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## Exports of software

*Exports of software and computer services from Iceland have been growing rapidly in recent years. From 1990 to 2000 the sector's exports have increased from just under 35 m.kr. to more than 2.4 b.kr., adjusted to 2000 prices. However, growth between 1999 and 2000 was only just under 80 m.kr., or 3.2%, the lowest annual increase since the Central Bank began gathering data on exports by software houses.*

### The software industry in Iceland

Since 1990 the Central Bank of Iceland has gathered data on the revenues earned by software companies from exports of software products and computer services. These data are used in the calculation of the balance of payments, as one section of exported services.

#### *Definition of software companies*

In the Central Bank survey, the following activities are classified as part of the software industry:

- Analysis of user software and hardware requirements.
- Software and hardware consultancy.
- Software development and production (customised and standard) together with compilation of manuals and program descriptions. Leasing of software.
- Data processing and data registration services.
- Database operation.
- Network operation.
- System leasing.

The main definition for selecting companies was to include those which had core activities in the

industries classified under IT consultancy services<sup>2</sup> and also earned export revenues in 2000. At the same time, several companies were selected from other industries which may be expected, according to previous surveys, media coverage or other sources, to be involved in software production and development, although their core activities are in other fields. A questionnaire on exports in 2000 was sent to 121 companies. In all, 111 companies responded, or 91.7%. Of the 111 respondents, 62 had earned export revenues from software and computer services in 2000.

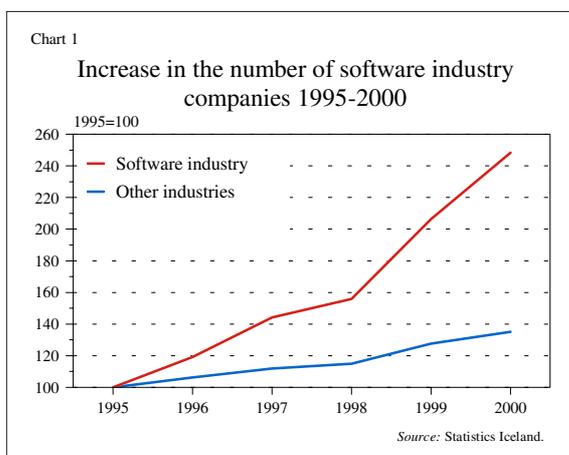
In the selection of software companies, it should be pointed out that the distinction between software companies and others in the technology sector is not always clear. The value and functionality of many companies' products largely depends on the software incorporated into them. The software is then a part of another product. The Central Bank survey, however, did not include such production.

#### *Domestic scope of the software industry*

The number of software companies in Iceland has grown sharply in recent years. Chart 1 shows the increase from 1995-2000 in the number of software industry companies in the Statistics Iceland register of enterprises, compared with growth in other sec-

1. The author is an economist at the Central Bank of Iceland Statistics Department.

2. Industry classification 72.10.0-72.60.0 Computers and computer services and 71.33.0 Leasing of office equipment and computers, under the Statistics Iceland ÍSAT 95 nomenclature.



tors. Software companies have grown much more rapidly in number than others over this period. In 1995 there were 188 software industry companies in the register, but by 2000 their number had risen to 467, an increase of 148%. At the same time, companies registered in other sectors increased by 35%.

However, purely numerical growth of companies is perhaps not the best yardstick of expansion in the software sector, since the size and scope of companies can vary considerably. A better reference is to use turnover and labour force statistics. Table 1 shows the estimated labour force in the software industry from 1991-2000, compared with other industries according to Statistics Iceland labour market surveys. This shows that the labour force in the

