that significant changes have been undertaken to reform import and export procedures in the last 2 years, due largely to the activities of the Foreign Investors’ Council in Latvia ad hoc customs group, and those of the Latvian Customs Brokers’ Association and the Latvian Transit Business Association. The following are some reforms that have been implemented due to legislative change or streamlining of procedures:

- Recently, almost all implementing regulations relating to customs procedures have been adopted, in compliance with EU norms.

- The UNCTAD ASYCUDA++ electronic declaration and processing system has been introduced at customs control points.

- Improvements have been introduced to border crossing procedures to alleviate the lengthy time (often 3–4 hours) that carriers often had to spend on the Latvian borders, largely by defining the duties and responsibilities of the government institutions on the border (i.e., customs service, border guards, sanitary border inspectorate).

- Customs clearance procedures have been simplified and manuals have been prepared and made available to businesses.

58. A recent study of the administrative barriers to investment in Latvia\(^\text{18}\) showed that the authorities should do more to ensure that custom procedures comply with the best standards. Within this vision, the customs administration should shift its emphasis to voluntary compliance, including the implementation of periodic verification or periodic audits. A summary of recommendations is proposed in Table II-6.

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\(^{18}\) FIAS/LDA, op.cit.
Table II-6: Summary of recommendations for streamlining administrative barriers

- The customs administration should continue implementing the simplified customs procedures, first through pilot projects and then on a broader basis. It should constantly monitor and address the legal, technical, and organizational issues, and the problems that arise in the process of implementing and applying the simplified procedures.

- Implementation of the ASYCUDA system should be completed as soon as possible and the associated problems should be addressed in a timely manner. Adequate attention and resources should be devoted to fully implement a computerized system for processing customs declarations.

- The customs administration should continue to increase the transparency of customs procedures, including information on regulations, administrative guidelines, applicable procedures, and rulings to ensure that traders have all the pertinent information to make business decisions through making available standard mechanisms for accurate, consistent, and user-friendly information.

- The customs administration and the sanitary border inspectorate should consider introducing an e-mail bulletin for subscribers to inform them about changes in procedures, requirements, and other issues of interest to traders. This tool would allow the institutions to demonstrate a proactive and business-friendly attitude.

- It might be worthwhile to categorize the refusals in order to be able to track the recurring patterns and take appropriate action. The practice of the sanitary border inspectorate is a good example that could also be applied by the customs administration.

- Introduce clear appeals provisions in the customs administration to provide a means for business to challenge customs decisions, which they believe are erroneous or inequitable, by having standard mechanisms for transparent, independent, and timely appeals.

- The National Customs Board should design and implement similar tools as those used by the sanitary border inspectorate for recording and tracking different types of complaints and appeals submitted by affected persons. The National Customs Board should also prepare a clear decision-making process for appeals or complaints, and should inform the public at large about this process.

- It may be necessary to carry out an independent review of the natural resource tax, which is levied in the process of clearance of goods and to design proposals for its reform. The international donor community could assist in this task.

- The National Customs Board should critically evaluate and solicit feedback from the industry to determine what hinders implementation of the Baltic Transit Agreement, and prepare suggestions for changes either in the agreement itself or in the operational and implementing procedures and regulations, or both.

Source: FIAS/LDA.
**Recommendation 3:** Simplify the tax system by rationalizing incentive regimes granted to large projects and export-oriented enterprises, thereby eliminating the VAT exemption on imported capital goods, and accelerating VAT reimbursement to exporters.

59. Although the general tax system in Latvia is attractive, with a relatively low corporate tax rate of 19%, the government has introduced different tax regimes that apply to firms depending on the magnitude of their investments and their level of exports:

- Companies with investments greater than LVL 10 million benefit from a tax rebate equal to 40% of the amount invested—upon approval from the government.
- There exists a special taxation regime for exporting companies (at least 80% of their production) located in special economic zones.

60. FIAS advises the suppression of these two incentive regimes because they contribute to increasing the complexity of the system, without a clear positive effect on the level of investment. Most surveys reveal that investors are more interested in the simplicity and predictability of the tax system rather than generous tax incentives. Along these lines, FIAS is highly doubtful that these regimes make a significant difference on the investment decision of most firms, in light of the low corporate tax rate in Latvia. Eliminating the tax rebate granted to large investments appears also justified in the sense that there is no apparent reason to favor large projects at the expense of small projects.

61. The tax system should be further simplified by eliminating the VAT exemption on imported capital goods. Although this exemption provides a cash flow benefit for exporting firms (or startup companies), the costs associated with it are important, as is recognized by the customs administration. The VAT exemption for imported goods requires massive administrative controls and clearly places potential local producers of such goods at a disadvantage.

62. Simultaneously, the authorities should accelerate the reimbursement of VAT credit to exporters. While the private sector recognizes that the tax authorities have realized significant progress, delays still exist for some companies and operations. In a country such as Canada, it is estimated that more than 90% of the requests are processed in fewer than 30 days. This result should become the objective for the Latvian tax administration.

**Recommendation 4:** Enhance a firm’s reputation by facilitating the adoption of quality standards.

63. The adoption of well-recognized international standards is fundamental for the development of the knowledge-intensive sector in Latvia. Foreign buyers will refer to these standards when they are exploring partners in emerging countries. The issues faced

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by most local firms, especially the smallest ones, are twofold: First, they are not aware of the procedures required to qualify for such standards; and second, they do not have the human and financial resources to complete such procedures.

64. The Government of Latvia should contemplate a more active role by following the steps that South Africa took (Box II-3). Institutional support and select policy interventions have played an important role in the development of an internationally competitive automotive industry in South Africa. These policies have been particularly important in ensuring standards for the international market and enhancing quality competition. Institutions such as the South African Bureau of Standards, the Department of Trade and Industry, and various research and academic institutes all have a part to play in enhancing the competitiveness of the automotive industry.

### Box II-3: South African experience with standards

The South African Bureau of Standards (SABS) plays a critical role, especially for firms wanting access to international markets. Goods are inspected, tested, and analyzed in terms of compulsory specifications, and are tested in accordance with numerous international test methods. Individual firms may also set standards against which products can be tested by the SABS. Commodities that do not meet the specified requirements are rejected, or even destroyed. Testing and certification facilities at the SABS are increasingly being considered as a passport to export opportunities for South African companies, and collaboration between the SABS and various automotive firms has been an encouraging feature of the industry’s quest for international competitiveness.

Collaboration between the SABS and automotive firms has led to the establishment of various testing and certification facilities. One such example is the EuroType Test Centre (Pty) Ltd, a state-of-the-art laboratory that can perform vehicle exhaust emission testing to the most exacting European, American, and Japanese environmental requirements.

3. Improving Access to Skilled Labor

65. Improving labor skills is at the essence of adopting and developing technologies. Generally, firms have two choices. The first is to develop training capacities, the second is the use of (temporary) expatriate workers. These options are not discussed in this report, but they have been reviewed in other studies.

**Recommendation 5:** Promote training at the firm level by providing financial assistance.

66. International experience shows that the private sector plays a pivotal role in developing the skills of the local workforce, and it can do so by collaborating with the education system and by developing its own training capacities or by enhancing skills that employees acquire in the workplace. In both cases, the government should be actively involved because training benefits not only the company, but also the workers whose new knowledge diffuses to other workers and, eventually, to other companies.
Indeed, training is a public good that produces externalities for society. Without government support, it is likely that a firm will invest suboptimal resources in training.20

67. The Government of Latvia has not yet decided how to improve workplace training (except for training subsidies that unemployed persons receive). This quasi absence of involvement is viewed as having a negative effect on both the acquisition and diffusion of knowledge and on firms’ productivity. Several recent studies have shown that training has a positive and decisive effect on these two variables (Box II-4).

68. FIAS strongly recommends that the government carefully examine its options for assist the private sector to develop better training options. It should evaluate the costs and benefits associated with such programs, and clearly identify the causes that underlie the private sector’s lack of involvement in training. The choice of the policy instrument should be indeed closely related to the nature of the market failure. When poor information is the constraint, for example, the appropriate policy response is to disseminate best practices in training know-how and information on training availability and costs. High labor turnover rates may suggest that firms are unable to internalize the benefits of training because skilled workers can be hired by other firms, which leads to a cycle of training underinvestment.

69. FIAS has not been able to identify the specific reasons why private firms in Latvia have not yet developed in-service training,21 but we discuss two instruments that have been used around the world to promote training investments. The first instrument is payroll-levy training funds, the second is tax incentives for employer-sponsored training. FIAS recommends the first instrument for Latvia, which appears to be the most effective.

70. The Payroll Levy Grant System. The payroll levy is a common instrument used in both developing and developed countries for overcoming low investments in training (Box II-5). These employer-targeted training policies take many forms: 1) levy-grant schemes, in which fund administrators use earmarked levies to make grants to employers for approved training, as in Singapore and previously in the United Kingdom; 2) training levy rebate schemes, in which employers are partially reimbursed for approved training

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20 For a fuller discussion on market failures, see “Malaysia: Enterprise Training, Technology and Productivity.” World Bank; 1997.
21 The World Bank is currently undertaking a labor market study to better understand these reasons. One reason might be the high labor turnover observed in many firms; the job turnover rate in Latvia is considerable, reaching 15% in 2001.
out of their payroll levies, as in Malaysia and the Netherlands; and 3) levy exemption schemes in which employers are exempt from levy payments.

71. Whatever the schemes used, international experience with levies yields several lessons that Latvian policymakers can use for guidance. Five principles have emerged from international best practices, and are listed below (also see Box II-5 for examples).

Box II-5: Well designed levy-grant schemes can motivate firms to train

Several East Asian economies have used direct reimbursement of approved training expenses, funded through payroll levies, to encourage firms to train their employees. Successful schemes are flexible, demand-driven, and are often accompanied by an information campaign and technical assistance to smaller firms.

The introduction of such a scheme in Taiwan (China) led to dramatic increases in training, which continued after the program ended in the 1970s. Singapore uses a levy on the wages of unskilled workers to upgrade workers’ skills through the Skills Development Fund. The fund’s aggressive efforts to raise awareness of training among firms, to support development of company training plans, and to provide assistance through industry associations have led to a steady rise in training, especially among smaller firms. However, such schemes can also create disincentives to train when they are rigidly administered. In Korea, which required that training last a minimum of six months or that firms pay a fine, many firms paid the penalty rather than train to this standard. In addition, the fund provides grants for developing training plans, organizes regional courses on training need assessments, and administers a variety of subsidized programs targeting small enterprises. A recent analysis indicates that the scheme has significantly increased the incidence of training.

In Malaysia, the HRDF was established in 1993 with a matching grant from the government. It replaced the training tax incentive scheme (the double deduction incentive for training) that had been in operation since 1987, and which was widely acknowledged to have been relatively ineffective. The act created a council (HRDC), with representatives from the private sector and from responsible government agencies, and a secretariat to administer the HRDF schemes. Eligible employers with 50 or more employees are required to contribute 1% of payroll to the HRDF. Those who have contributed a minimum of six months are then eligible to claim a portion of allowable training expenditures up to the limit of their total levy payments for any given year. The HRDC set rates of reimbursement, varying by type of training and generally lower for larger firms.


- Keep employers in charge. Industries need to own the levy. It is crucial for the success of levy grant schemes that key stakeholders be involved in their management. Recent experience suggests that locating country management of training with the social partners (business, unions) can improve the quality, relevance, and the flexibility of training, which has tended to become more diversified in its sources and uses, including their use in the informal sector. In many countries (including EU members), the management of these funds has been decentralized to the industry or sectoral level. Such decentralization has proven to be effective for two main reasons: it increases the degree of ownership of these programs, and it allows better targeting of the needs of the
firms and employees to design the training courses effectively.22 The United
Kingdom has vested supervision of levies in industrial bodies, which is also
recommended for Latvia (see Chapters IV and V for fuller details for the ICT
and electronics sectors).

- **Use Matching Grant programs.** In order to increase commitment (from both
the employer and the employee) and limit the risk to finance a training
program that would have taken place in any case, the majority of countries use
matching grants schemes. The Singapore Skills Development Fund was
designed and successively modified to provide an incentive for enterprises to
increase the skill and pay level of their workers on the basis of an effective
matching grant scheme.

- **Design to increase competition in provision.** Levy funds are not cost-
effective when they support only government training providers. To avoid this
caveat, Canada has developed a program in which training providers include
independent private firms, colleges and universities, industry associations, and
public organizations. Other countries such as Finland and the United Kingdom
have adopted the same strategy. To increase competition among providers,
some countries have opted to distribute funds through open tenders, with the
state as purchaser rather than supplier of training (Australia, Chile). Other
countries have used voucher schemes, such as the United Kingdom training
Credits Schemes.

- **Earmark funding strictly.** Funding levels are better maintained with levies
than with government grants, which tend to decline with shrinking budgets.
But levy funds should not be used for other government expenses, as has
happened in the past in Costa Rica.

- **Provide support for smaller enterprises.** Large firms and enterprises that
already have a high skills base have typically use these schemes, but they are
not well used by SMEs. Mexico’s Integral Quality and Modernization
Program concentrates on the productivity of small enterprises, using both
private training consultants and government and private training institutions
(Box II-6). Similar examples can be found in Austria and Germany.

