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CZECH REPUBLIC

Technical report: Business information in the Czech Republic*

*Based on the work of Rudolf Stefec, national expert
on design of information systems*

Project Manager: J. Pavlik, Industrial Information Section

* Mention of firm names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO). This document has not been edited.

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1 ECONOMIC SITUATION

The main trends are set out below in only the briefest form. More attention is paid to the various programs intended to boost the economy and to assist businesses and businessmen, because of their inherent business information component.

1.1 Main trends

In 1994 the period of fundamental changes connected with the transformation of the Czech Republic to a market economy came to an end. At the same time, 1994 became the first year where most of the important economic indices showed signs of recovery and upward trends.

This was accompanied by continued privatization and a further decrease of the role of the State in controlling the national economy.

All the same, the major production sectors and, to an extent, the services remained at a level below that of 1990, lagging behind by 13-30 % at the end of 1994.

The GDP rose by 2.6 % as against 1993 in comparable prices, and 56.3 % of this rise was accounted for by private enterprise. Manufacturing grew by 2.3 %, together with a 5.2 % boost in labor productivity. Consumer prices rose 10.0 % on the average, whereas real wages increased by 5.2 %.

Utility generation kept level at 54.8 mln GWhours. Construction grew higher by 7.5 %. Output in agriculture rose 4.8 %. Retail sales kept growing systematically (by 14.8 % and 5.5 % in current and comparable prices, resp.). Tourism noted a 26 % increase. Public transport dropped 4.3 %. Housing construction dropped 37-50 %.

Foreign trade balance is negative, the volume of imports and exports rose 13.1 % and 6.9 % in current prices, resp.

The state budget had a surplus of CKR 10.4 bln. Inflation in terms of consumer prices was 10 %. Unemployment rate was 3.19 %.

Recent notable events include

- * the return to a fully convertible currency
- * large foreign investments into Czech Telecom
- * the country's high credit rating
- * balanced budgets expected in 1995 and proposed for 1996.

1.2 Programs of support to the Czech economy

The transformation process in the Czech economy is characterized by a boost of activity of the private sector, including the SMEs. The extremely dynamic upward sweep of the number of private entrepreneurs, witnessed during the first years of the economic transformation, has now become stabilized, but the share of SMEs keeps growing larger.

As at 30 June, 1995 the Czech Republic had almost 1 million private entrepreneurs on file, which was almost 12 % more than at the end of 1993. In certain sectors, the SMEs have already taken up a dominant share of production. This is favorably reflected in the number of new jobs as well as in labor productivity.

One of the factors responsible for the successful upswing of entrepreneurial activity has been the various entrepreneurial support programs. The objective is to tune in these private entrepreneurial activities in line with the interests of the economic policy of the Government.

Government funding of the support programs for the SMEs is provided for by the state budget to the tune of 1.5 billion CKR annually. Entrepreneurs can apply for support having the form of guarantees toward subsidies and interest-free loans from the Czech-Moravian Guarantee and Development Bank.

The following types of support are available from the bank:

- (a) general-type support including support for SMEs, for the labor market, for job information and consulting, regional support, and support to innovative entrepreneurial activity
- (b) special support which includes support to agriculture and forestry, the power engineering sector, health care, environment, and tourism as well as assistance toward participation in fairs and exhibitions
- (c) support with a foreign component which encompasses those types of support to the SMEs which are funded or co-funded from PHARE, PALMIF, the Czech-American Enterprise Fund, or bilateral assistance programs.

1.2.1 General-type support

The programs funded by the Government are initiated by individual Ministries (of Economy, of Labor and Social Matters, of Health, of Industry and Trade; the National Assets Fund¹, etc.). The competency for SME-oriented types of support is held by the Ministry of Economy. As a rule, the support is implemented via the Czech-Moravian Guarantee and Development Bank. The major tools here are the contributions toward repayment of interest on credit, loan guarantees, subsidies toward the labor costs of newly generated jobs, repayment of the costs e.g., of working out the business plan for specific entrepreneurial projects, and assistance toward the

¹a Ministry which holds the as-yet unprivatized shares in Czech companies being privatized

expenses incurred when hiring consultants. Selected programs also yield support in the form of access to inexpensive credit (the GUARANTEE program).

The fundamental criterion being applied to potential assistance-seeking projects is the expected profitability as laid out in the business plan. The business plan ought to meet at least one of the following requirements:

- * generate new jobs
- * provide jobs for the disabled
- * enhance the environment
- * enhance exports
- * make use of progressive technologies.

These programs are mainly aimed at entrepreneurs who are

- * short of capital,
- * small operators, or
- * just beginning their entrepreneurial activity

while active in

- * a sector of industry
- * the building trade
- * the artisan crafts
- * the services sector
- * trading
- * mass passenger transport of regional importance.

The programs are expected to speed up the implementation of the respective entrepreneurial projects (*e.g.*, the programs called START and DEVELOPMENT).

Priority is also accorded to those enterprises or entrepreneurs who manufacture medical technology and instrumentation or who themselves offer consulting and information services to SMEs. Also envisaged is support to physicians who are about to set up or upgrade their private practice, as well as to pharmacists (the AESKULAP program).

Some of the programs are destined exclusively for regions facing formidable obstacles to their economic development, such as the districts of Ostrava, Frýdek-Místek, Louny, etc. (the REGION program) or for alleviating the problems of unemployment faced by various underprivileged groups of the population (the program called SPECIAL). Also included in the support programs package are programs aimed at assistance to the SMEs in old town sections or rural zones important for the national heritage (the REGENERATION program).

Programs of support to innovative entrepreneurial activities

The declared mission of the Association of Innovative Enterprising of the Czech Republic is to create prerequisites for innovative enterprising to better flourish in the Czech Republic. A national network of techno-parks has been set up, and the association is active in projects run to

- * popularize successful methods and examples of technology transfer (the program called SUCCESSFUL TRANSFER)
- * generate a stimulating environment in the area of cross-border interpersonal contacts (the INTECH program - International Technology Clearinghouse)
- * build up technology transfer awareness in regions
- * stimulate professional training (the programs TECHNOLOGY MARKETING, TECHNOLOGY MANAGEMENT, TECHNOLOGY AUDIT).