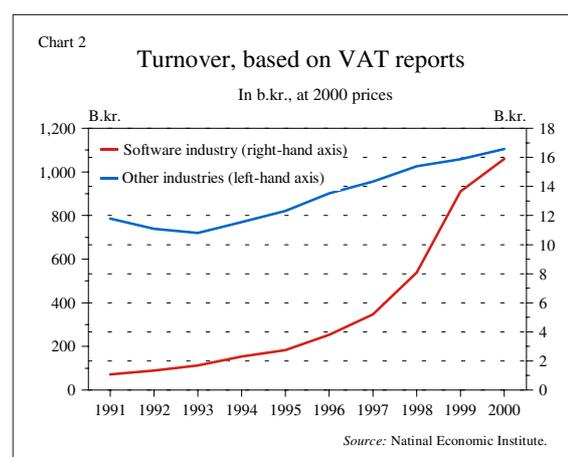
Table 1 Estimated size of labour force

|      | Software industry | Other industries | Total   |
|------|-------------------|------------------|---------|
| 1991 | 1,300             | 139,200          | 140,500 |
| 1992 | 1,000             | 142,000          | 143,000 |
| 1993 | 1,000             | 143,200          | 144,200 |
| 1994 | 1,000             | 144,400          | 145,400 |
| 1995 | 1,000             | 148,000          | 149,000 |
| 1996 | 1,300             | 146,200          | 147,500 |
| 1997 | 1,300             | 146,500          | 147,800 |
| 1998 | 1,800             | 150,300          | 152,100 |
| 1999 | 2,200             | 154,300          | 156,500 |
| 2000 | 2,700             | 157,400          | 160,100 |

Source: Statistics Iceland (labour market surveys).

software sector has grown much faster than that in other industries – more than doubling over the period, while the increase in other industries has been just over 13%. From 1995-2000 the total labour force in Iceland increased by just over 11,000 full-time positions, according to the survey. Of these, 1,700 were in the software industry. Thus 15 out of every 100 jobs created over the period were in software. In 2000, it was estimated that just under 2% of the Icelandic labour force was employed in the software industry. However, although the sector has attracted labour in recent years, it has been affected by staff shortages until, conceivably, very recently. Some labour has been brought in from abroad to fill vacancies in the Icelandic software industry, and certain companies have transferred their activities to other countries and set up production centres there, for example in India. Software development is a labour-intensive industry requiring specialised labour that takes a long time to train. The software production process is also typically a very long one. A long time generally elapses from an original idea to the creation of a marketable product. For a long time the University of Iceland was the only tertiary institution in Iceland which graduated computer scientists. More institutions graduate computer scientists at university level today, and the subject is also taught in secondary school courses.

National Economic Institute statistics for turnover of companies in the software industry from 1991-2000 show that their revenues grew more than fourteen-fold in real terms over this period (Chart 2).



## The IT industry

International comparisons and statistics divide the information technology industry into production and services. The services category is further subdivided into wholesale, telecommunications services, and software and consultancy.<sup>1</sup>

| Manufacture  | Services  |
|--|---|
| 30.01 Manufacture of office machinery  | <i>Wholesale</i>  |
| 30.02 Manufacture of computers and other information processing equipment  | 51.43 Wholesale of electrical household appliances and radio and television goods |
| 31.30 Manufacture of insulated wire and cable  | 51.64 Wholesale of office machinery and equipment                                 |
| 32.10 Manufacture of electronic valves and tubes and other electronic components   | 51.65 Wholesale of other machinery for use in industry, trade and navigation      |
| 32.20 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy  | <i>Telecommunications</i>   |
| 32.30 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods                                  | 64.20 Telecommunications  |
| 33.20 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment | <i>Consultancy services</i>   |
| 33.30 Manufacture of industrial process control equipment  | 71.33 Renting of office machinery and equipment, including computers              |
|  | 72.10 Hardware consultancy  |
|  | 72.20 Software consultancy and supply   |
|  | 72.30 Data processing   |
|  | 72.40 Database activities   |
|  | 72.50 Maintenance and repair of office, accounting and computing machinery        |
|  | 72.60 Other computer-related activities   |

1. Sector codes under the Statistics Iceland ÍSAT 95 nomenclature.  
Source: Nordic Statistics, The ICT Sector in the Nordic Countries. Copenhagen 2000.