72. **Tax Incentives.** These can take several forms, including tax rebates for firms that
spend a given percentage of their payroll on training, as occurs in France, Korea, and
Morocco; and tax incentives for approved training paid out of general revenues, as occurs
in Chile and, previously, in Malaysia.

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22 Such participation is encouraged for the ICT and electronics sectors in the last two chapters of this report.
Box II-6: Mexico’s proactive approach to small and medium-size enterprise support

The Integral Quality and Modernization Program (CIMO), established in 1988 by the Mexican Secretariat of Labor, has proven effective in reaching SMEs and assisting them in upgrading worker skills, improving quality, and raising productivity. Set up initially as a pilot project to provide subsidized training to SMEs, CIMO quickly evolved when it became apparent that lack of training was only one of many factors contributing to low productivity. By 2000, CIMO provided an integrated package of training and industrial extension services to more than 80,000 SMEs each year and training to 200,000 employees. Private sector interest has grown and more than 300 business associations now participate in CIMO, up from 72 in 1988.

All states and the Federal District of Mexico have at least one CIMO unit, each staffed by 3–4 promoters, and most units are housed in business associations, which contribute office and support infrastructure. These promoters organize workshops on training and technical assistance services, identify potential local and regional training suppliers and consulting agents, and actively seek out SMEs to deliver assistance on a cost-sharing basis. They work with interested SMEs to conduct an initial diagnostic evaluation of the firm, as the basis for training programs and other consulting assistance. CIMO is expanding its support in two directions: assisting groups of SMEs along specific sectoral needs, and providing an integrated package of services, including information on technology, new production processes, quality control techniques, and marketing as well as subsidized training.

Evaluation studies (1995, 1997) found CIMO to be a cost-effective way of assisting SMEs. The study tracked two groups of SMEs over three years, one with firms that participated in CIMO in 1991 or 1992, and another with a broadly comparable control group of enterprises that had not participated in the CIMO program. CIMO firms tended to have lower performance indicators than the control group prior to participation in the program, but by 1993 labor productivity had either caught up or exceeded that of the control group. Other performance indicators showed similar improvements—increased profitability, sales, capacity utilization rates, and wage and employment growth and reduced labor turnover, absenteeism, and rejection rates for products. The most dramatic impacts of CIMO interventions were among micro and small firms.


73. Many experts believe that grant schemes, not tax incentive schemes, promote better workplace training. Tax incentive schemes are not advised for Latvia primarily because the taxes on training expenses are generally deductible from corporate income tax only if a firm makes a profit. Tax incentive schemes are generally used by large, well-established companies rather than by young, small firms. For example, in Malaysia, a tax incentive scheme was used by only 7% of small companies. In Brazil and Chile, for example, it appears that tax incentives have needlessly subsidized well-run firms that were already providing training, while poorly managed firms either did not provide worker training or they established training sessions that were designed more to maximize financial gains than to develop workers’ skills.

**Recommendation 6:** Facilitate the hiring of foreign workers by providing more flexible procedures for nonmanagerial staff.
74. When local firms face a skill gap in the workforce, they can provide training, or they can opt to bring in foreign workers. It is worth noting that training and the use of foreign workers are not mutually exclusive because the use of foreign workers is only a temporary solution to a worker shortage. By all accounts, Latvia appears to have relatively liberal foreign worker policies compared with many other countries (e.g., the introduction of flexible procedures for foreign investors and management). This flexibility is likely to increase further with the EU accession.

75. Yet, immigration issues remain for nonmanagerial positions. Several companies have reported problems in hiring foreign experts for a relatively short period of time. Administrative procedures are complex and delays are generally excessive. Therefore, it is recommended that the short-term use of expatriates be made more flexible. One option would be to implement accelerated procedures for a list of positions (such as teachers, experts, trainees, etc.) and activities, notably in the knowledge industries, in which a gap of local skilled labor has been identified. These measures would help fill the skill gap in some positions without disfavoring local workers in the most general unemployment policy followed by the government.

4. Increasing Private R&D

76. To promote research and development, many governments adopt proactive policies that give incentives to the private sector to invest in research and development activities. A government’s intervention is generally justified on the grounds that R&D benefits both the firm that conducts the research, and the general economy through its spillover effects.

77. The Latvian private sector has made a relatively small investment in research and development. The Government of Latvia may wish to follow a recent trend of OECD countries and adopt one of two policies to strengthen their private sector effort in R&D. The first is to strengthen the intellectual property rights legislation; the second is to expand the use of fiscal instruments, such as grants and tax incentives. FIAS strongly recommends the first option because a good legal protection system reduces the risk of appropriation or the risk of leakage to others, and it will motivate firms to undertake and commercialize their research. In contrast, fiscal instruments have associated costs and limited effectiveness, and FIAS recommends they not be used in Latvia.

**Recommendation 7:** Strengthen the application of the current intellectual property rights legislation by reinforcing the court system.

78. Current intellectual property rights legislation in Latvia appears to be consistent with international standards; neither did the firms that participated in the FIAS survey perceive this as an issue that needed attention. Their main preoccupation lies in the low confidence in the court system, which is perceived to be slow in resolving disputes. The government could demonstrate its commitment to this issue by devoting resources to

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23 Some argue that if strong intellectual property rights favor innovations by private firms, these rights may also slow down the diffusion of innovations into the local economy.
judicial training. These actions should be incorporated in the global judiciary reforms and the current agenda against corruption.

**Recommendation 8:** Continue to limit the use of tax incentives or financial grants that favor R&D.

79. The use of tax incentives varies throughout the world (Box II-7). For example, the governments of the United Kingdom and the United States both directly fund R&D and offer favorable tax treatment; Italy and New Zealand finance business R&D but do not provide preferential tax treatment. In contrast, Australia, Canada, Portugal, and Spain have generous fiscal incentives but less direct government funding.

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**Box II-7: International experience with tax incentives**

Governments have multiple options to favor capital expenditures in R&D:

- Accelerated depreciation rates (used in 13 OECD countries, including 4 that provide an immediate 100% write off [Canada, Denmark, Ireland, United Kingdom]).
- Tax credits (Canada, France, Ireland, Italy, Japan, Korea, Taiwan, United States)
- Investment credit (Australia, Belgium, Denmark, Norway, United Kingdom, etc). Great variation from 13% in Belgium to 125% in the United Kingdom, but generally there is a cap.

Many countries (Belgium, Canada, Italy, Japan, Korea, Netherlands, Norway, United Kingdom) target their tax incentives toward SMEs that are less likely to make R&D investments due to financial, technical, information-related, and other constraints. For example, in 2002, Norway introduced an SME tax credit for R&D, which includes external purchase of R&D services (from universities and public research institutes) as well as research conducted by the firm itself. Other countries offer more generous R&D tax provisions to small firms than to larger enterprises (Canada, Japan, Korea, and the Netherlands).


80. So far, the tax incentives are relatively modest in Latvia compared with the range of incentives used in other developed and developing countries. Latvia, like almost all OECD countries, allows current expenditures on R&D to be deducted from taxable income in the year they are incurred as a business expenses. Such expensing is a form of accelerated depreciation because current R&D expenditures may generate income in the future as well as in the present. This incentive is not negligible because it is estimated that 90% of each R&D dollar is spent on current expense in OECD countries. By contrast, there is no favorable tax treatment for capital expenditure on R&D.

81. FIAS recommends that the Government of Latvia continue to use tax incentives on R&D with restraint. The first argument is that the use of incentives has not proven to be effective in most countries, and it is much less effective than instruments that support

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24 Although s discussed below in fuller details, one of the issues of the current legislation consists of the lack of incentives for researchers and academics to commercialize their innovations.
training capacities. It remains unclear from the empirical evidence whether such incentives have pushed private firms to fund additional R&D expenses—on top of those that they would have financed without incentives (Box II-8). Countries such as Finland and Sweden have reported relatively high private R&D expenditures, but neither has used substantial direct or indirect funding.

**Box II-8: Limited effectiveness of tax incentives**

There is an on-going debate regarding the effectiveness of tax incentives in stimulating private R&D, partly because it is difficult to capture the amount of R&D that would have taken place without incentives. A recent OECD survey estimated that a 10% decrease in the cost of R&D through tax incentives stimulates just over a 1% increase in R&D in the short term and just under a 10% rise in the longer term. Yet, when these benefits are compared with fiscal losses, it is not clear that the total effect associated with tax incentives remain positive. In addition, other surveys seem to indicate that tax incentives do not significantly influence the overall corporate R&D strategies in the knowledge intensive sectors.

82. The second argument is that tax incentives are almost superfluous due to the relative generosity of the overall Latvian tax system. The general corporate tax rate of 19% is sufficiently attractive to make tax rebates or other instruments redundant. Many countries that provide fiscal incentives do so because it is a way to reduce the tax burden on firms and to signal the governments’ strong commitment to private sector development. A comparison is useful. The overall income tax rate is 19% in Latvia, whereas it is as high as 42% or 33.9% in Japan and Belgium, respectively. These two countries offer a tax credit of 10% (Japan) and tax allowance of 13.5% (Belgium), which reduces the effective tax rates to 32% and 29%, respectively. These two rates remain higher than the overall rate of 19% in Latvia.25

83. Another argument for limiting the use of fiscal incentives in Latvia is that these regimes are generally quite complex to administer. Most countries struggle to define what kind of activities will be included in R&D. For example, do tax incentives apply to basic and applied research or only to one of them? Should they apply to machinery and equipment or also to buildings? Another issue is to define whether tax incentives should use as the basis of the total or the incremental volume of R&D expenditures.26 There is also the argument that tax incentives should be granted only to SMEs because they are more likely to suffer from market failures than large firms. Many OECD countries such as Belgium, Canada, Italy, Japan, Korea, the Netherlands, Norway, and the United Kingdom have therefore targeted tax incentives for small firms.

25 Other countries, such as Canada and the United Kingdom are more generous. The overall rate of 19% in Latvia is nearly equivalent to rates in Korea or the Netherlands after adjusting for the R&D tax credit.

26 Basing tax relief on either the volume of R&D spending or incremental R&D spending has pros and cons. Volume-based schemes tend to be simpler for both companies and governments. By contrast, incremental schemes may better target additional, new research because they tend to provide better value for the money. A look at OECD countries show that volume based schemes are used in Canada, Italy, Korea, and the United Kingdom, while incremental schemes in France, Japan, Mexico, or the United States. Some countries, such as Australia, Hungary, and Spain use both schemes.
Like all kinds of tax incentives, those for training come at a cost to the government in terms of fiscal losses, at least in the short term. To avoid abuse of the system, authorities must establish control systems that can verify a firm’s activities over time. Germany abolished its R&D tax credit in the mid-1990s due to problems with abuse, and Ireland has now phased out its R&D tax allowance. Latvia would have to consider this additional cost when authorities begin to reduce corruption.

**Recommendation 9:** Consider with caution the use of matching grants schemes on R&D expenses because, although they may be effective, they are costly in terms of fiscal losses and they increase opportunities for corruption.

Some governments have used matching grants to encourage business R&D expenses. The comparison between the Republic of Korea and Mexico can illustrate some of the expected effects associated with matching grant programs targeted to R&D expenses. Korea provided financial support for private firms to establish research centers and for joint projects across firms—in 1995, the Korean private sector had more than 2,200 research institutes and more than 60 research unions. By contrast, except for the state-owned companies such as PEMEX and the electric utilities, the government of Mexico provides neither R&D funds nor incentives for R&D by private firms. This comparison does not account for the fraction of R&D that would have taken place in the absence of a grant program in both countries, but it is striking to observe that the share of R&D undertaken by firms was about 70% in Korea against only 25% in Mexico.

The comparison between Korea and Mexico suggests that matching grant programs can influence the extent of business R&D expenses and, thus, could be considered in principle by the Latvian authorities as a channel for using EU structural funds that are expected to be forthcoming in the next three years. However, the government should be aware that some obvious costs are associated with such programs (Table II-7).

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Coordinate public and private R&amp;D spending</th>
<th>In principle, could target areas with large gap between social and private rate of return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disadvantages</td>
<td>Government may need to choose technologies</td>
<td>Pressure to show visible success may lead to financing of projects with high private rates of return, thus crowding out private funding</td>
</tr>
</tbody>
</table>


Latvian authorities first need to address that these programs are generally expensive and they require upfront government money, with uncertain returns over time. This is the main reason why they have been used primarily in OECD countries that have less-severe budgetary constraints than economies in transition. The availability of EU
structural funds reduces this budgetary constraint for Latvia, but it remains that the authorities must define their priorities between alternative grant programs. In the view of FIAS, these funds should be allocated first to training programs for the reasons mentioned earlier.

88. An argument against matching grant programs for R&D expenses is that they are difficult to administer and they require considerable expertise. Even if the management of these funds is decentralized to industry associations or to academic experts (as recommended for the labor training programs), substantial expertise would be needed to evaluate the incremental value of each request. Such an expertise is difficult to possess because it changes rapidly over time. It would also need clear rules for the allocation of these funds as well as a strong monitoring mechanism. It is not sufficient to approve proposals, it is also necessary to ensure that projects are carried forward according to the conditions that were agreed to initially.