Support is also given to scientific and technological development in the area of new materials and technologies, cooperation with international science centers, etc.

Programs in support of applied research

The support to development and implementation of progressive technologies provided by the Ministry of Economy exceeded CKR 700 mln during the 1991-1994 period. A total of 598 projects were given support under this scheme. In 1995, this activity continues within the TECHNOS program, aimed at making it feasible for the SMEs to implement the results of R&D and to researchers to establish contact with practice.

Programs in support of science and technology

Support is being provided to the process of establishing, operating, and upgrading Techno-parks so as to create conditions conducive to innovative activity and the survival of innovation-oriented SMEs. The programs are focused on the implementation of top technical solutions and on technology transfer. The programs called PARK and TRANSFER provide for interest-free loans amounting up to 80 % of technology transfer project and implementation costs.

1.2.2 Special support programs

Agriculture and forestry

Subsidies and loans are being provided by the Ministry of Agriculture. The areas of support include

- * restructuring of agribusinesses
- * maintenance and generation of the genetic potential of livestock and seed
- * health care of livestock and of field crops and plants
- * agro-information
- * consulting in agriculture
- * abatement of external factors damaging to forest management.

The activity of the Agriculture and Forestry Support and Guarantee Fund focuses onto the programs OPERATION, AGROBUSINESSMAN, SERVICES (investment support to agro-services), LANDSCAPE (for zones enjoying special protection status), and YOUTH (support to young entrepreneurs).

Power engineering

The programs include

- * Government support to more fuel and energy efficient buildings, homes, and apartments
- * Government support to the use of renewable and non-traditional sources of energy
- * Government support of technical measures to reduce fuel and energy consumption in buildings, homes, and apartments.

Medicare

Government support is being provided by the National Assets Fund to the privatization of health care. This has the form of subsidies toward the cost of credit used in the sale of state-owned health care facilities. The sum total of these subsidies is CKR 800 bln.

Environment

The National Environment Fund is active in this area of support. In 1995, support having the form of inexpensive loans is being extended to enterprises active in environmental monitoring, technologies, and products.

The Ministry of Environment has initiated the Pollution Abatement Program with priority targets in the areas of substitute fuels (such as gas, electric power and alternative energy sources as replacement for excessive lignite and sludge combustion) in local heating installations.

The National Assets Fund plans to channel CKR 6.1 bln to this program over a period of three years.

Support to participation in fairs and exhibitions and to promotional activities

The support programs oriented onto the SMEs apply here. For example, START is one of these programs. The Ministry of Economy and Protrade Co. (which is a part of the Association for technical cooperation under the Federal German Ministry of Economy) together with Phoebe Agency of Prague are engaged in the preparation of a new program called FAIR '96. This program is to provide support to SMEs in various areas of manufacturing and trading; the objective is to make it easier for the SMEs to access foreign markets through presentations at seven important European fairs.

Support to job generation

The Ministry of Labor and Social Affairs implements a so-called active pro-employment policy, creating tools in support of programs for graduates and those who just left school, retraining programs, public works programs, and programs for the disabled. These tools of an active Government policy influence

- * the over-all mobility of the workforce
- * alleviation of unemployment in micro-regions
- * alleviation of extended unemployment of minority groups.

The PHARE-PALMIF program is an important source of support to job generation, retraining, and skills upgrading.

Support to pro-export policy

In spite of a negative foreign trade balance in 1994, the Ministry of Industry and Trade does not intend to set up any barriers to imports; and imports keep growing higher even though its structure is not satisfactory, with imports of consumer goods dominating over inward investment. The Government is aware of the need to boost exports but will not assist individual enterprises in the exports of their commodities. What the Government strives to do is to set up a favorable macroeconomic climate. Specific Government measures include export insurance and organizing access to export oriented information.

Government support to pro-export policy is effected via the Export Guarantee and Insurance Company (Czech abbreviation, EGAP) and the Czech Export Bank². This represents a tool of Government pro-export assistance. The Czech Export Bank should focus on providing a range of financial tools where the terms of loan repayment would be comparable with those offered by foreign competitors. Thus the Czech exporters will have an opportunity to tap long-term credits at international market prices.

The Czech Export Bank will draw on CKR 200 mln. in 1995 to subsidize the interest rates on credits. EGAP received CKR 800 mln in 1995 to set up reserves to cover potential insurance policy payments.

²Established 1994 by EGAP.

The Czech-Moravian Guarantee and Development Bank contributed ca. CKR 1 bln. in 1994 to some 1350 individual subsidies to interest repayment. The sum total scheduled for 1995 is CKR 1.5 bln.

1.2.3 Foreign sources of support

PHARE support to SMEs

The areas receiving support include

- * increased credit availability for SMEs
- * consulting activities
- * promotion of SMEs
- * development projects and "new activities".

Specific forms of support include

- * the small loans system
- * the activity of Regional consulting and information centers
- * the activity of BICs, *i.e.*, Business innovation centers (innovation and technology transfer)
- * assistance toward participation in the 37th Mechanical Engineering Fair in Brno, in border region exhibitions, in so-called Euro-partnerships, in specialized training schemes, and in foreign study stays of the executives of SMEs.

The PHARE-PALMIF program

The PALMIF fund (Pro-active Labor Market Intervention Fund) is a tool of the LABOR MARKET RESTRUCTURING program. Here the major objective is to seek, evaluate, and sponsor new projects incorporating active labor market measures and aimed at balancing out the regional supply and demand.

The Czech Republic will receive ECU 14 mln for the programs NATIONAL EDUCATION FUND, LABOR MARKET DEVELOPMENT, AND SOCIAL PROTECTION REFORM.

Czech-American Enterprise Fund

This is a privately controlled fund providing support to private enterprise in the Czech Republic. In March, 1991, when the US Government took the initiative to establish Enterprise Funds in the Czech and Slovak Republics, a total of US\$ 65 mln were set aside by Congress for these Funds.