Software industry turnover was just under 1.1 b.kr. in 1991 but had reached 15.9 b.kr. in 2000. Over the same period, turnover in other sectors grew by 41%. Massive turnover growth in the software industry reflects the fact that an ever-increasing number of areas in modern society depend on computers. Computerisation started in the working environment, but has spread to many aspects of everyday life, such as leisure, shopping and information services. Software and computer services are thus playing an

increasingly important role in modern society, thereby opening more opportunities for the sector.

### *Size of Icelandic software companies*

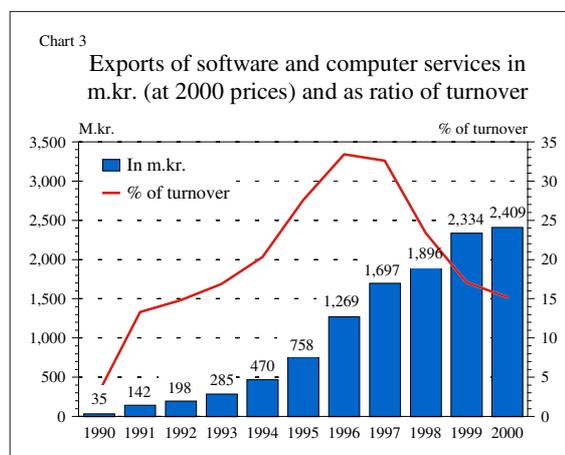
Iceland's small population inhibits business expansion potential. If they are to grow on any real scale, Icelandic companies have to export their products. Very few Icelandic software companies can be termed large, even by local standards. Nonetheless, several have reached the scale where they employ a

staff of several hundred in Iceland. Overseas marketing is complicated by the much larger markets involved, making it more difficult to analyse the market and establish business contacts, besides presenting much fiercer competition. Launching international marketing is therefore an extremely costly undertaking. Small and medium size enterprises generally have neither the financial nor human resources to penetrate markets abroad. The bulk of the work is shouldered by a handful of employees, and usually these companies lack the financial capacity to sustain conceivable operating losses in other countries while establishing a reputation in a new market. Most of them therefore depend on external support, such as venture capitalists and international sales and marketing consultants, in order to launch their overseas marketing work. But being small can have advantages too. Employees with small and medium sized enterprises often have a more comprehensive knowledge of their company and its products and services. Jobs with large corporations are frequently more specialised and defined than those with smaller businesses where employees have often been engaged in more than one aspect of production or operations. Management of smaller businesses is also simpler, with shorter channels of communication and closer involvement with employees and projects. Smaller businesses are thus often quicker to adopt new technology. However, international competition and the costly marketing which this entails demands larger operational units.

### Exports 1990-2000

Iceland exports a highly diversified range of software. In most cases this involves software that has proved successful in the home market, and specialised applications in fields where few players are developing solutions. Examples of Icelandic exports include business software based on foreign financial systems, specialised solutions, and software for data transmission, virus protection and the fisheries and health sectors.

Chart 3 shows that software exports have mushroomed since 1990, from 35 m.kr. that year to 2.4 b.kr. in 2000, adjusted to 2000 prices. However, growth between 1999 and 2000 was only just under 80 m.kr., 3.2%, the lowest rate of annual increase