89. Recent international experience has shown that matching grant programs have disproportionately favored large firms or those that have the human and financial resources to apply to and administer such programs. In short, the firms that do not really need financial support from the government have largely used these programs. Although such program can be designed to target SMEs, one can reasonably argue that other policy options might be more effective than matching grants. For example, FIAS proposes that the legal intellectual property rights framework should be modified to include monetary incentives for researchers to commercialize their innovations and ideas.

90. In conclusion, FIAS recommends that matching grant programs will be evaluated with care by the Latvian authorities; at least those that might be conducted on a large-scale basis. Although these programs can bring substantial incentives to private firms, especially to those constrained by their lack of financing, they are generally difficult to manage properly. Not only do they require simple and transparent rules, but they will also have a negative effect on fiscal revenue.

5. Improving the Linkages between Research and Private Business

91. One of the main challenges of the Latvian government is to increase demand and linkages between industry and academia as well as research institutes. As part of the effort to promote these linkages, FIAS recommends a two-pronged approach based on the following actions: a) reinforcing the coordination and the diffusion of information between researchers and private firms; and b) encouraging researchers to commercialize their innovations. By contrast, as was argued earlier for business R&D expenses, the scope for tax incentives appears limited for encouraging the linkages between firms and research institutes in Latvia’s current context.

Recommendation 10: Coordinate and facilitate information flows between firms and research institutes.

92. One of the obstacles to the transfer of technologies arises from the mismatch (in terms of geographical location and type of agents) of information among those supplying
and demanding technology. It might be very costly, for example, for an SME to identify the specific technology suppliers that meet its needs. Suppliers and demanders have asymmetric information about the quality of a product and the needs that a technology has to meet.

93. For these reasons, a number of countries have established centers or agencies to coordinate the relationship between academia and businesses. The Latvian government has attempted to launch such an effort, partly through the Latvian Development Agency. At the sectoral level, such as in the information-communications technology sector, the Latvian Information and Telecommunication Association (LITTA), for example, has played such a role, but with limited success so far (see Chapter IV for more details).

94. An example of this policy is described in Box II-9, in which the British government attempted to set up a centralized network for the acquisition and distribution of information technologies. The establishment in 1988 by the government of India of the Technology Information, Forecasting and Assessment Council (TIFAC) represents another example of this approach to technology transfer policy. TIFAC is an autonomous organization under the Department of Science and Technology. Its role is to undertake technology assessment and forecasting studies, favor technology information flows, perform analysis, and keep track of global technology developments. It functions as a clearinghouse for information. Its aim is to provide techno-commercial information on business opportunities, especially to entrepreneurs and business planners. It has proven to be useful in areas such as leather, chemical, and aerospace technology.

95. Establishing a network should include not only an emphasis on the relationship between researchers and businesses at the local level, but it should also incorporate international linkages such as EU-related R&D activities (including national management of EUREKA, COST, etc.). Providing access and information about these programs to both researchers and businesses in Latvia should be one of the priorities of such an agency.

96. Additional examples of initiatives to strengthen information diffusion will be presented in the last two chapters, when we discuss such the issue at the sectoral level for both information-communications technology and electronics. We believe that an important share of these activities could and should be carried out by experts in their field, to be really effective. Otherwise, there is a risk that such effort will not be credible among the business community—both locally and internationally.
Box II-9: Supernet in the United Kingdom

There is a case for government intervention to favor technology diffusion among SMEs, as most of SMEs lack the capability to realize their technology needs and acquire information about new technology opportunities. To target this market failure policy makers have used innovation consultants, established technology information centers, or introduced financial and fiscal incentives to favor technology transfer activities and encourage business clusters.

The technology transfer policy adopted by the United Kingdom has changed over time. Initially, it consisted in financial support for R&D activity. Later, it was more focused on raising awareness about technology advancements and providing technology advice. More recently, the United Kingdom’s technology transfer policy has pointed to the use of regional networks, the so-called Business Links to assist SMEs in their business development. There are two important groups in the United Kingdom that deal with technology transfers: the Innovation and Technology Counsellors and the Design Counsellors.

One experiment run by the United Kingdom government to increase technology transfer to SMEs was the Supernet. During the period 1994–97, Supernet worked as a technology network, matching technology needs and sources. SMEs would communicate their needs to the Supernet team. The latter would sign-post it to the most appropriate technology source.

Supernet’s success was modest. The number of members using it remained limited. A sample analysis of Supernet activity suggests that only 20% of inquire led to direct contacts between the SMEs and the business links, and a much lower percentage led to remunerative projects. The United Kingdom experience revealed that ingredients of a successful technology network (i.e., of a network that people use and that helps solving their problems) include:

- Developing a network that is widely extended both geographically and in terms of technological coverage
- Ensuring the good quality management of the network
- Guaranteeing easy access, by establishing a deep level of integration with local agents, such as emerging business links.

**Recommendation 11:** Increase the motivation for researchers by modifying the intellectual property rights legislation.

97. The existing intellectual property rights legislation remains unclear about the rights and benefits that are attributed to researchers or research institutes that want to commercialize their innovations. Several experts, including the recent EU study on clusters, have noted this gap.
98. The Latvian government should consider revising the legislation to include further incentives for researchers. In doing so, it could follow the example of the U.S. legislation, which is briefly summarized in Box II-10.

<table>
<thead>
<tr>
<th>Box II-10: The U.S. Federal Technology Transfer Act (1986)</th>
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</thead>
<tbody>
<tr>
<td>The Federal Technology Transfer Act of 1986 (FTTA) allows federal laboratories to enter into cooperative research agreements with private industry, universities, and other interested parties. The Act provides laboratories with clear legal authority to enter into these arrangements and thus encourage technology transfer from federal laboratories to the private sector. Under the Act a Cooperative Research and Development Agreement can be implemented that protects proprietary information, grants patent rights, and provides user licenses to corporations, while allowing government expertise and facilities to be applied to interests in the private sector.</td>
</tr>
<tr>
<td>Specifically, the major implications have been: 1) Scientists and engineers are now responsible for and evaluated for their abilities to get technology transferred out of the laboratory. 2) Inventors from government-owned and operated laboratories are required to receive a minimum of 15% share of any royalties generated through patenting or licensing. 3) The Act allows federal employees, both current and former, to participate in commercial development if there is no conflict of interest. 4) The Act established and created a charter for the Federal Laboratory Consortium for Technology Transfer, which is responsible for a variety of activities, including training courses, and providing advice and assistance for technology transfer programs, and it functions as a clearinghouse for technical assistance.</td>
</tr>
</tbody>
</table>

99. As part of this effort to provide more incentives to researchers, the Latvian government (through the Patent Bureau) and the private sector (through the Association of Entrepreneurs) should develop information and training materials regarding intellectual property rights and the need to patent innovations. The ownership of state research should be clarified and incentives put in place for such research to be commercialized.

**Recommendation 12:** Avoid the use of tax incentives for stimulating collaborative efforts.

100. Tax incentives for stimulating more collaborative research between industry and institutions/universities have been used in several countries. For example, Japan, Norway, Spain, and the United Kingdom have more generous tax relief for industry R&D projects contracted to universities and public research institutes. The U.K. tax credit for all companies, introduced in April 2002, is given to companies that conduct rather than finance R&D, except when projects are carried out in collaboration with universities or research organizations.

101. FIAS advises that the Latvian government should not provide tax incentives to stimulate collaborative efforts. The current overall system is already conducive to business and research activities due to the low tax rate. Furthermore, such systems have proven to be difficult to manage, and they offer opportunities for corruption by the public and the private sectors alike.
102. Global business is rapidly changing in ways that affect the competitive opportunities open to developing countries. Yet, attaining competitiveness is difficult and needs much more than passively opening up to free markets. Recent experience has shown that tapping into this potential source of competition requires firms with a high degree of technology, which are able to integrate into the global production network.

103. Two basic options exist for firms to upgrade their technological capacities. First, they can develop their own R&D capacities. Second, they can acquire technology from other firms or partners located either in-country or abroad. The second option is essential to emerging economies due to their limited financial and human resources. The rapid pace of innovation—and the resulting promise of productivity increase—makes it more costly to insulate economies from international trade and investment.\(^\text{27}\) The success of economies such as Chile, Ireland, Korea, and Malaysia relied on their capacity to exploit linkages with external partners.

104. Using the data from a recent survey (Box III-1), this chapter discusses why Latvian firms have most often used the second option of acquiring technology from other firms or partners. We find that firms with the highest productivity that have been able to benefit by developing close contacts with foreign partners or markets. These findings will underscore the importance for Latvian policymakers to 1) remove constraints to export activities, 2) enhance training capacities in local firms, and 3) reinforce information dissemination between local and foreign firms.

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\(^{27}\) For a discussion, see: S. Lall, Linking FDI and Technology Development for Capacity Building and Strategic Competitiveness. *Transnational Corporations*. December 2002; 11(3).
A. **DEVELOPING KNOWLEDGE ACTIVITIES IN LATVIA**

105. The key element to increasing the competitiveness of the Latvian economy, following the recent experience in OECD and a few East Asian countries, lies in the capacity of local firms to upgrade their technology. To do so, about two-thirds of the firms established in Latvia were reported to have benefited from technology transfers against only one-third of which declared to have built their own R&D capacities. For many firms in Latvia, these two options appear complementary, because about 86% of the firms that conduct R&D also benefit from external technology transfers.

106. The survey results confirm that, for an economy like Latvia’s, importing technologies remains the primary option that firms can use to upgrade their capacities (Figure III-1). Firm size is an important determinant of propensity to purchase new technologies. While a vast majority (80%) of very large firms reported technology acquisition, this was only true of slightly more than half (58%) of small and medium firms. There was no significant difference in the acquisition patterns between foreign and domestic firms or between public/privatized/private firms.

**Figure III-1: Percentage of firms receiving technological transfers**

![Figure III-1](image-url)

Source: FIAS survey

107. The survey also provided information on the modes used by Latvian firms to acquire technology (Table III-1). For most companies, the primary mode of technology acquisition appears to be through international trade and contacts with foreign companies. It is estimated that about 34% of firms acquired technology through imports of capital equipment and machinery, while licensing agreements with a foreign partner, transfer from a foreign parent, and joint ventures amount to about 9% of total technology transfers. The two other channels that Latvian firms use are the equipment purchases from another company in Latvia (24%) and the hiring of key personnel (13%). It is worth underscoring that firms in the knowledge-intensive sectors have relied more on explicit agreements with foreign companies than on capital equipment purchases. About 14% of
firms operating in these sectors have reported licensing agreement and joint ventures with foreign companies.

<table>
<thead>
<tr>
<th>Table III-1: Modes of acquisition</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Import Types</td>
</tr>
<tr>
<td>Equipment purchases in Latvia</td>
</tr>
<tr>
<td>Key personnel hiring</td>
</tr>
<tr>
<td>Licensing from abroad</td>
</tr>
<tr>
<td>Licensing from Latvia</td>
</tr>
<tr>
<td>Transfer from a foreign parent</td>
</tr>
<tr>
<td>company/foreign customer</td>
</tr>
<tr>
<td>Joint venture</td>
</tr>
<tr>
<td>Acquisition of another company</td>
</tr>
<tr>
<td>No. of firms in the group</td>
</tr>
</tbody>
</table>

Source: FIAS survey.

Knowledge-intensive.

108. About one-third of the firms reported to have developed internal R&D capacities (Figure III-2). While this figure is indicative, it does not reveal the quality and the magnitude of these efforts. Not surprisingly, companies in knowledge-intensive sectors, as defined by the Latvian government, are more likely to be engaged in R&D activities because more than half of them conduct R&D, compared with a quarter of the firms in other sectors.

**Figure III-2: Percent of firms conducting R&D**

![Bar chart showing percent of firms conducting R&D by sector](image)

Source: FIAS survey

109. The propensity of firms to engage in R&D expenses depends on size and ownership. Size matters, because only 25% of small firms versus 32% of large enterprises conduct R&D activities. This finding reflects that research is an expensive
activity with increasing returns, which favors larger firms. The survey also reveals that firms with established foreign capital in Latvia conduct more R&D activities. Among local firms, formerly state-owned enterprises are more likely to conduct R&D, especially those in the knowledge-intensive sectors (75% reportedly conduct R&D, compared with 46% reported by other companies).

B. CHANNELS FOR TECHNOLOGY TRANSFERS

110. The description above reveals that most Latvian firms acquire technology from their partners rather than develop their own R&D capacities. This finding is not surprising. It reflects that most local firms in Latvia do not have the human and financial resources to conduct these activities on their own. Their reliance on imports and adapting technologies is not unique; rather, many experts view this reliance as the key to the success of emerging countries around the world.

111. The next question is therefore to identify the factors that can help enhance technology transfers in Latvia. Recent international experience suggests that exporting firms and those that have established contacts with multinational companies are more likely to benefit from technology transfers than others. This trend has been confirmed in Latvia. Table III-2 shows that exporting companies and suppliers to multinational companies have received more technical assistance from multinationals than from other firms (37% vs. 15%). Furthermore, FIAS preliminary empirical analysis reveals that these firms are also more productive than others. For example, the productivity associated with suppliers to multinational companies is about 50% higher than the productivity associated with the full sample of firms (Figure III-3).