In cooperation with the Commercial Bank, the Czech-American Enterprise Fund has been implementing the PP PROGRAM which provides credit to small businesses and starting new ventures. A total of CKR 145 mln is available.

Bilateral foreign assistance programs

International Executive Service Corps (USA) runs a program focused on restructuring of state-owned enterprises and new SMEs.

Citizens Democracy Corps (USA) seeks out volunteer experts to assist businessmen in sorting out their problems.

United States Peace Corps (USA) operates a program in support of the SMEs, linked to the Regional Consulting and Information Centers.

Support to the integration of the Czech Republic into the European Union

This program has a budget of CKR 300 mln (*i.e.*, ECU 9 mln) spread over a period up to the year 1997. Out of this, CKR 170 mln is destined for "European Union accession agreement and its implementation through education, training, civil service activities, and translations of EU documents.

UNDP/UNIDO program in support of inward investment

This program supports foreign investment into the Czech industry and the development of direct industrial cooperation with foreign partners at company level. The program is implemented on the basis of a UN project for the Czech Republic. Its objective is to assist the SMEs to establish direct links to foreign partners in advanced countries in order to start joint ventures or other forms of direct business cooperation. Implementation has been entrusted to the Association of industry and transport.

2 USERS OF BUSINESS INFORMATION

Until 1990 the utilization of all data bases available from the NIS host kept increasing without any major changes in the structure of the data base supply. In 1990-1991 a break point in demand was reached which clearly was a reflection of the sweeping changes occurring in the CR in 1989-1990; the demand for traditional information (mainly, STI) dropped dramatically and the core of demand has shifted (mainly, to company and, to a degree, juridical information).

Similar trends have been noted by all information providers in the Czech Republic.

As for any attempt at a rough categorization of prospective business information users, it is clear that outside of Government which always will remain a big client requiring multifaceted business and economic information, it is the SMEs which are the only hope for the information agencies because the resurrection of the old market for information (research institutions, universities, Academy of Sciences, ...) may take too long for these agencies to survive.

It is worth noting however that until now, all the information providers failed to attract a large segment of the SMEs (and sole entrepreneurs). The reason usually given is that SMEs and individual traders are not yet "ripe" for requesting and receiving business information. Probably the only bit of truth in it is that they are not ripe for paying for it. The real reason must be that the range of business information offered to them is not what they want and need (also cf. *e.g.*, Section 3.2).

Another market segment into which information agencies must invest is the students of all kinds of schools, however remotely related to business. This is reflected *e.g.*, in the discounts on *NIS* services offered to students.

A well-served local market for business information will then generate more spin-offs aimed at the international business community. Mastering the intricacies of language translation is one of the prerequisites here.

3 INFORMATION NEEDS

Actual and future information needs in terms of industry, technology, and business are discussed in this Chapter.

3.1 Actual information needs

Company information is the kind of business information which is in most demand and where business today is most brisk. The market for economic and sector-specific information as well as product information appears to be less extensive.

An initial estimate of the present-day breakdown of demand can be derived from the following sample research carried out by *NIS* into the type and degree of specialization of company data bases in the Czech Republic.

Specialization. Of the total of about 120 brokers providing company information in the CR, almost half produce *general-purpose, cross-sectional data bases of companies covering all kinds of businesses.*

Specialized, sector-oriented company data bases are produced only by a few brokers.

Sector-specific company data bases - manufacturing

Five such data bases were found.

Sector-specific company data bases - services

A total of 14 data bases.

General-purpose, cross-sectional company data bases

There are four such data bases.

Other databases

Data base of executives

Data base of economic information (on companies)

Data base of products.

3.2 Future information needs

The information needs in the Czech Republic, identified by a thorough, in-depth analysis at the *NIS* encompass the following six basic groups of business information:

- * Annual reports (and accounts) of Czech companies
- * Information support to exports
- * Information support to foreign assistance, inward investment, and technology transfer
- * Comprehensive R & D directory (incl. information on R & D institutions; R & D personnel; and, above all, R & D projects and their degree of commercialization)
- * A system of public tenders online information
- * Business register online
- * Information on international and national "information society" programs and projects, especially those of the EU and the G-7 group countries.

Above information is of potential interest to Government as much as to large corporations and SMEs; the reasons of each may be different but all will benefit. The SMEs would benefit most.

This information today is either unavailable or poorly available, or does do not lend itself easily to analysis as again may be required both by the Government and by private clients. Also, any step toward an improved availability of this information will assist the countries' accession to the European Union as well as the transparency of (and, hence, confidence in) their respective economies.

4 INFORMATION PROVIDERS

There are some 600 institutions, companies, and agencies in the Czech Republic which generate, process, or broker STI and business information. Out of these, ca. 260 institutions and agencies exist in the State sector, whereas ca. 340 companies and agencies are private. Some of the information brokers can be regarded as neither fully public nor fully private.

4.1 Government sources of business information

The state sources of business information include organizations at the level of Ministries such as the *Czech Statistical Office* (Český statistický úřad, ČSÚ), but mainly organizations which are ranked within individual Government sectors, such as the *Czech Republic Information Center* (Národní informační středisko České republiky, NIS) under the Ministry of Economy, the *School of Economics* (Vysoká škola ekonomická, VŠE) under the Ministry of Education, Youth and Sports, and those state research institutes, company information centers or information departments which also keep or provide economic information relating to the different industries or sectors to which they belong.

An important share of business information which the Government should typically generate and keep within its state information system in order to have an effective decision-making tool and also to provide a guarantee of credibility of the data, is in fact possessed only by private information providers. This information is kept outside the state information system and is not directly accessible for the Government which basically lacks this information and whose demands may, but need not, be met by the private providers.

4.1.1 Government organizations at sector level

The *Czech Statistical Office* (Český statistický úřad, ČSÚ) is a government organization (established by Law No. 278/1992 C.L.). Its scope of activity is set out by the Competency Law (No. 69/1993 C.L.). A new Law on State Statistics has become effective in 1995. The ČSÚ is mainly active in the collection and processing of statistical data.