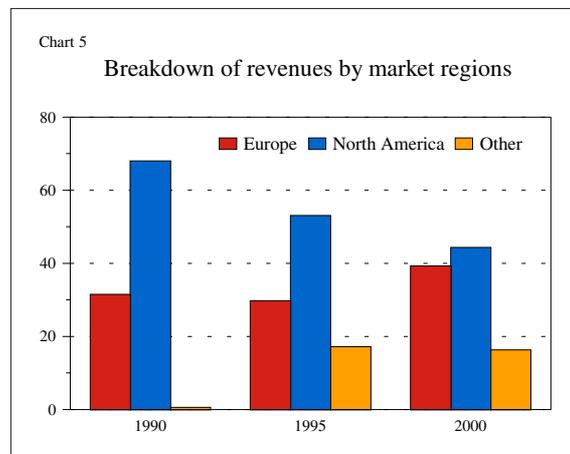
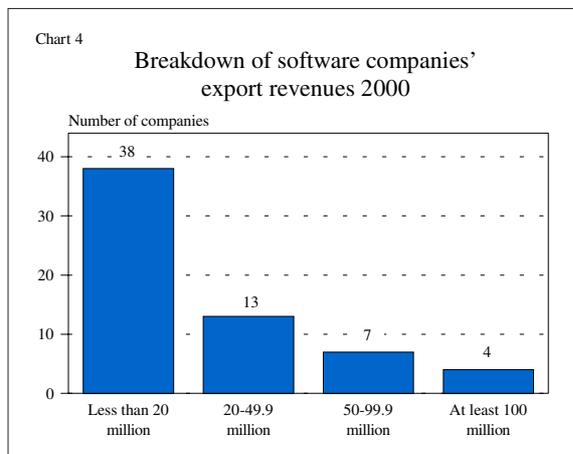


since the Central Bank began collecting data on software exports.

Furthermore, Chart 3 shows how the ratio of exports to turnover has been on the decrease since 1996: domestic turnover growth has therefore outstripped export growth. One conceivable reason is that staff shortages and rapid growth in the domestic market have left companies with less capacity for export work. Another explanation is that companies may have transferred part of their operations to other countries. Sales by their overseas subsidiaries or associated companies are not recorded as exports in the Central Bank survey. Since the purpose behind the Bank's surveys is to measure external service trade levels, it does not extend to companies' overseas activities. Icelandic foreign investments are measured through the capital account of the balance of payments. Profits earned by these companies in other countries appear in the balance of payments as factor income from abroad. Other value-added activities abroad are reflected in the respective countries' own economic statistics.

Of the software companies sampled in the survey, only four achieved exports exceeding 100 m.kr. in 2000. These export around half of all software from Iceland. The majority of companies (just over 61%), have export revenues of less than 20 m.kr. and 80% of companies are below 50 m.kr. A breakdown of export revenues is given in Chart 4.

In terms of market regions in 1990, 1995 and 2000, North America has been and is consistently the largest, although its share is decreasing (Chart 5). In 1990 almost 70% of all software exports went to



North America, but this ratio was down to just under 45% in 2000. Europe is the second-largest market region. Growth elsewhere is largely explained by exports to Asia and Australasia.

#### *Sales methods*

Software companies which earned export revenues in 2000 were asked about their sales methods in overseas markets. In all, 53 responded. The commonest method was direct sales to customers, followed by sales through foreign partners. More than half of the companies employed a single sales method – direct sales to customers. When two methods are involved, a combination of direct sales to foreign customers and sales through foreign partners is the most usual arrangement. If a third method is used, this generally entails sales through an overseas subsidiary or associate. Market penetration abroad therefore seems to begin with sales to individual customers. A partnership with foreign sellers follows, and when activities expand in scope an overseas subsidiary or associate is set up. This can be a desirable way to probe foreign markets. Partnerships with companies in the respective country enables their knowhow and experience to be utilised in the local market. This carries less risk than founding a branch, subsidiary or associated company overseas.

Iceland's software industry has grown sharply over the past decade. The number of jobs has doubled, turnover has increased fourteen-fold and export revenues have grown from just under 35 m.kr. to 2.4

b.kr. The software industry in Iceland has many qualities that could sustain its growth in the years to come. Supply of skilled labour has increased and many companies have long experience in program design. Although the domestic market is small, it is diversified and quick to adopt new technology, which creates the opportunity to develop solutions and innovate. Their small size may inhibit companies from exporting, however. Potential software exporters can be increasingly expected to look for foreign partners, set up subsidiaries overseas or merge with other software houses, domestic or foreign.

#### *Sources:*

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