29 Such a positive effect is not so evident for exporting companies, perhaps reflecting that many firms are still exporting to the Russian and CIS markets, whereas productivity is not the key factor for success (as reported later in the text).

30 Evidence of such spillovers is found in Hungary and Lithuania. See for example, B. Smarzynska, Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In: Search of Spillovers through Backward Linkages. World Bank Policy Research Paper 2923, October 2002.
Table III-2: Assistance received from multinational companies located in Latvia or from foreign customers abroad

<table>
<thead>
<tr>
<th></th>
<th>All firms</th>
<th>Exporters</th>
<th>Non exporters</th>
<th>Suppliers</th>
<th>Non suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of firms that received assistance</td>
<td>22.1</td>
<td>39.2</td>
<td>12.5</td>
<td>35.5</td>
<td>16.3</td>
</tr>
<tr>
<td>Percentage of firms that did not receive assistance</td>
<td>77.9</td>
<td>60.8</td>
<td>87.5</td>
<td>64.5</td>
<td>83.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: FIAS Survey

Figure III-3: Labor productivity (value added/employment)

Source: FIAS survey
Note: Labor productivity values are normalized to 100 for the full sample. MNC means multinational company.

112. In view of these findings, the Latvian government cannot underestimate the importance of exporting and establishing close contacts with multinational companies, especially if their aim is to build up the technological skills of local firms and integrate them into the global economy. Below is closer examination of the characteristics that may enhance these channels for Latvia.

Exporting firms

113. Firms from developed countries often provide considerable technical aid to their industrial suppliers in developing countries. For Latvia, the importance of technology acquisition for export purposes is confirmed in that our survey, the exporters said they more likely than the non-exporters to acquire new technologies (Figure III-4). During the past three years 70% of exporting firms reported acquiring new technologies, compared with 60% of non-exporting firms, and exporters were 50% more likely to rely on imports of equipment, twice as likely to license technology from abroad, and three times more likely to receive a technology transfer from a parent company.
The good news is that exporting activity is much more prevalent in knowledge-intensive sectors than in other industries. Almost half the firms in the sample that operate in these industries reported significant exporting activity (i.e., selling abroad more than 20% of output), as compared with only 35% of firms in other industries.

**Figure III-4: Technology transfers; exporting vs. non-exporting firms**

There is also a positive association between firm size and propensity to export. This association is to be expected as a significant effort—investment in product upgrading, marketing, and gathering information about new markets—is required if firms are to begin exporting. Thus it is not surprising that larger firms are better positioned to do so. We also note that firms with foreign capital are twice as likely as domestic firms to be exporters. A higher propensity of foreign firms to export has been found in many transition economies (e.g., Lithuania, Poland, and Slovakia), because accessing foreign markets tends to be easier for subsidiaries of multinational companies than for domestic firms. Foreign subsidiaries can rely on the distribution networks established by the parent company. Finally, private or privatized firms have a higher export propensity than state-owned enterprises.

Beyond the characteristics of the firms (size, sectors, ownership), the survey revealed a close relationship between the decision to export and contact with a foreign partner or customer. Table III-3 presents the percentage of firms that rated a variety of factors as somewhat important, important, or very important in their decision to export. In Western markets (i.e., Scandinavia, the European Union, and the United States), more

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31 For instance, in 2000, 61% of Slovak exports (52% in 2001) were accounted by firms with foreign capital (see Hoskova, Adela, Impact of Foreign Direct Investment on the Economy of Slovakia, National Bank of Slovakia, Institute of Monetary and Financial Studies, Bratislava; 2001). The corresponding figure for Lithuania was equal to 56.5% in 2000 (Smarzynska, 2002, op. cit.).
than one-third of firms indicated that assistance from foreign distributor in obtaining contracts has been a key element to their exporting activity. Receiving technology or marketing advice from a foreign customer or foreign partner had been the second-highest ranked factor, with almost a third of firms considering this to be vital. The third most important factor was being able to sell the brand name of a foreign customer or becoming a subcontractor to a foreign company.

Table III-3: Factors that allowed firms to enter foreign markets

<table>
<thead>
<tr>
<th></th>
<th>Western Markets*</th>
<th>Russia/CIS*</th>
<th>Other*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finding a foreign distributor to help obtain contracts</td>
<td>34.7</td>
<td>24.1</td>
<td>25.6</td>
</tr>
<tr>
<td>Receiving technology/marketing advice from a foreign customer/partner</td>
<td>32.0</td>
<td>17.2</td>
<td>21.1</td>
</tr>
<tr>
<td>Selling under the brand name of a foreign customer</td>
<td>26.5</td>
<td>9.5</td>
<td>12.8</td>
</tr>
<tr>
<td>Becoming a subcontractor to a foreign company</td>
<td>17.7</td>
<td>8.6</td>
<td>11.3</td>
</tr>
<tr>
<td>Receiving foreign investment</td>
<td>15.6</td>
<td>10.3</td>
<td>10.5</td>
</tr>
<tr>
<td>Relationships with customers from the Soviet Union era</td>
<td>8.8</td>
<td>27.6</td>
<td>20.3</td>
</tr>
<tr>
<td>Recognition of our brand name from the Soviet Union era</td>
<td>5.4</td>
<td>20.7</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Source: FIAS survey.
*Firms were asked to rate each option on a scale 1–5 (1 = not at all important; 5 = very important). The percentages indicate that this factor was somewhat to very important.

117. In Eastern markets (Russia and the CIS) the ranking was quite different. The top ranked factor that allowed a firm to enter a foreign market was the relationships with foreign customers from the Soviet Union era, while third factor was recognition of the brand name. The second most important factor, like that in Western economies, was finding a foreign distributor. This ranking points to a bipolar world of exporters in Latvia. On the one hand, are firms that attempt to enter Western markets to a large extent through their ability to become part of international production and distribution networks by finding foreign distributors, cooperating closely with their foreign customers, and receiving from them technological and marketing advice, using brand names of foreign firms on their products or becoming subcontractors to multinational companies. On the other hand, are many firms that still benefit from their knowledge of the markets in the former Soviet Union.

118. While Eastern European markets are and should be important to Latvian exporters because they enjoy the advantage of language skills, knowledge of CIS consumer preferences, and business practices over potential competitors from other parts of the world, it is unclear how long these advantages will remain in place. With the greater opening of Russian and CIS markets to imports, Latvian firms will be facing increasing competition from multinationals that spend huge sums of money on R&D and marketing while also have access to cheap labor in developing countries. Thus, while Eastern European markets should not be neglected, it would be prudent if Latvian firms were to increase their competitiveness in order to withstand the competition of Western markets.
Linkages with Multinational Companies

119. Exporting is only one channel through which a Latvian firm can become part of the global economy. The second channel is to incorporate local producers into the production and marketing networks created by multinational corporations worldwide. This arrangement could yield several advantages for Latvia because a relationship with a multinational company would be accompanied by the transfer of technology and managerial know-how, which could lead to significant demonstration effects. Ties with multinational companies could give Latvian firms direct access to larger markets and thus bring benefits of economies of scale. They could boost exports without local firms having to incur marketing expenses, and they could provide greater stability in earnings thanks to the global reach of the parent company. The expansion in network-driven trade could contribute to greater productivity and integration of the national economy into global markets.32

120. Our survey provides some evidence of this phenomenon taking place in Latvia in that since about one-third of survey respondents indicated having benefited from the presence of multinational companies in their industry (Table III-4). For 14.5% of firms, these benefits took the form of learning new technologies, 9.3% learned new marketing strategies, and 4% benefited by hiring employees that were trained by foreign firms. The latter observation is also confirmed in that almost 20% of the sample indicated that they have hired workers who had once been employed by a foreign firm operating in Latvia. Moreover, more than two-thirds of the multinational companies interviewed indicated that employees who decided to leave their company subsequently found positions in Latvian firms.

Table III-4: Have you benefited from the presence of foreign companies in your sector?

<table>
<thead>
<tr>
<th>Percent responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>By buying inputs from them</td>
</tr>
<tr>
<td>By learning about new technologies</td>
</tr>
<tr>
<td>By learning about marketing strategies</td>
</tr>
<tr>
<td>By becoming their suppliers</td>
</tr>
<tr>
<td>By hiring employees trained by multinationals</td>
</tr>
<tr>
<td>By using them as export channel</td>
</tr>
</tbody>
</table>

Source: FIAS Survey

121. The most frequent relationship between a multinational company and a local company operating in Latvia has been through vertical or backward linkages, which is the purchasing of goods and services that are then included in the production process. About 82% of the multinational companies in our sample reported having at least one Latvian

32 For a fuller discussion, see Global Economic Prospects, World Bank; 2003.
supplier with whom they work on an ongoing basis (Table III-5).\textsuperscript{33} Not only is the number of companies very high but the percentage of inputs outsourced by multinationals account for almost half of their total intermediate inputs, which is a positive sign. They also reported sourcing more from local firms than from suppliers located abroad. Note, however, that many multinationals indicated they may consider decreasing their share of supply from Latvian suppliers over the next 2–3 years. This strategy may be motivated by taking advantage of lower local labor costs in other CIS countries, as was reported by some companies in the FIAS survey.

\begin{table}[h]
\centering
\begin{tabular}{llll}
\hline
 & \textbf{Percentage} & \textbf{Average share of intermediates sourced*} & \\
\hline
\textbf{Multinational companies with:} & & & \\
Latvian suppliers & 82 & 47 & 42 \\
EU/US/other suppliers & 42 & 34 & 35 \\
Foreign suppliers in Latvia & 38 & 11 & 11 \\
Russian/CIS suppliers & 22 & 6 & 8 \\
\hline
\end{tabular}
\caption{Vertical linkages between multinational companies and local suppliers in Latvia}
\end{table}

* Average includes firms without any local sourcing.

122. When asked the reasons behind their purchasing from Latvian firms, multinational companies generally said that proximity helped them have a better relationship with their suppliers, a more convenient payment structure, more competitive prices, and savings on transport costs and import tariffs. Almost 10% of multinational companies also praised the quality of Latvian products. Note that the ranking of factors that influences sourcing patterns is similar to the factors that influence local firms to decide their purchases (Table III-6).

\begin{table}[h]
\centering
\begin{tabular}{lll}
\hline
 & \textbf{MNCs} & \textbf{Local firms} \\
\hline
Proximity & 58 & 49 \\
More convenient payment structure & 40 & 42 \\
Savings on transport costs & 38 & 44 \\
More competitive prices & 36 & 47 \\
No need to pay import tariffs & 18 & 35 \\
Technical assistance from suppliers & 18 & 17 \\
Higher quality products & 7 & 16 \\
Mandated by domestic content requirements & 7 & 16 \\
Products can enter EU duty free & 4 & 4 \\
Tax benefits & 3 & 5 \\
\hline
\end{tabular}
\caption{Factors that affect sourcing by Latvian firms}
\end{table}

Source: FIAS survey. MNCs indicates multinational companies.

\textsuperscript{33} Note that suppliers of services, such as for instance food or cleaning, were excluded in the question.
C. RECOMMENDATIONS

123. Technology transfers appear to be the main channel for Latvian firms to upgrade their technological capabilities to a much higher degree than they could by developing their own R&D efforts. The FIAS survey found that these two channels are complements rather than substitutes. Only about 10% of Latvian firms report to have developed their own R&D capacities without receiving any technological transfer from partners or customers.

124. Based on this assessment, the recommendations are not so different from those elaborated in the previous chapter. They basically aim to enhance the relationships between exporting firms and suppliers to multinational companies that have a higher probability to benefit from technical assistance than other firms. A series of actions that were proposed earlier were aimed explicitly at promoting exports by removing administrative barriers and facilitating the adoption of international standards. Another set emphasized the need to improve the information flows across firms and the marketing efforts on foreign markets. All these actions should increase the export propensity of Latvian firms and, ultimately, help them to build up their technological capacities. Such patterns will be confirmed in the next two chapters where we discuss the most successful firms in the information-communications technology and electronic sectors, and which are those that have established close contacts with foreign partners or customers.

125. FIAS also recommends strengthening the capacity of local firms to become suppliers of multinational companies, whether they are located inside or outside Latvia. Most recommendations proposed in the previous chapter apply to this objective, and this is obvious in the recommendation to strengthen the training capacities in the workplace, and to some extent, in the proposal to enhance the reputations of local firms. FIAS believes that these actions will automatically address some of the major constraints currently perceived by multinational companies that may be looking to outsource part of their production to Latvia (Table III-7). Increasing the technological capacities and the quality standards of local firms will make them more attractive to many multinational companies.

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Multinational companies (%)</th>
<th>Local firms (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small production capacity</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>Low level of technology</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Inadequate quality control</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Lack of suitably trained personnel</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Poor engineering capabilities</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Unable to make timely deliveries</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Lack of quality certifications</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>
126. An additional action that Latvian authorities may want to consider is to implement a program to link domestic suppliers with multinational companies. Over the past decade, these programs have been applied with relative success in the Czech Republic, Ireland, the Philippines, and Thailand. While linkages may differ in their scope, they generally rely on the voluntary participation of both multinational and local firms. The government’s role consists of providing assistance services and coordinating the efforts of the two partners. Latvia could use the so-called “global supplier program” in Malaysia as an example (Box III-2).