The ČSÚ gathers information mainly through its own regional offices and in cooperation with regional authorities. Further, it has access to the data bases of ECE in Geneva³ and OECD in Paris⁴.

³ ECE= *Economic Commission for Europe*

⁴ OECD= *Organisation for Economic Cooperation and Development* = OCDE= *Organisation de Cooperation et de Développement Économiques*

ČSÚ is the keeper of one of the so-called *basic registers* of the state information system, the *Register of Reporting Units* (Czech abbreviation, *RZJ*) which ranks among the data bases covering business activity in the country. Data from the register is provided to clients on magnetic tape, CD-ROM, and in printed form. According to the Law about State Statistics the proposed *Register of Economic Subjects* (*RES*) should also be kept by the ČSÚ.

For all the business registers in the country⁵, the ČSÚ generates and maintains a single list of *Business Identification Numbers* (Czech abbreviation, *IČO*) issued to companies, businesses, and other organizations.

The ČSÚ publishes a number of periodicals⁶ which cover general statistical information (population, production, consumption, industry, construction and real-estate investment, agriculture, trade and foreign trade; consumer prices and average prices; employment, jobs and salaries; state budget; demography and living standards; etc.).

The ČSÚ operates the *Central Statistical Library* (Ústřední statistická knihovna) with research reports and Czech as well as foreign statistical sources since the 1890s (ca. 700 thousand items) and an *Information Services Department*.

4.1.2 Government organizations standing outside sectors

The Czech National Bank (*Česká národní banka, ČNB*) is the central bank of the state⁷. Its information inputs and outputs stem from its activity of which the major objective is a stable currency. The ČNB takes position to Government proposals touching upon its scope of activity. It acts as an advisory body to the Government on issues of monetary policy and banking. It has the obligation to report at least twice a year to the Parliament and to inform the public every three months on currency developments. It keeps the registry of foreign bank representations in the country.

⁵the *Trade Register*; the *Register of Small Businesses = of Sole Entrepreneurs*; the *Register of Reporting Units* and the proposed *Register of Economic Subjects*

⁶- Statistical Yearbook of the CR (Statistická ročenka ČR)
 - Czech Economy in Figures (Číselné zrcadlo české ekonomiky, yearly)
 - ČSÚ/Statistical Bulletin (Statistický bulletin ČSÚ, monthly and quarterly)
 - Survey of Economic and Social Development Indicators of the CR (Přehled ukazatelů ekonomického a sociálního rozvoje ČR, quarterly)
 - Statistical Surveys (Statistické přehledy, monthly and quarterly)
 - Demography (Demografie, quarterly)
 - Statistics (Statistika, monthly)
 - ČSÚ News (Aktuality ČSÚ)
 - series of reports (Aktualní informace, Statistické informace)

⁷The Czech National Bank enjoys a special status: it is the central bank of the Czech Republic and, simultaneously, it acts as the administrative arm of the Czech Government in accordance with Law no. 6/1992 C.L.

It coordinates the development of the bank information system in the Czech Republic. Its subsidiary is *Institute for Economics Ltd. (Institut ekonomie s. s r.o.)* operating with macroeconomic data of statistical character and currency aggregates (serving the Czech National Bank only) and publishes studies and features in the Czech press.

The Economic Chamber (Hospodářská komora, cf. Section 4.1.6).

The Czech Chamber of Business and Industry (Česká obchodní a průmyslová komora) and other Chambers, cf. Sections 4.1.6, 4.2.1).

4.1.3 Organizations under the Ministry of Economy

National Information Center of the Czech Republic (Národní informační středisko České republiky, NIS), the country's hub for information on science, technology, and business, is active in the following fields of business information:

- the operation of INFONIS host, an online data base network allowing access to own company⁸, economic, legal⁹, referral, and branch/sector information on the one hand, and to foreign hosts on the other hand
- referral service, *i.e.*, information on information sources (mostly on sources in the Czech Republic), with access to a rather comprehensive selection of catalogs and directories of institutions, companies, and other organizations providing information
- World Bank and European Communities tenders and other information
- data base processing and publishing of various kinds of information having a business/economic component, *e.g.*,
 - short term economic indicators,
 - international economic statistics,
 - contact information on banks in the Czech Republic and in-depth information on their services
 - the data bank of companies (profiles of important Czech and Slovak companies)
 - information on systems of automatic identification (*e.g.*, bar codes) and on the suppliers of such systems and services
 - monitoring of foreign periodicals,
- international brokerage/exchange of trade and production opportunities within a project called *Trade and Production without Boundaries (Obchod a výroba bez hranic)*.

⁸The full range of company information available from NIS can be found in Appendix I.

⁹PALLAS the Central online data bank of Czech Law featuring full texts of valid Czech laws as well as texts of other important legislative documents; Czech Law on diskettes (full texts of laws, individual years, selections by topic, individual laws)

- an *EURO INFO Correspondence Center*¹⁰ network (focusing on assistance to SMEs, information about EU countries and their trade, and brokerage of business contacts of Czech enterprises with those in the EU)
- studies, surveys, and analyses.

Enterprise Development Agency (Agentura pro rozvoj podnikání) of the Ministry of Economy, also incorporating the former *SMEs Promotion Center (Středisko pro podporu malých a středních podniků)*, offers help to entrepreneurs in four areas: consulting, mediation of cooperative contacts with companies abroad, marketing-oriented training, and assistance in the elaboration of requests for support addressed to the *Czech-Moravian Guarantee and Development Bank (Česko-moravská záruční a rozvojová banka)*.

4.1.4 Organizations under other Ministries

The business information providers, brokers, and users in the public domain sector (but outside the Ministry of Economy sector) includes

- certain universities
- specialized libraries
- research institutes and institutions
- the information departments of state-owned companies (formerly distinguished as belonging to the class of sector-level, branch-level, or basic information units)
- other organizations having an information component (possibly with restricted public access) such as banks, insurance companies, investment funds, and a pleiad of other organizations either owned by the State or with mixed State and private ownership.

The important information sources of this kind will be shown by sectors.

¹⁰The EURO INFO Center at NIS is a so-called correspondence center of the European EURO INFO network: it mediates contacts among enterprises using the BRE (Bureau de Rapprochement des Entreprises) network, receives information directly from the European Commission, and maintains contacts (by various networks) with other EURO INFO Centers in Europe. It provides information on

- the legislation of EU and EU countries (incl. customs regulations, standards, etc.)
- potential business contacts with EU countries
- scientific and technological programs of EU countries
- potential business venture partners
- the specifics of doing business in individual EU countries
- measures to interlink European SMEs
- social and regional politics of EU countries
- financial and support programmes of EU (PHARE, regional funds etc.)
- on development of united European market.

The Ministry of Industry and Trade has established an *Info-center (Infocentrum)* as part of its *Center for External Economic Relations (Centrum vnějších ekonomických vztahů)*, with the objective of improving the flow of information in the sphere of foreign trade and providing export support information services to Czech exporters¹¹.

The Ministry of Finance operates the *Securities Center (Středisko cenných papírů)*, opened in 1993 to provide public access to information needed by brokers, traders, and other entrants in the securities market. With this Center are filed the so-called Prospectuses of the Emitters of Securities, of which a fulltext data base is kept (and sold on diskettes).

The Ministry of Environment established the *National Center of Environmental Education (Národní středisko ekologické výchovy)*, operated by Environmental Education Foundation, *EVA*). The Center provides company information and consulting in the area of environmental awareness.

The Ministry of Foreign Affairs (Ministerstvo zahraničí) supervises so-called *CR-UNIDO Joint Programmes*; one of these formerly implemented by the *National Technical, Consulting and Training Center (Národní technické, konzultační a školicí středisko)* is now operated by *TECON Ltd.*¹²

The High School of Economics (Economic University, Vysoká škola ekonomická, VŠE) in Prague offers a range of information services.

The Czech Technical University (České vysoké učení technické, ČVUT) in Prague founded in 1991 a non-profit organization called *Entrepreneurial and Innovation Center of ČVUT Prague (Podnikatelské a inovační centrum ČVUT Praha)*. Since 1992 the Center has been a full member of the European Business and Innovation Centers Network.

The technical universities (Vysoké školy technické) are as a rule also a source of economic information oriented toward the specific disciplines dealt with in education and research.

¹¹One problem facing the *pro-export policy* of the Czech Government is that the funding of pro-export activities is guaranteed by the Ministry of Economy, its material support is in the province of the same Ministry but also of the Ministry of Industry and Trade, and its execution draws on the personnel of the Foreign Ministry, the Ministry of Industry and Trade, and the Ministry of Economy. Out of the organizations operating under these various Ministries and active in the area of pro-export policy, the information support to exports is provided as the sole activity of the Center of External Economic Relations (under the Ministry of Industry and Trade) and as one of the activities of NIS (under the Ministry of Economy) and of the Administration of Czech Centers Abroad (under the Foreign Ministry); their coordination so far has been poor. The Czech Centers Abroad (as well as the Commercial Sections of Czech Embassies) complain of the difficulties faced in their efforts to obtain pertinent information from the Czech Republic.

¹²It mediates UNDP and UNIDO technical assistance, furnishes sector-oriented financial analyses, and engages in brokerage and export activities.

The Charles University (Karlova univerzita) runs the *European Information Center of Charles University (Evropské informační středisko Univerzity Karlovy)* which furnishes consultations on European Union issues, European integration, human rights, legal regulations of the EU, etc.

The Center for Inter-University Program of Studies of The Future (Středisko meziuniverzitního programu studií budoucnosti) carries out literature surveys, publishes studies and reports, and provides consultations in the area of futurology and forecasting.

The Central Economic Library (Ústřední ekonomická knihovna), formerly part of the *National Library (Národní knihovna)*, now is operated by the High School of Economics.

The National Economy Institute of the Czech Academy of Sciences (Národohospodářský ústav AV ČR) generates national economy analyses for Government. It is interlinked with *CERGE* (cf. below).

CERGE (the *Center for economic research and graduate education, Charles university*) provides graduate courses for foreign students and operates a library specialized on economic information.

The various **State research institutes (Státní výzkumné ústavy)** do as a rule provide a range of business (or economic) information related to their respective field of specialization. In the past, every research institute had the duty to provide information within the nationwide system of STI. Today, in absence of a formally interlinked system in either STI or business information, the research institutes which survived offer information on a commercial basis. However, inasmuch as these institutes have in fact more STI (which is in much less demand) than business information, their actual information generation capacity is poorly mapped. Only those organizations of R & D character which so far have not been privatized belong into this category.

The surviving **Company [state] information centers (podniková [státní] informační střediska)** usually provide business information in addition to company-specific STI.

The Commercial Sections of Embassies (Obchodní oddělení zastupitelských úřadů) furnish basic orientation data on the economy of the respective countries.

Foreign Culture and/or Information Centers (Zahraniční kulturní resp. informační střediska) offer a limited range of information on the economy of their countries. They can be of assistance where business contacts are sought. Data on Culture and/or information centers of foreign countries in the Czech Republic and on Czech centers abroad can be obtained from *NIS*.

4.1.5 The media, telecommunications, business promotion

The various organizations mentioned in this Section all engage to a degree in the dissemination of STI and business information.

Of course, the media are aimed at the general public and, therefore, as far as concerned at all with science and economy, they deal with these topics only at a popular, awareness-generating level.

The Czech Radio (Český rozhlas)¹³ prepares and broadcasts audio programs over the entire territory of the CR.

The Czech Television (Česká televize)¹⁴ generates and beams television programs.

The Czech Press Agency (Česká tisková kancelář¹⁵, ČTK) professes to "provide objective and versatile information for free opinion-making".

ORBIS¹⁶ as a multimedia information and publishing company also provides a limited range of business information, especially in the areas of promotion, advertising, and information digests.

SPT TELECOM, the state telecommunications giant, operates under the Ministry of Economy. This is a joint stock company with state ownership¹⁷, providing telecommunications services mainly by operating the public telephone network of the CR. One of their more recent activities is *Videotex*, a Minitel-type information service which offers e.g., Czech stock exchange information, information on transport in the country, and some information useful for SMEs.