Box III-2: Malaysia: Global Supplier Program

**Vision**
Local companies to be world-class suppliers of services and materials.

**Mission**
To develop and upgrade the capability of local companies through training and smart partnerships with multinational companies.

The global supplier program is divided into two stages. The first consists of training for manufacturing and materials suppliers in critical skills, and more importantly, to acquire competencies to adopt and use new technologies. The focus is on quality and productivity. There are three levels of training:

- The first level, or core competencies (Core Com), involves 9.5 training days spread over 4 months, and covers 13 courses. Malaysia hopes that Core Com becomes the entry standards for all suppliers.
- The second level is Intermediate Systems, or IS 2, which involves 7.5 training days spread over 4 months.
- The third level, Advanced Systems, or AS 3, elevates SMEs into a predictive mode and requires a large investment and commitment from both vendors and buyers.

The second stage is the linkage program, in which a multinational company adopts local companies and “hand-hold” them to upgrade their leadership skills and technology. This initiative calls for investment of time and commitment of both the large corporations and SMEs. The success of this linkage would be apparent when suppliers have attained the level of competency and become global players themselves.

34 For a description of some programs, see FIAS Occasional Paper, Suppliers to Multinationals: Linkage Programs to Strengthen Local Companies in Developing Countries; 1996, no. 6.
127. The information-communication technology (ICT) sector has been selected by the government of Latvia as one of the priority sectors in its effort to develop a knowledge economy over the next decade. The objective of this chapter is not to assess whether this selection is justified (because this decision has already been made by the authorities in their national innovation strategy). Rather, it aims at examining to what extent the role of the private sector can be strengthened in this process by considering the two main themes developed in this report. First, it will examine what policy actions might be considered by the authorities to improve the business climate and encourage the development of this sector in the country. Second, it will stress the need for integrating the local firms within the global economy. We will see that the most successful firms in Latvia have already included such integration in their operations.

A. GLOBAL TREND IN THE ICT SECTOR

128. Understanding Latvia’s current position in the ICT sector requires a brief review of the recent evolution of this sector at the international level. This review is useful because this sector has been subject to a series of significant and successive changes over the past decade. Those have not only influenced the way these companies do business around the world but they should also be integrated in Latvia’s government strategy toward the development of this sector in the country.

129. Over the past decade, numerous technological and management developments have led to significant changes in the ICT sector worldwide. Among the most important technology developments are miniaturization; exponential increases in information processing and storage capacity and integration of technologies and user applications. For example, we now see the mobile phone, a recent development for voice communications, being integrated with Internet and imaging technologies. The hardware and software niches and increasingly creative possibilities for new applications have made it impossible for the “one-stop-shop” industry structures of previous decades to exist. As a result, the global and vertically integrated firms that dominated this sector in 1980s and early 1990s have almost disappeared or have been severely restructured (e.g., IBM, Dell, Motorola, Ericsson) (Box IV-1).

130. Most firms operating in the ICT sectors have gradually focused on a core of key competencies that have emerged at different stages of the production and delivery processes. These companies are now connected through complex and borderless supply chains that are made up of high volume multicitystomer and multinational specialists at each level. This includes not only product manufacturing but also the front-end customer contact and support services.
Box IV-1: Breaking an Original Technology

Manufacturer: Apple Computer provides a typical example of the refocusing of activities within the major OEMs. From 1980 to the late 1990s they built up a large and successful manufacturing base in Ireland to service the EMEA markets.

This facility employed more than 1,000 people, mostly in production and related activities. At one point, Apple manufactured not only the core desktop computer, but also the keyboards, printers, and mouse. All design and development of hardware and software was internal and proprietary.

Today, that same facility still has more than 1,000 employees but they are engaged mainly in customer service, systems development and integration, and technical support. The peripheral components such as keyboards etc. are bought in from third parties. The manufacturing and assembly of Apple branded computers is largely done by independent contract manufacturers in low-cost regions. Apple provides Microsoft software with its computers, in addition to its own bespoke products. Distribution and local support is provided through independent distribution and logistics providers.

Apple has clearly recognized that in order to be a competitive solution provider that it need not, indeed cannot, provide all the pieces. The industry is changing much too fast to be “all things to all people.”

We are back to the age old day of the specialist. The focus is on retaining only core and essential competencies.

131. The following chart IV-1 demonstrates the general organization that can be found in the ICT sector. These structures have evolved only in recent years, and they are expected to evolve more, and they do not apply to all products and companies.
The organizational structure in Chart IV-1 emphasizes four groups of firms. While the main characteristics of these groups are described below, a sample of activities and firms operating in each of this group can be found in Table IV-1 below.

Group 1 represents the front end, or customer centric portion of the supply chain, including service providers such as contact centers, order processing and technical support.
support. At the same level is the order fulfillment hub, which is a combination of a logistics center with order picking and configuration capabilities. Included in Group 1 are small to medium-sized software developers, which would typically support the original economic manufacturer with localized or other customer specific software solutions. They would also provide similar software outside the major supply chain loops (i.e., directly to a distributor or end user).

134. Group 2 is the original economic manufacturers (OEMs), the original product developers and brand owners, who now concentrate their efforts and investment in developing technology solutions and packaging of core hardware and software components. These companies are frequently major companies, with a large workforce and fixed investment in several countries simultaneously. They are generally at the center of the supply chain and can be considered as the driver of the location decision of other independent supply and support companies operating at different levels of the supply chain.

### Table IV-1: Organizational structure of the ICT sector

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Post-sale customer support centers</td>
<td>• Brand owners (e.g., Nokia, IBM, Apple)</td>
<td>• Administration (finance, back office)</td>
<td>Component suppliers (e.g. metal, plastics, electronic components)</td>
</tr>
<tr>
<td>• Logistic center and order processing</td>
<td>• Assemblers</td>
<td>• Storage and logistics in/out</td>
<td></td>
</tr>
<tr>
<td>• Technical support</td>
<td>• System providers</td>
<td>• Contract manufacturers (e.g., Flextronics, Cesestica).</td>
<td></td>
</tr>
<tr>
<td>• Software applications and developments</td>
<td>• Product development</td>
<td>• Key component suppliers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Original technology provider</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

135. Group 3 includes the main hardware and service suppliers to the core technology brand owners and assemblers. It is within this group that the manufacturing, materials management, and therefore highest employment, occurs. There are two levels and usually they must be located in reasonable proximity to each other. The first level consists of the “input hub” that has grown from the freight carriers who started to offer increasing levels of value-added services. They now manage the component supplies from approved commodity suppliers, provide interim storage, pack and unpack requirements on a daily basis and deliver to point of use, usually to the production line on an as required basis. Increasingly, this level attracts a growing number of independent service providers who
manage such functions as finance and human relations on an outsource basis. The second level is the input hub, which includes all the major manufacturers of components and sub-assemblies. These companies have specialized in high-volume low-cost manufacturing, with several sites in each continent. While their capital investment is high, they are also, of necessity, very mobile. They locate where the original economic manufacturer has a need but will frequently relocate for cost or market demand reasons. For example, they may locate in a country to support a particular global customer. If the customer relocates or switches to another supplier they will often shut the facility and move residual business to another location. All Group 3 functions will be located in close proximity to the original economic manufacturer’s site. In some cases they are actually leasing facilities from them.

136. At the bottom of the supply chain is Group 4, which consists of Tier 3 or commodity suppliers. These include the suppliers of low-value components. With the exception of certain high-technology and proprietary components these companies are predominantly located in China and Southeast Asia.

137. FIAS believes that such a presentation helps to better understand the opportunities for the Latvian economy in encouraging this sector in the country. Basically, the main attractions of Latvia are seen in activities linked to Group 1 and, for a few niches, in Group 3. At the same time, we wish to stress that it is likely that the structure will continue to evolve, both providing opportunities and challenges to Latvia. It is important that the authorities and the ICT sector in Latvia continue to monitor international trends in this highly dynamic sector.

B. STRENGTHS AND WEAKNESSES OF THE ICT SECTOR IN LATVIA

138. The main advantages that have been generally associated with the ICT sector in Latvia are threefold. First, the country is centrally located between EU, Scandinavia, and the CIS States. Second, the logistic infrastructure required for the development of such activities, while not up to modern standards, offers a strong potential. The deep-sea ports at Riga and Ventspils, both with relatively developed hinterlands, offer a good opportunity for developing logistics hubs with spin-off value-added businesses. The existing penetration of the digital telephone exchanges is an advantage to be built on (including approximately 70% coverage throughout the country with 100% in the Riga area), especially considering the liberalization of the network that should occur in early 2003. Furthermore, a fiber optic cable “backbone” is already in place, with broadband capability and existing connections to Russia and Sweden. The third main advantage that Latvia offers is its supply of a skilled workforce. The development of a computer-literate society is being intensified with the introduction of Internet-connected computers in all schools. The mass education of teachers in ICT-related skills would also contribute greatly to the flow of students into knowledge-intensive sectors in the future. The government is well aware of this factor and launched the Education Information System (LITS) in 1997.
139. These are the global advantages that are seen as the most important in the vision to make Latvia a knowledge economy. As reviewed in Chapter II, Latvia presents some advantages for developing a knowledge economy, but none of them differ significantly from those in neighboring countries or EU members. In many aspects, Latvia even ranks near the bottom of EU candidates. Such a global diagnostic seems to apply to the ICT sector as well. The recent publication of the World Economic Forum, in association with the World Bank Group, shows that Latvia ranks in 38th out of 82 countries in terms of ICT readiness. A closer examination confirms that Latvia is at par with Poland (39th) and Slovenia (33rd); higher than Russia (69th) and Lithuania (46th); but lower than Estonia (24th), Hungary (30th), and the Czech Republic (28th).

140. Yet, the ICT sector appears to account for a relatively high share of the Latvian economy, at least compared with European standards (Figure IV-1). According to EU statistics, economic activities associated with the production of goods and services in the ICT sector accounted for about 7.9% of GDP in 2001. The telecommunications company, Lattelkom, which is estimated to account for about one-third of the ICT sector, dominates the ICT market structure.

**Figure IV-1: ICT expenditures (% of GDP)**

![Bar chart showing ICT expenditures (% of GDP) for various countries including EU and selected others.](source:EU Scorecard)

141. Below is a brief assessment of four main activities within the ICT sector. Not all these activities present the same potential opportunities for Latvia and a list of advantages and disadvantages are presented in light of the requirements that firms have shown at the international level. Such an assessment remains preliminary, but it should help identify gaps and areas for actions at the policy level.

---

1. Hardware manufacturers and suppliers

142. As of today, no major ICT hardware manufacturer has located in Latvia, except for the Finnish Sonera Holdings, when it purchased the national telecommunications company, Lattelekom. This observation is not surprising in view of the requirements of these companies. Most of them need to operate from a location close to an innovation center; one that offers economies of scale in the production process as well as in its connection with main suppliers and distributors. These requirements cannot be easily fulfilled in a country such as Latvia. Austria, Ireland, and Scotland, which previously attracted significant FDI in ICT manufacturing, have suffered in recent years from multiple closures of these companies, partly because of the decline in demand and partly because of increasing competition from other countries. Even some countries such as the Czech Republic and Hungary have seen some enterprises close, that were lauded as major investment achievements a few years ago. Latvia is at best mid-level in cost competitiveness for cost-effective manufacturing and it has an insignificant internal market.

143. The limited opportunity for Latvia to become a major player is reinforced in that large multinational companies and brand owners have already established a presence in other EU countries, including in Central Europe. Because the local market is extremely small, Latvia has no worthwhile target market. Most experts believe that the Russian market will eventually be supplied from within Russia and from Southeast Asia.

144. A similar assessment can be made regarding assemblers and large-scale suppliers to the hardware manufacturers. Activities such as electronic components, printed circuit board assembly, power supplies, disk drives, metal parts, plastics, and cables require economies of scale and, so, to be competitive, they require relative large plants to be profitable.

<table>
<thead>
<tr>
<th></th>
<th>(1) Requi</th>
<th>(2) Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>High volume capability and infrastructure</td>
<td>• No existing base—would need to start from zero in technology and capital investment in a low-cost/low-margin business</td>
<td></td>
</tr>
<tr>
<td>Proven expertise</td>
<td>• Limited ability to support facilities with 2000+ assembly employees</td>
<td></td>
</tr>
<tr>
<td>Technology leader with established reputation</td>
<td>• Intense competition from Asia and established regions in Central/Eastern Europe</td>
<td></td>
</tr>
<tr>
<td>Low cost and highly mobile</td>
<td>• Not geographically closer to major end users</td>
<td></td>
</tr>
<tr>
<td>Available workforce in close proximity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

145. These assessments should not come as a surprise to most Latvian experts. They have been relatively well known and were partially included in the design of the National
Innovation Strategy. FIAS believes that it was still useful to set the picture straight so that no unrealistic expectations arise from the government.