The Foreign Culture and/or Information Centers mentioned above also belong into this category.

¹³Law no. 484/1991 C.L. on the Czech Radio

¹⁴Law no. 483/1991 C.L. on the Czech Television

¹⁵Law no. 517/1991 C.L. on the Czech Press Agency

¹⁶ORBIS was reconstituted in 1993 as a quango under the Ministry of Economy. Its mission stems from Government decree no. 335/1993 of 23 June, 1993.

¹⁷The privatization of *SPT TELECOM a.s.* proceeds as per the decree of the Czech Ministry for National Assets and their Privatization, and the ownership of shares as at October, 1995 is as follows:

51%	National Assets Fund (the State)
27%	TelSource (Dutch-Swiss consortium; private)
19%	Restitutions Fund and Foundations (the State)
3%	Investment Funds and individual shareholders (private)

4.1.6 Regional institutions

To improve operations and especially, territorial coverage, many "central" information institutions have established their regional subsidiaries or offices.

There are eight **Regional branch offices of the Czech Statistical Office, ČSÚ**. Their task¹⁸ is mainly to gather and organize regional statistical data and to supervise so-called *reporting units*¹⁹ as to whether these meet their reporting requirements.

The Economic Chambers, an analogy to the more traditional *Chambers of Commerce*, represent the oldest business information network. They provide business information services to entrepreneurs, members as well as non-members. They also claim to have information on international trade, customs regulations, etc.

The Czech Republic National Information Center (Národní informační středisko České republiky, NIS) has a network of **regional offices**, which extend the *NIS* information services to regional outlets. Their prominent service is the information support to SMEs.

The Regional Consulting and Information Centers (Regionální poradenská a informační centra, RPIC) have been in existence in the CR since 1992. They are *PHARE*-supported centers which focus on assistance to emergent entrepreneurs.

The Business Innovation Centers (Podnikatelská inovační centra, BIC) are another type of centers providing assistance to SMEs. They help the small businesses to shape up their business plans for new ventures, offer consultations to emergent entrepreneurs, organize training (incl. consultant training), and operate business incubators. Some 40% of the volume of these services is funded by *PHARE* via the *SME Development Agency*²⁰ (*Agentura pro rozvoj malého a středního podnikání*) of the Ministry of Economy. The *BICs* are members of an European Network of Business Innovation Centers.

¹⁸Until 1995 their activity was set out by the Law no. 278/1992 C.L. on State Statistics; the new Law no. 89/1995 C.D. on the State Statistical Service became effective as of 20 April, 1995.

¹⁹As *Reporting units* are denoted all juridical persons engaging in entrepreneurial or other profit-generating activity. They have the obligation to report if notified of this obligation in advance by a notice published within the Code of Law series. Individual citizens, as natural persons, have an obligation to take part in statistical reporting if this is set out by a special law (e.g. the census law); otherwise their participation in statistical research is voluntary.

²⁰Subsidies for individual *BICs* differ depending on their activity and on the range and volume of services provided.

The **EURO INFO** regional network aims at direct interlining of the regions to EU-generated information (the EU Commission in Brussels), wider participation of entrepreneurs in European SME support programs²¹, and workshops for companies interested in international trade. Its own online network called *VANS*²² supports bilateral communications as well as teleconferences. In the Czech Republic, the *NIS* is the *EURO INFO* coordination point; the three regional points are the *Regional Development Agency (Agentura pro regionální rozvoj a.s., ARR)* in Ostrava, the *Chamber of Commerce and Economy (Obchodní a hospodářská komora)* in Brno, and the *Business and Innovation Center (BIC)* in Plzeň (Pilsen).

Czechinvest has 10 regional offices to attract inward investment to the regions. Their focus is on investment projects contributing to the development of regional infrastructure. This regional initiative of the Ministry of Industry and Trade is coordinated with the Ministry of Economy.

The *Regional Inspection Offices (Oblastní inspektoráty)* of the *Czech Metrology Institute* represent yet another regional institution with an information component.

There are many other information providers at the regional level and these do not necessarily have any formal links with one another or to any supervisory center. These include e.g., the *Techno-parks* or so-called *Economic parks*, the *Regional Development Agencies*, *Municipal Information Centers*, certain Foundations, etc. A rather comprehensive list is being maintained by *NIS*.

4.1.7 Government hosts

The term "*online host*" is used for those information providers who store and retrieve their information mainly in the online mode. First of all, *hosts* include public domain information providers. Information centers with private networks may be regarded as *hosts* only if they communicate online with other centres or networks.

For an information provider to qualify as *host*, certain criteria have to be met; the problem is that these criteria have never been formulated clearly enough to be universally accepted and respected. Hence, the term *host* tends to be used with too much freedom and often refers to organizations which properly should be denoted as information brokers. Consequently, it is something of a dilemma which information providers should be on the list of hosts and which should not: many "hosts" fit only rather loosely the somewhat vague definitions of "online", "information in the public domain", "services to the public", "importance from the point of view of business information", "network size", etc. As a result, one has to resort to a compromise²³.

²¹ E.g. the so-called *INTERPRISE initiative* intended as a boost for the development of partner relations and cooperation among manufacturing or service companies.

²² *VANS* = Value Added Network Services

²³ Well-known international directories of online services. e.g. the *IM GUIDE* of the *ECHO host* in Luxembourg, also faced this problem and also have found only compromise solutions.

In the Czech Republic, the public-domain hosts include

- INFONIS at NIS
- ČTK, the Czech Press Agency host
- the Czech Technical University Computing Center acting as the administration for CR of the Internet (*i.e.*, CESNET),

although each of them is a *host* in a somewhat different sense:

- the NIS host, *INFONIS*, has its information in the form of regularly updated data bases to which established public-domain online access routes exist
- the ČTK host offers completely different type of information; mostly it serves its specialized clients but also remains in the public domain, with access open for all
- *CESNET*, while allowing access to a number of hosts (incl. *INFONIS*), is not a clear-cut online network in most of its operating modes.

Out of these state-owned or Government sector information providers, the *INFONIS* host probably is the most important business information source.

However, the Government also operates a considerable number of "private", *i.e.*, restricted-access networks. Some are mentioned further on in this Section and also in Chapter 5.

An indicative list of data communication networks in the CR is shown in Section 5.4.

The *INFONIS* host at NIS

The NIS host is called *INFONIS*²⁴. Users have online access to data bases representing

- several million documents (books, conference proceedings, magazines, patents, journal articles, dissertations, research reports)
- information about companies and entrepreneurs on the territory of the CR, software products, juridical information, information about consulting services, banks, representations of foreign companies, etc.

Some of the data bases go back as much as 20 years but this old data is accessible online only by agreement with *INFONIS* staff. The number of data bases of Czech origin is expanding. The data bases of *INFONIS* are listed in international directories.

²⁴Data bases were accessible online since 1978. Until 1993, user dialog was conducted with SIEMENS computers under the BS 2000 operating system, using the GOLEM query language; the individual data bases were accessible according to a pre-set schedule. Since 1994 a round-the-clock online service is run using a DEC 5900 computer under UNIX. The fulltext and relational data are organized under *TEXPRO* and *INGRES*, resp.

For clients who do not have (or need not) online access, NIS offers SDI services²⁵.

Trends. Rather than purchasing expensive foreign data bases, NIS today follows a policy of providing wide access to Czech data bases, own as well as purchased, while tapping international hosts for foreign, international data bases. The advantages which NIS offers in this latter area, in contrast to individual user access (bearing in mind that individual users today can also access foreign hosts directly, even from their homes), is skilled staff who know how to access foreign hosts effectively and economically, higher-quality communication links (access via EUROTEL's stacked-data transmission network (X.25), via Internet and, very soon, via METRONET's optical cables network, as against ordinary public telephone lines), and contracts with a dozen important international hosts. In this manner INFONIS host has access to information from more than 600 data bases world wide, not speaking of the full Internet capability of NIS as an institution.

NIS staff also make use of a selection of CD ROM data bases.

NIS clients are granted access to paid online information services of *INFONIS* (individual password) on signing a user agreement²⁶. A WWW Home Page of NIS is accessible on the Internet²⁷.

Restructuring of the INFONIS data bases is in progress; the data bases accessible in 1995 include

- the *PALLAS* juridical data bank (Czech law)
- a range of STI data bases
- a range of business information data bases (incl. company information, economic information, etc.).

²⁵ *SDI*= Selective Dissemination of Information

²⁶Requirements for the remote user:

- PC (minimum standard. IBM compatible XT/AT) or VT100 type terminal
- telephone line or connection to X.25, to INTERNET (EUNET, CESNET), METRONET, APSNET
- modem or modem card
- SW to emulate an INFONIS terminal on the user PC (or of any other online communication SW).

The user can communicate with the INFONIS system using stacked pop-up menus or a variety of other devices under INGRES (incl. SQL) or TEXPRO.

²⁷<http://www.nis.cz/>, <http://dec.nis.cz/>

Other state hosts

Many Czech hosts work with networks which are off-limits to the public and carry sector-oriented or even highly specific information. These are e.g., the large servers and networks of banks, Government ministries, local government, health care facilities²⁸ and information providers at the level of sector or branch information centers²⁹, and also of the media³⁰.

Among universities connected to Internet, the network which has its hub at the Czech Technical University (ČVUT) plays an important role (cf. Section 5.1).

The *Universities' Regional Computer Center (Oblastní výpočetní centrum vysokých škol)* located at the Czech Technical University (ČVUT) operates the Czech "academic" part of *Internet* called the *CESNET*. It registers individual users, allocates addresses, and sets the rules for user operation on the network. It alerts registered users to recent and future events and sends out information to users organized in so-called conferences³¹ (*NEWS*).

There is little doubt but that online access will gradually find its way to ever more facets of our life; in the areas of science, technology, and business this is a certitude.

4.2 Business information in the private sector

The private sector is interested in information which can be sold. In other words, the providers of information in the private sector will always focus on the generation of such information which is potentially profitable.

Business information has its customers. On the other hand, the generation of public-domain STI as a rule is dependent on Government support; the STI generated by the private sector relates in most cases to the main activity of the producer in question and mostly is available for his own use only.

²⁸First of all in the *National Medical Library* but also in large hospitals.

²⁹E.g. Institute of Agricultural and Food Information (Ústav zemědělských a potravinářských informací), Ministry of Transport Computer Center (Ústředí výpočetní techniky dopravy), Building Trade Information Institute (Ústav stavebních informací), Ferrous Metallurgy Research Institute Information Center (Výzkumný ústav hutnictví železa, VÚHZ), Informetal, Czech Power Board (Česke energetické zavody, ČEZ).

³⁰First of all, the host of the Czech Press Agency (Česká tisková kancelář, ČTK) where four basic segments of information can be accessed, called *ACTUALITY*(NEWS), *FOND*(FUND), *FAKTA*(FACTS), and *UDALOSTI*(EVENTS).

³¹The debate on the Internet proceeds in such a way that one participant sends information to all other participants of a given "conference"; this information can be commented by each of them, and such comments can again be communicated to all.

In world economy today, globalization is a fundamental trend, and its key factor is the division of labor world wide. The determining factor for such a worldwide division of work is the development of global information networks.

Business information in the private sector is being provided by a relatively high number of usually small Czech companies³², plus a smaller number of branch offices of international business information companies.

More or less all of these companies draw on the primary information resources of the Government (mainly, on a variety of company directories or individual mailing lists derived, legally or illegally, from various Government "registers"), which they expand by added-value information and sell them. The problem is that the primary sources compiled by or for the Government are far from error-free and far from complete, so many private information brokers have to engage in basic data research as well. They provide a wide palette of information products ranging all the way from directories of available services (e.g., Yellow-pages type) to financial data and credit rating of companies, debtors and creditors (bad debts) and to sector-specific studies and reports. Many of the private information providers offer their information services as a spin-off of their consulting activity.

Some companies on the market only produce business data bases, other firms are setting up hosts, or work as offline information brokers.