146. While Table IV-2 substantially describes the current structures, opportunities, and constraints for Latvia in the ICT manufacturing sector, these models are based on economies of scale and core specialization. A number of possible niche opportunities exist that are not generally catered to within this structure. While not providing large-scale employment, they can offer substantial value-added opportunity. For example, as the Baltic and Russian markets grow, so will be substantial need for hardware products in the region that require failure analysis, post warranty service, and repair. This is also closely related to the increasingly regulated and difficult issue of after-life disassembly and disposal. The major providers of telecommunications and information processing equipment could consider the country’s location ideal for such activities. One suggestion is to identify and attract third-party suppliers of these services in the international arena. Because this is a fragmented sector, it would be necessary to make a separate study of the requirements and possibilities.

2. Software Development and Production

147. Latvia’s software industry had an annual turnover of US$28 million in 2001. Approximately 100 companies are engaged in software development; most of them are SMEs with fewer than 15 employees. It is difficult to obtain a definite total number of full-time development engineers, because many students and some college lecturers move in and out of business as part-time project workers, however, the number is estimated to be more than 3,000 employees.

148. Latvia has a young and growing software industry. While much of this is to support indigenous purchase and implementation of information technology such as financial packages, there is evidence of success in software development for a variety of applications. The few companies that have made an international impression have benefited considerably by attracting investment, experience substantial revenue growth, and acquiring knowledge and technologies.

149. The main advantages and disadvantages of the software in Latvia are summarized in Table IV-3, in light of the requirements from the major companies that operate internationally.

150. Private firms find it increasingly difficult to attract skilled labor. Latvia’s costs at for programmers are rising, partly due to more complicated supply and demand issues. In addition to official wage costs it appears common and expected that programmers receive additional payments. Compared with Belarus and many parts of Russia, costs for programmers tend toward being less competitive. One company in the FIAS survey is solving this problem by subcontracting some non-core activities while retaining overall project management. This allows the company controlled access to a wider range of skills and at lower cost.
### Table IV-3: Software developers and producers, 2003

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Constraints</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Competence and continuous supply of engineers with masters and doctoral degrees in relevant disciplines</td>
<td>• Costs rising and not lowest in region</td>
<td>• Young, but growing software sector</td>
</tr>
<tr>
<td>• Continuous training</td>
<td>• Engineer supply is uncertain</td>
<td>• Well positioned between Russian and Western markets with unique ability to easily do business with both.</td>
</tr>
<tr>
<td>• Access to global markets</td>
<td>• Poor postgrad pool</td>
<td>• Some good success stories already</td>
</tr>
<tr>
<td>• Continuous international exposure</td>
<td>• Isolated from markets and FDI opportunities</td>
<td>• Latvian Information and Telecommunications Technology Association (LITTA) established with strong initial strategies</td>
</tr>
<tr>
<td>• Funding for long development cycles</td>
<td>• Weak training and retraining</td>
<td></td>
</tr>
<tr>
<td>• Cost competitiveness (software is not location dependent; it can be moved electronically from producer to user)</td>
<td>• Absence of international marketing capability and market presence</td>
<td></td>
</tr>
<tr>
<td>• Exposure to international partnerships, including foreign investment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

151. Another concern is that only a few of companies have been able to integrate into the global economy, and because the Latvian market is limited, integration is crucial if the software industry is to survive. Of the 100 or so software companies, only a handful have penetrated international markets for export purposes or have attracted inward projects or inward investment. Those who have, such as Dati Grupa, Alise, Exigen and Tieto, have seen considerable growth and exposure to international markets and technologies. The two constraints—linkages to foreign partners and access to cost-effective skilled labor—and how to alleviate them, are discussed in the next section.

### 3. Customer-Based Services

152. Although the domestic economy is limited, Latvia is geographically well positioned to establish itself as a multiregional contact center hub that could link the Baltic States, Russia, and Western Europe. This diagnosis is well known and seems to justify the government’s interest, and that of many experts in developing customer-based services.

153. Recent experience, as briefly described early in this paper (Group 1 in Chart IV-1), shows that services for customers by and for the ICT sector are now outsourced to specialist companies. These specialized companies are generally referred to as call centers or contact centers, the former receiving or making contact by voice only and the
latter using voice mail, electronic mail, internet, and fax. In addition to providing services for the ICT industry, these centers also provide services to a wide range of other industries and businesses. A contact center can be dedicated to and owned by one user only, or, increasingly, it can provide a range of services to many customers.

154. These are some services for which a contact center may be used:

- Customer contact
- Customer inquiries (e.g., bill queries)
- Credit control
- Technical support
- Order placement
- Travel booking
- Hotel or car reservations
- On-line purchasing
- Help lines
- Telephone banking
- Financial services
- Telesales
- Telemarketing

155. An approximation of the contact center business size in Europe shows that it is growing much faster than the industries it services (Box IV-2). The number of centers in Europe is expected to increase from 12,000 in 2001 to 17,000 in 2003. For example, it is estimated that the United Kingdom has 5,000 centers, Germany has 4,000, Sweden has 1,200, and Ireland has 100 (70 of which are multinational). The market is fragmented, with a mixture of local and multinational companies. A number of very large multinational service providers operate in several regions.

Box IV-2: Leading the way? The Irish experience

The Irish experience can serve as a useful indicator of potential in this sector. Ireland has several similarities to Latvia: The size of its population and certain demographics are comparable, and neither country is centrally located in a region of large scale ICT market activity. In 1993, Ireland had no pan-European contact centers. Authorities had begun to recognize the imminent loss of large-scale manufacturing projects to China and Central and Eastern Europe, and telecommunication costs were too high. A strategic agreement was reached between the Industrial Development Authority, the government and telecommunications service providers to make Ireland competitive for in-bound free phone calls. Coupled with a major marketing effort by the International Development Association, this has resulted in the current situation, in which more than 6,500 people employed in 100 companies. This is expected to double in the next 3 years. More than 30% of U.S. call center investment in Europe since 2000 has been in Ireland and they handle a variety of sectors: hotels; carhire; airlines; insurance; ICT providers; back-office functions, etc.

156. As a call center location, Latvia has the potential of the Russian market. While Russia does have several hundred such centers (258 at the end 2001), they are primarily indigenous, small centers that focus on specific local markets. Call centers in Russia with
fewer than 30 agents represent 58.6% of the market in volume terms. The sector is much more developed in Sweden, many centers employ several hundred agents. Russian language skills in the Latvian population can serve to attract expansion and displacement from the Swedish centers that wish to serve the Russian markets. The comparative security, proximity, and ease of doing business in Latvia should obviate the necessity for international companies to locate within the Russian borders. The recent fiber optics link from Latvia to Gotland in Sweden can be significant in this scenario. The caveat, however, is that Russia has a well-developed communications infrastructure, particularly around Moscow and St. Petersburg, and Latvia must compete on cost and technology terms with these alternative locations.

Table IV-4: Customer-based services, 2003

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Constraints</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Modern telecommunications infrastructure, including digital and broadband</td>
<td>• High costs of telecommunications</td>
<td>• Backbone of telecommunications infrastructure in place</td>
</tr>
<tr>
<td>• Multilanguage skills</td>
<td>• No established reputations</td>
<td>• East-West language skills reasonably good</td>
</tr>
<tr>
<td>• Geographic positioning to attract multinational specialist providers</td>
<td>• Ability of government to influence services and costs from the privatized telecommunications sector</td>
<td>• Multicultural</td>
</tr>
<tr>
<td>• Good level of technical training in young population</td>
<td></td>
<td>• Good geographic positioning for services using information technology</td>
</tr>
<tr>
<td>• Low-cost communications, particularly incoming international free phone calls</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

157. Companies have a number of requirements before they would consider using Latvia as a base to establish a call center or a contact center. The major ones are summarized in Table IV-4. Aside from the basic infrastructure, which appears to be largely in place, they emphasize the need for skilled labor and labor flexibility; companies require multilingual skills as well as technical skills in information technology and financial engineering.

4. Value-Added Hub Services

158. Most ICT products are now fashion, or market sensitive. Therefore, an increasingly knowledgeable customer base requires a wide range of product configuration

options. While manufacturing is tending toward centralized, large-scale manufacturing in low-cost countries, a need exists for regional value added logistics (VAL) centers that can make the link between the manufacturer and the customer in a speedy and cost-effective manner.

159. Time to market and cost-effectiveness have become essential factors in a firm’s decision to relocate these activities. Countries such as the Netherlands and Singapore have been able to promote themselves as regional hubs because of their location and the quality of their infrastructure (transportation, storage, and communications) (Box IV-3).

160. Historically, Latvia has capitalized on its location as the center of the Baltic States and its proximity to Scandinavia and Russia to act as a transfer point for a wide variety of goods. Latvia has a relative good infrastructure at its air and sea points and for through-traffic, which explains the interest by Latvian authorities and by a few foreign companies in developing Latvia as a hub for value added services. Examples of these activities could include freight transfer from a variety of locations, storage, consolidating components into delivery packages (e.g., display, computer, keyboard from different locations), bulk order repackaging (i.e., storage, ship-to-order, testing, modifying, localizing etc.), representative order processing, representative invoicing, and brokering.

161. Several constraints must be addressed so that Latvia can attract investors to this sector (Table IV-5). Exports and import administrative procedures are not yet rapid enough so that they create a comparative advantage for a company to locate to Latvia. The transportation infrastructure, while competitive with other Baltic countries and more modern than that of most former CIS countries, is not as reliable and effective as it is in Scandinavian countries. Many companies have emphasized the gap between Helsinki and Riga ports. Part of this gap is explained by the lack of volume in Riga, preventing economies of scale, but it is also due to management and administrative problems. The same difficulties appear to exist in the storage and warehouse facilities.
Table IV-5: Value-added services, 2003

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Constraints</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sea/air/land access with high-volume capacity</td>
<td>• Regulations do not favor fast entry/exit of goods</td>
<td>• Two sea ports with potential for further development</td>
</tr>
<tr>
<td>• Ease of import/export regulations</td>
<td>• Russian customs</td>
<td>• International airport but not a major freight hub</td>
</tr>
<tr>
<td>• High-capacity carriers with daily in/out services</td>
<td>• Economies of scale</td>
<td>• Bordering the large markets of Russia and within easy reach of Scandinavia</td>
</tr>
<tr>
<td>• Inbound costs must compete with Helsinki and St. Petersburg</td>
<td>• No major sea or air carriers currently serve Latvia</td>
<td></td>
</tr>
<tr>
<td>• Storage facilities</td>
<td>• No anchor tenant to demonstrate feasibility</td>
<td></td>
</tr>
</tbody>
</table>

C. REMOVING CONSTRAINTS FOR DEVELOPING THE ICT SECTOR

162. FIAS has identified two major constraints in the development of Latvia’s ICT sector, and they are similar to those discussed throughout the report. The first constraint consists of the lack of interactions between Latvian firms and foreign markets. Only a few foreign companies have been interested in investing in this sector, and few local companies have been able to develop significant relationships with foreign partners. The second constraint lies in the increasing difficulty in acquiring skilled labor at a competitive cost. This is highly associated with the absence of training policies in the workplace, despite active education policies to disseminate computer use and literacy.

163. These two constraints are not exhaustive, but policymakers in Latvia can address them in the short-term. Over time, it is essential that they be complemented by appropriate education and infrastructure upgrading to sustain and increase the competitiveness of the Latvian ICT sector. For example, it is essential that contact centers must have access to low-cost digital telecommunication infrastructure with broadband capabilities.

1. Strengthening Linkages with Foreign Partners

164. It is crucial that Latvia strengthen the relationships between local and foreign firms in the ICT sector. These relationships should help Latvian companies adopt and adapt existing technologies in activities where a strong expertise still does not exist. For example, Latvia offers some potential to provide customer-based services and valued-added services, but Latvia lacks the international reputation and expertise to do so. In other activities, such as software development, local expertise already exists, and linkages with foreign partners are important for facilitating access to foreign markets, which
enhances new product development, and stimulates (and funds) research. This emphasis on the need to establish cooperation with foreign partners and investors appears on the top of the agenda of firms that operate in the ICT sector in Latvia (Table IV-6).

**Table IV-6: Survey of the ICT sector**

<table>
<thead>
<tr>
<th>What supports the development of the ICT sector most?</th>
<th>Agree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperation with foreign partners and investors</td>
<td>47</td>
</tr>
<tr>
<td>Service infrastructure</td>
<td>30</td>
</tr>
<tr>
<td>Education policies</td>
<td>24</td>
</tr>
<tr>
<td>Communications infrastructure</td>
<td>19</td>
</tr>
<tr>
<td>Legislation</td>
<td>4</td>
</tr>
<tr>
<td>Taxes</td>
<td>3</td>
</tr>
</tbody>
</table>


165. Local firms have multiple options for establishing relationships with foreign partners and investors. The most direct channel is foreign direct investment, through which a foreign partner acquires managerial responsibilities by financing part of the equity of the company. The ICT sector is estimated to constitute up to one-tenth of total accumulated FDI in Latvia, with the privatization of the national telecommunication company accounting for most of it. The most significant acquisitions from recent years have been made by Tieto from Finland, by Exygen from the United States, and by Microlink from Estonia. As an indication of the potential interest of some multinational companies, some have established their regional headquarters in Riga. Alcatel (France), Exigen, IBM, Microsoft, Sybase (all USA), Marconi and Nomad Software (UK), and TietoEnator (Finland/Sweden) are examples.

166. Alternative channels can be developed between Latvian and foreign firms: joint training programs, marketing, supply chains, and so on. A few of these the channels are summarized below for a limited sample of Latvian firms. The sample includes the most dynamic firms in the ICT sector in Latvia; or at least those that presented themselves to FIAS.

167. The six firms included in Table IV-7 accounted for the bulk of exports in the information technology and electronic equipment industries, which amounted to US$75 million in 2001, with hardware accounting for US$ 49 million and software accounting for US$26 million. Major foreign orders come from Germany, Ireland, Sweden, and the United States. These exports made by Latvian firms operating in the ICT sector consisted of supplying multinational companies outside Latvia. Four of six firms reported supplying major companies abroad, and large assignments have been completed among others for IBM, Siemens, Nixdorf, Hewlett-Packard, Unisys, Nokia, LTU, Citibank, and Daimler-Chrysler. Some firms have collaborated with foreign partners to operate in foreign markets, such as Dati, Exigen, and Tieto, or they have sent their staff for training courses abroad. If all firms report supplying one multinational company in Latvia, this relationship principally reflects interactions with the national telecommunications company.
Table IV-7: Existing linkages between foreign and domestic companies in the ICT sector

<table>
<thead>
<tr>
<th>Linkage</th>
<th>IBM</th>
<th>Alise</th>
<th>Dati</th>
<th>Exigen</th>
<th>Microlink</th>
<th>Tieto Enator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing network</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Training abroad</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Direct foreign Invest.</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Loan or subsidy from a multinational company</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply to a foreign company established abroad</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Supply to a multinational established in Latvia</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

168. The success of these firms appears to be closely related to the establishment of relationships with foreign partners, which have provided the firms with a combination of credibility and marketing, as well as technical skills. Those with the most success gained credibility on a single project abroad and then attracted foreign investment.

2. Skilled Labor and Training

169. In order to penetrate international markets and attract international interest, most firms operating in the ICT industry emphasize the need for skilled labor at competitive costs.

170. Some signs indicate a shortage of engineers and software developers in Latvia. These signs are based on a few meetings with firms and experts, and should be verified by a more systematic analysis. Such an analysis is important because any shortage will need to be addressed, because it takes time to educate people, especially for specialized tasks as required in the ICT industry.

D. Recommendations

171. Ireland, Scotland, and Wales until recent years invested heavily in attracting major suppliers of ICT goods and services. Their successes have shown, beyond the existence of strong comparative advantages, the importance of developing linkages with foreign companies and markets, as well as in facilitating access to skilled labor.

172. The recommendations are based on the same principles as those identified in the preceding chapters. FIAS emphasizes four complementary actions: a) training with an emphasis on b) linkages with foreign partners; c) R&D; and d) information and marketing.

173. Training. Although skills development should be part of the Latvian government’s global education strategy, some immediate steps can be taken. As Chapter II noted, there is a paucity of training by firms in the workplace. Training is crucial
because it allows firms to directly train their staff and respond to the rapid technological innovations of the sector. Each firm is likely to have developed its internal standards and processes and will require staff to adopt them in a relatively short time. In the ICT sector, internal courses are frequent and viewed as a necessity by most firms.

174. FIAS believes that the government should play a more active role. So far, Latvia has no policies to encourage firms to enhance their training capacities. Because the benefits of such capacities are likely to spill over from a firm, subsidies or tax incentives should be provided to the private sector; a few of these were described earlier. An international example that has been applied in the ICT sector is explained in Box IV-4.

175. The existence of a broad-based industry association such as LITTA can be expanded to design and achieve a national plan, which, over time, would seek to meet industry requirements with labor skills and R& D efforts. LITTA will need to coordinate continuous training for qualified engineers, to maintain the skills of engineers at current industry levels, and to assist in specialist training for experienced engineers. Although some of the costs should be borne by the beneficiary companies, a system of subsidy through training grants should be considered, as was suggested in Chapter II.

176. **Linkages with foreign partners.** It is only through participation in international markets that the industry is going to mature. This will require skills in international sales and marketing, and in complex project management, which are not currently available in Latvia. Furthermore, a major recognition of this skills deficit in the third-level education system seems to not exist.

177. A suggested initial step would be to invite an international provider of training in sales and marketing to establish an office in Latvia. This would be focused on executive training and development while indigenous capability is developed. Some form of subsidy would attract such training companies.

178. **Research and development.** The development of unique products and solutions within the Latvian ICT sector can be greatly enhanced by a coordinated effort in the direction and commercialization of research and development. While commercial

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**Box IV-4: Training programs in the ICT sectors**

Since the 1970s, the Republic of Ireland has operated an extensive industrial training program, and the Industrial Development Authority uses the availability of structured and customized training programs as a selling point to attract FDI.

During the development years of the ICT sector, professional and external trainers were used. Trainers and instructors had to be approved in advance by the training authority (Fás).

A company use approved programs and trainers and conducting a course when the need was pre-agreed by submission of a detailed application, could obtain a refund of up to 50% of its external training costs. Such training programs were used extensively, and an across-the-board levy of 1% of a company’s wage bill was imposed as a means of funding. Training was therefore tailored by a company to its own needs. In certain cases, an internally developed and presented course could also be approved for subsidy, providing the course met all the criteria of the independent courses.

In recent years the emphasis of Fás has been focused more on correcting imbalances in the labor supply market.
research is the domain of private industry, it is increasingly common in many developed countries to have formal links between the centers of academic research and industry. It is also common to have structures and funding in place to allow commercially viable research findings be spun off into private enterprise.

179. **Information and marketing.** It is not possible, particularly for smaller and developing software companies, to be present in several international markets. However, it is essential to have such a presence in order to establish contacts with suitable partners and clients. This may be directly, or more likely, through partnerships in selected locations.

180. Consideration should be given to locating a number of industry specialists in selected markets. Germany, Ireland, the United Kingdom, and possibly the United States would be likely initial locations. The relevant government body and industry should jointly select these specialists. FIAS recommends a joint industry/government approach to placing competent professionals in selected overseas markets with the goal of identifying target channels and linking with home based providers.

181. **International marketing.** Latvia does not have a strong image abroad as a source of information technology competence. Yet, Latvia can compete in many areas in this sector. This is an issue of insufficient or inadequate marketing. Even the few Latvian companies achieving success on the international stage express these concerns. The ability to identify key markets and associated strategies, perform competitive analysis, and win the confidence of international customers is of paramount importance. There should be an immediate targeting of both the existing marketing executive pool and undergraduates to develop these skills. For existing executives, perhaps a national training authority, as suggested earlier, could provide such training. However, FIAS suggests that LITTA could also coordinate some interim training, at least partly, for participating companies.

182. Other studies have been conducted on the Science and Technology Parks project in Riga. The concept, when fully implemented, should contribute significantly to attracting high-technology FDI and generate spin-offs into the indigenous industrial and educational sectors. In this regard, however, consideration should be given to some related points mentioned elsewhere in this report, as well as to the institutional and administrative requirements associated with such an initiative.
183. The Latvian government has selected the electronic sector as a priority in its strategy to develop a knowledge economy. This choice has been partly justified by the historical emphasis on this sector during the Soviet era and, as a result, the presence of local companies and a relatively important pool of skilled labor. Yet, the importance of this sector in the Latvian economy has become marginal today. Most of the firms that operated in the past decade have disappeared or have been considerably downsized as a result of their lack of international competitiveness.

184. Only a handful of firms have emerged from the transition to a market economy. The successful firms, as in the ICT sectors, have shown two main characteristics. First, they have been able to exploit the relatively skilled labor that is still available in Latvia rather than seeking economies of scale. Second, they have sustained their development by developing a network of relationships with foreign partners and foreign markets. These firms have been able to integrate into the global economy. Their lessons will help derive a series of policy recommendations.

A. OVERALL DIAGNOSIS OF THE LATVIAN ELECTRONIC SECTOR

185. The electronics sector includes subsystems, components, semiconductors, enclosures, and consumer electronics. Around 5,000 companies work in the sector worldwide, 500 of which have an annual turnover of more than $10 million. The majority of companies are located in the United States, but the industry’s long-term growth potential is strongest in Europe. The biggest companies, most of them American, include SCI (US$6.5 billion in annual revenues), Solectron ($6.1 billion), Celestica ($3.2 billion), NatSteel (Singapore; US$1.5 billion).

186. Over the past decade, the electronics sector has seen a rapid and brutal evolution (see Box V-1 for factors). Similar to the changes described in the ICT sector (see previous chapter), the large and vertically integrated firms have been replaced by supply chain structures that integrate multiple groups of companies. Outsourcing has allowed the main original providers to turn fixed costs into variable costs, lower the cost of sales, reduce inventory exposure, and free up cash, all of which have led to the industry’s emergence and growth.

187. These recent changes have also caused a profound change in the traditional customer base of the electronic sector. Today it appears that the main clients are other

industries, mainly in the ICT and automobile sectors. By contrast, consumers represent about only 30% of direct sales.

188. The electronics sector in Latvia has not been isolated from these changes. During the Soviet era, Latvia’s electronics industry played a central role not only in civil production, but also in the Soviet military industrial complex. Five large plants with specialized production formed the backbone of Latvia’s electronics industry: VEF, Alfa, Rigas Radiotechniskais Rupnica (RRR), Komutators, and Elar. The electronics sector employed about 30,000 specialists. The industry in general was supported by a system of scientific institutes that were involved in industrial science, and which employed a research staff of 10,000 people. The industry also included large institutes in which Soviet specialists copied Western technologies.

189. Today, the electronics sector clearly appears to be of secondary importance in Latvia. Unlike in Estonia (with Elcoteq) and in Lithuania (Vilniaus Vingis and Ekranas), no very large companies have been able to integrate the supply chain at the international level (Boxes V-2 and V-3). The Latvian electronics and electrical engineering sector is made up of 50–60 companies that altogether employ 5,500–6,000 people. In 2001, the industry’s output was 1.2% of GDP and its turnover was 97.1 million euros.

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**Box V-1: Drivers of changes in the electronics sector**

The main drivers of the recent changes in the electronic industry worldwide are discussed below.

**Lower costs.** The emergence of supply chains allows labor costs and overheads to be reduced. The original providers can also reduce their materials procurement, inventory, shipping, insurance, and other costs.

**Reduced capital investments.** Original economic manufacturers can tap global production networks, reducing their OEMs’ need for investing in rapidly evolving manufacturing and testing technologies and, in turn, shift capital resources to their core competencies such as product design, marketing, research and development and building channel relationships.

**Faster time to market.** New firms are highly specialized and can play an important part in product development stage (prototyping; design for manufacture and testing by using their manufacturing equipment) as well as ramping up production quickly. The typical turnaround time for a consignment job is one to two weeks, and for a turnkey job it is six to eight weeks.

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38 Letera’s membership structure is 9 large companies of more than 250 employees, 12 medium-sized companies (50–249 employees), and 29 small companies (fewer than 49 employees).
Vilniaus Vingis (VV) is an example of a Lithuanian company that has had success integrating with the global production and distribution networks through subcontracting. VV is one of the largest manufacturers of electronic components in Central and Eastern Europe, and the largest manufacturer of deflection yokes for black-and-white and color picture tubes in the Baltic and CIS countries, with more than 40 years of experience. Its product assortment also includes flyback transformers and power transformers for TV sets, monitors, video control equipment, winding machines, and household goods. Yokes account for about 85% of total output.

Samsung purchases about 37% of yokes produced by VV. Samsung uses the yokes in TV tube production, which in turn, become part of TV sets assembled by Samsung and Philips. Another 30% of yokes are sold to a Lithuanian company, Ekranas, where they become part of assembled TV sets sold abroad. Ekranas accounts for 4% of Lithuania’s total exports to Western Europe; 10% of VV’s output is exported to Philips in Barcelona, and 7% to Philips in England. Another 10% is shipped to Thomson Polkolor in Poland, where the yokes become part of TV tubes sold all over the world through Thomson’s distribution network.

Ekranas is located in Lithuania and belongs to the top ten of European color picture tube manufacturers. It produces glass components as well. In 1999 about 85 per cent of its production was exported primarily to Turkey, Italy, France, UK, Poland, and Germany. Ekranas collaborates with Thomson and some Japanese companies on developing new products and is part of their supply chain. It adopted the ISO 9001 quality control system in 1999 and its production is certified according to the Russian GOST, the British BSI and the German VDE standard.

However, regardless of the general size of the electronics industry in Latvia, few firms have emerged successfully over the past few years. FIAS staff met representatives of nine high-tech companies in the electronics sector. The companies that have survived are those that have endured substantial restructuring by gathering the best of technology and people that were present before 1990, and by developing specialized competencies related to some other field (e.g., electronics and medicine, electronics and chemistry).

Following the general rule of examining which companies have already been growing in Latvia’s electronic sector, one can develop a preliminary list of characteristics of firms that might be attracted or emerged. One good guideline of investors to target is the principle of “if something moves, push it.” Within that context, we briefly describe what some of these companies are doing because it can provide an indication of potential niches for the Latvian electronics industry:
- JOT Automation—The R&D division of an engineering company based in Estonia.
- ELMI—A producer of medical devices, relatively large batches (centrifugation), the subsidiary of a Russian company.
- Sidrabe—A producer of special equipment for coating, a high-technology, subsidiary of a U.S. company, well established, with a world-class reputation in its niche.
- Microlink—The Latvian division of an Estonian company; industrial activity that has a good potential for growth in export markets, very high technology.

192. The electronics sector in Latvia has two main characteristics for successful firms: a) they offer a relative degree of technological sophistication that allow them to integrate into the global production network; and b) they rely on a relative small size for their operations.

193. These companies have been successful because they are competitive enough to expand beyond the local market, which remains extremely small. Indeed, it is estimated that about 70% of the electronics industry’s output was exported in 2001, with more than half destined for Western markets. The main export countries were Sweden (19%), Estonia (18%), Russia (18%), Germany (15%), Lithuania (13%), and Finland (7%). The main export goods were electronic devices (28%), testers (19%), radio and telephony devices (14%), automotive components (10%), integrated circuits (8%), and loudspeakers (5%).

194. The success of these firms can be explained by their technological level rather than by their capacity to compete at lower costs. Although production costs are lower in Latvia than in most of Western Europe, they are higher than in neighboring countries such as Belarus or Ukraine or in Asia. All success stories in Latvia are based on a technological advantage against their competitors and a good knowledge of their clients’ needs (notably in foreign markets). All firms, without exception, were very well aware of the most recent technical developments in their areas. As an illustration of the relatively high level of technology in Latvia, Siemens has opened two regional centers of excellence for microwave data transmission and indoor networking solutions. The EU awarded a prize to the Latvian Institute of Electronics and Computer Science for research in the field of digital signal processing in 1997. A local company, SIDRABE, has developed a very specific technology, which it inherited from former military technologies, at the state-of-the-art top level, exporting its products to niche markets in the entire world.

195. The high level of technological expertise is the major reason behind the success of electronics firms in Latvia that FIAS was able to assess. Not only is the level of technological expertise up to date with the most current international standards, but the general level of professionalism of the managers also appears adequate in all cases, and at par or comparable with the other European and developed countries.
196. During our visit, several managers reported having increasing difficulty finding skilled labor, and the demand for experts and skilled labor has created some tension in the local labor market. This concern also applies to generalists or engineers with a general background, and may eventually push some companies to look elsewhere (including relocating their production facilities). Although this pressure on the local market can be addressed by appropriate educational policies, their effects will take place only in the mid to long terms. In fact, the increasing pressure on the labor market reflects the limited size of the skilled labor pool in Latvia. A “back of the envelope” calculation shows that the labor force is around 1.3 million, with an estimated 0.21 million workers with tertiary education, or only 50,000 scientists and engineers. These figures illustrate that even with a relatively high percentage of educated people and experts, the absolute number of skilled labor will remain limited in Latvia due to the small population size.

197. The small pool of skilled labor explains why most of the recent success has been by companies that employ relatively few skilled laborers. This strategy has allowed the companies to avoid increasing pressure on the labor market. Large operations in electronics assembly, such as those of Elcoteq in Estonia, would inevitably trigger higher salaries and reduce Latvia’s competitiveness in comparison to neighboring countries such as Belarus and Ukraine.

B. REMOVING CONSTRAINTS

198. In the past few years the Latvian electronic sector has been able to emerge through the success of a few companies in specific niches. This success has indicated that the development of the sector is possible to the extent that two major constraints are removed: the first is that the relationships with foreign partners and markets are relatively limited, despite the success mentioned above; the second is that the costs of doing business for SMEs and exporting companies remain relatively high due to administrative/procedural barriers. These barriers should be removed.

Enhancing Channels with Foreign Partners

199. Export share is important in the electronics sector especially because a high level of exports has been achieved through close interactions with foreign partners. For example, successful electronics and electrical companies have reputable customers, such as ABB, Siemens, Nokia, AEG, ELGA, Bayer, Agfa, Bio Tek, LT Industries, Telia, Sonera, Tele Denmark, and NetCom.

200. Developing linkages with foreign partners has proven to be most useful for existing electronics firms in Latvia and has provided an immediate effect on exports. There is some evidence that local companies in the electronic sectors have been able to address some of their basic needs through joint operations with foreign partners. Among the most important are training, co-financing of research, technology and equipment imports, and so on (Table IV-8).
Table V-1: Existing linkages between foreign and domestic companies in the electronics sector

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training (co-sharing)</td>
<td>ABB and Siemens</td>
</tr>
<tr>
<td>Co-financing of R&amp;D by a multinational or foreign partner</td>
<td>JOT Automation</td>
</tr>
<tr>
<td>Direct Foreign Investment (Greenfield or Joint Venture)</td>
<td>ELMI, ABB, Siemens, Sidrabe, Microlink</td>
</tr>
<tr>
<td>Imports of Material/Equipment</td>
<td>ABB, Siemens</td>
</tr>
<tr>
<td>Supplier to foreign companies established abroad (exports)</td>
<td>Sidrabe, Microlink, Elmi</td>
</tr>
<tr>
<td>Supplier to foreign companies established in Latvia</td>
<td>ABB, Siemens</td>
</tr>
</tbody>
</table>

201. Despite the success of these companies, interactions remain limited between local companies (and research centers) and foreign partners. There might be several reasons for this: a) lack of quality, because the standardization processes have been used minimally in this sector, b) absence of marketing, and c) lack of incentives for researchers (i.e., commercialization rights).

Removing Barriers Against Exports

202. Because it is important to integrate Latvian companies into the global production network, there is an urgent need to remove the obstacles that exporting companies face in doing business in Latvia. These obstacles were reviewed in Chapter II at the general level, and they are approximately identical for companies in the electronics sector. A series of administrative procedures remain complicated and are a source of delay for exporting companies (e.g., customs clearance). Many firms also complain about the poor infrastructure, notably the ports and roads, which are not yet at the level of international standards. The waiting time for VAT reimbursement has been a concern for a few companies. These obstacles are well known and recommendations were developed in Chapter II to address them. Still, it is even urgent to address them for the electronics sector because exports remain their only avenue for expansion and, ultimately, success.

203. Success in removing these barriers, as well as in developing linkages with foreign partners, is crucial in the sense that Latvia does not seem to present fundamental advantages compared with neighboring countries.

C. RECOMMENDATIONS

204. Developing the electronics sector in Latvia remains a challenge. The cost of labor is high and the relatively small pool of skilled labor prevents the development of activities where economies of scale are crucial. The need to offer strong comparative advantages is exacerbated by the limited size of the local market.
205. Yet, over the past few years, a few companies have been able to blossom using their technological advantages in a few niches. This development has been possible through their integration with the global network that have given them access to export markets and, for some, training capacities and financing. The lessons from this recent experience suggest that the government must strengthen linkages with foreign markets and partners.

206. FIAS proposes three actions that should help develop these linkages:

- Upgrade the quality and increase the reputation of local products abroad.
- Remove barriers to exports.
- Institute marketing and information diffusion.

207. The recommendations for the first two actions are similar to those that were described in Chapter II and, to some extent, to those proposed for the ICT sectors. Assisting private companies, notably small ones with limited financial resources, is necessary for them to acquire global quality standards. Although not all standards are mandatory, compliance greatly enhances the marketability of the item and are crucial in the effort to increase the visibility and reputation of local firms in order to eventually attract foreign partners. One international standard that Latvian companies can implement is the new ISO 9001:2000, the quality management system that ensures product integrity. Certification in this standard will, at minimum, provide an internationally recognized seal of approval. Another option, perhaps less costly, is for Latvian companies to acquire certification from regional and national standards (Box V-4), from they can gradually develop their process and product compliance and increase their market opportunities.

208. Latvian companies need not go about acquiring standards certification alone. Several consulting and service companies can assist companies to meet various regulatory, safety, and management standards to acquire certification.

Box V-4: Regional and national standards

The DKE German Commission for Electrical, Electronic & Information Technologies is responsible for the elaboration of standards and safety specifications covering the entire area of electrical engineering. It constitutes a joint organization of German Institute for Standardization (DIN) and the Association for Electrical, Electronic, and Information Technologies (VDE). The juridical responsibility for running the DKE being in the hands of the VDE.

CENELEC (European Committee for Electrotechnical Standardization) was established to harmonize existing national, regional, and private product testing and quality certification systems for electric equipment and electronics. It is involved with the conversion of IEC [International Electrotechnical Commission] standardization results into European standards; almost 85% of the European standards are based on IEC work results or are identical with them. In addition, CENELEC prepares its own European standards focused on European requirements. Furthermore, CENELEC has the task to establish a link between standardization and legislation—for the benefit of consumers and industry.
209. It is also recommended that enhancing the motivation of researchers and academics is needed to commercialize their innovations. Amending the intellectual property rights legislation is one step, as was detailed in Chapter II.

210. The necessity for private companies operating in the electronics sector to export a substantial share of their production abroad makes it essential that barriers to exports be removed. Specific recommendations can be found in the preceding chapter.

211. Latvia still does not have a strong image abroad as a competitive source of electronics. Yet, some recent successes can be used as a starting point for a strategic marketing/public relations campaign. The ability to identify key markets and associated strategies, perform competent analysis, and win the confidence of international investors and clients is of paramount importance.

212. One strategy for increasing the visibility of Latvian companies and products is to participate in trade fairs that showcase electronic products. Events such as these not only provide an annual, high-profile venue for publicizing products to an international audience, but they also present a high concentration of industry contacts (see Box V-5 for an example).

213. Another strategy for increasing company and product visibility is to establish contacts with industrial associations and chambers of commerce in various countries, such as Bundesverband der Deutschen Industrie (BDI) in Germany and Groupement des Fournisseurs de l’Industrie Electronique (GFIE) in France. These contacts will be useful for Latvian companies because their activities include providing initial contacts and assistance in potential business opportunities between foreign companies and those in their own countries. Other activities that could be initiated are training workshops and grant programs with associations. Inversely, Latvia should use its electronic association, possibly in partnership with embassies and consulates to find potential partners abroad and to publicize their companies’ names and products.

Box V-5: Productronica 2003

PRODUCTRONICA is the only trade fair that presents the world of electronics in its entirety. Its exhibits range from development to services, including manufacturing. Its product group categories are organized according to the logical flow of production and to market requirements. From innovative insertion techniques to the latest solar modules, a number of new developments—many of them revolutionary—will be on display at this year’s fair. When it comes to integrating all the links in the production chain, the world’s fair for this industry is the ideal forum. In the world of electronics manufacturing, PRODUCTRONICA has been the premiere market gathering for a long time. The 15th International Trade Fair of Electronics Production will occur November 11–14, 2003 at the New Munich Trade Fair Center.

Source http://www.productronica.de

214. Advertising in trade journals is another effective means of entering the international electronics market. For instance, Germany’s Productronica (Box V-5) and
Markt & Technik (Market & Technology) have a membership of 11,000 and 36,000, respectively. Other elements for developing an effective marketing approach can be found at the end of the preceding chapter devoted to the ICT sector.
ANNEX A
WORLD BANK INSTITUTE’S METHODOLOGY APPLIED TO LATVIA

A set of structural and qualitative indicators was collected for each of the four dimensions. The methodology consists of ranking 100 countries from the highest (a 10) to the lowest (a 0) and placing countries into the corresponding deciles. A summary measure, the knowledge economy index, was constructed by taking an average for the three representative variables for each of the four knowledge dimensions (i.e., education, innovation, and information society, economic and institutional framework).

Using this methodology, Latvia appears relatively well placed to take advantage of the knowledge revolution because it has a well trained labor force, considerable capacity in science and technology, relatively well developed communications facilities, and an increasing openness to foreign trade and FDI. On the other hand, expenditure on research and development, enrollment in tertiary education, computer availability, and the presence of Internet hosts are all low compared with EU member states and neighboring countries. Figure A-1 shows that Latvia has progressed between 1995 and the most recent period (which ranges from 2000 to 2002) from a score of around 4.2 to a score of 5.7, ahead of Russia and Turkey; roughly on par with Lithuania and Poland, the average candidate countries; and behind the EU average, Chile, the Czech Republic, Estonia, Slovakia, and Slovenia.

Figure A-1: Latvia knowledge economy index

Source: World Bank Institute, KAM 2002

Latvia’s progress across the different dimensions of a knowledge-based economy indicates that most progress between 1995 and the most recent period (between 2000 and 2002, depending on data availability) seems to have been made with regard to the

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39 See also the World Bank Institute’s Knowledge Assessment Methodology: www1.worldbank.org/gdln/kam.htm
40 See also the recent presentation made by Alfred Watkins, Knowledge Economy and Global Competitiveness: Implications for Latvia, February 14, 2003.
economic and institutional regime and the advancement of information-communications technology infrastructure (the latter is also observed in all candidate countries during this period as computers are installed and the Internet is accessed). The least progress has been made with regard to education systems (albeit already in 1995 literacy and enrollment levels had already been high). Latvia seems to perform particularly poorly on the innovation dimension of knowledge based economy. \(^{41}\)

\(^{41}\) This aspect will be examined in details in the forthcoming World Bank’s study on the knowledge economy in Latvia.