4.2.1 Producers of data bases

According to a well-informed estimate (based on the *Directory of information institutions, information departments, and libraries in the CR* (Adresář informačních institucí, pracovišť a knihoven v ČR) and the catalog *How to come across information about companies in the CR* (Kam pro informace o firmách v ČR) there were 75 private producers of data bases in the country at the end of 1994.

Of these,

- about 15 were private producers of STI
- about 60 were private producers of business data bases, of which however a fair share (mostly associations, chambers, unions) were only producing information about their own members.

The 1995 issue of the same directory already lists 120 data base producers. A selection of important private producers is shown below.

ALBERTINA icome Ltd. Established in 1991, this is one of the first companies in the CR that started the production of data bases on CD-ROMs. Their data bases include

³²Often founded by former employees of the institutes which formerly belonged to the state system of STI and business information.

CompAlmanach Ltd. Established in the CR in 1991. Mainly active in publishing. Their *Economic Almanach (Hospodářský almanach)* is a catalog covering ca. 10,000 businesses active in the CR, with up to 24 items per record.

EDB-DATASERVIS Ltd. Established in the CR in 1991. This is a data base producer best known for their *Service Telephone (Servisní telefon)* offering company and product/service information. This telephone information service operates 6 days a week and clients can dial the same telephone number in the whole CR.

EDIT Ltd. Established in 1990, it specializes mainly in the production and publishing of catalogs such as the *EDIT catalog of companies (EDIT katalog firem)*.

INFORM KATALOG Ltd. Established in 1990. Produces

- a business directory, *Czech Companies Inform (Inform českých podniků)*
- *Financial Market Inform (Inform finančního trhu)*, a directory of companies active on the financial market with their marketing profiles, produced in cooperation with Ministry of Finance
- a directory of Czech exporters, produced in cooperation with Ministry of Industry and Trade (information about exporters and importers)
- *INFORM KATALOG* which contains profiles of companies in the CR (agreed by the companies)
- *INFORM of travel agencies and hotels 94 (INFORM cestovních kanceláří a hotelů 94)*, a joint venture with the Czech Center for Tourism (Česká centrála cestovního ruchu) of the Ministry of Economy.

Jupiter Publishing Company Ltd. (Nakladatelství Jupiter, spol. s r.o.). Established in 1992. By consent of the Justice Ministry they receive, process, and publish Czech business register information.

Their basic product is a four-volume publication: The first three volumes named *Trade Register of the Czech Republic (Obchodní rejstřík České republiky)* list all companies registered in the Czech business register. Volume four named *Economy of the Czech Republic (Hospodářství České republiky)* contains lists of Czech solicitors, commercial lawyers, Notaries, Justices, tax consultants, important business laws, etc.

KOMPASS Bohemia, a.s. Established in the CR in 1991 as yet another national subsidiary of a company which is present in more than 100 countries of the world. It allows access to *worldwide KOMPASS data bases*, produces the *KOMPASS Czech Republic* directory of about 5,000 businesses.

MEDIATEL Ltd. Established in 1991. Producer of *Yellow Pages (Zlaté stránky)* telephone directory (currently ca. 400,000 business and private subscribers).

ŠPAČEK Ltd. Established in 1990. Producer of

- data base of construction industry
- data base of travel agencies
- data base of transport businesses
- the *Spacek Business directory (Obchodní adresář Špaček)*.

Stock Exchange (Burza cenných papírů, a.s.). Established in 1992. Presents information on stock market development and trading in securities at the Prague Stock Exchange (the so-called BCP index, daily volumes of trading, etc.)

RM-Systém, a.s. Subsidiary of PVT Corp., established in 1993. Offers stock trading information.

Czech Capital Information Agency (Česká kapitálová informační agentura, a.s.). Subsidiary of the Stock Exchange; source of information on the capital market.

RTP a.s. Owned by *First Czech-American Real Estate Company (První česko-americká realitní společnost)* and *Information Systems Design & Marketing Company*; requested authorization to open the third official securities trade market in the country.

4.2.2 Private hosts

A dozen private hosts are listed in Appendix 2?. These hosts are operated by Czech as well as by foreign companies. Not all of them are accessible to the public. In those which provide unrestricted access, it is often not a direct user access to online information but rather, the business is transacted as a consultation where only the company staff work online whereas to the clients the information obtained is communicated without computer assistance.

The private host companies draw on their own data bases (*i.e.*, are producers of data bases) or they obtain their data by communication with other hosts, mostly located abroad. Most of these hosts are narrowly specialized.

Other such hosts operate as information systems allowing no access to the public and providing information only for their own branch offices on the network. In analogy to the public sector (*cf.* Section 4.1.7), the private company networks of banks and other financial institutions, insurance companies, private media (broadcasters) etc. may also be regarded as online, on the condition that in turn they again communicate online with other networks or users standing outside their own organization.

These companies may employ just a few staff but on the other side of the spectrum there are one or two big information companies such as the *Computing Corp. (Podnik výpočetní techniky, PVT a.s.)* which however are not clear-cut online hosts.

Some hosts in the CR are subsidiaries of foreign data base producers. *Dun and Bradstreet* can be quoted as an example.

4.2.3 Private information brokers

A comprehensive information on STI and business information brokers has been summarized recently by *NIS*. In addition to libraries of which many also provide limited business information, a total of almost 500 organizations which can be characterized as brokers were listed; many of these would however only provide information about themselves, their membership, and/or their particular product and/or service.

4.3 International links

Cross-border traffic on the Internet keeps expanding steadily (Fig. 1?). Outbound traffic (Internet information leaving the Czech Republic) amounts of roughly 50% of incoming traffic (Internet information received in the Czech Republic from abroad).

Those information providers who access foreign hosts (usually, outside Internet) do not as a rule disclose the volume of the data transmitted. Additional information, especially as relates to the INFONIS host at *NIS*, can be found in Section 4.1.7 above.

Fig. 1 : Traffic on the Internet line connecting Prague and Amsterdam

5 TELECOMMUNICATIONS

5.1 Existing networking facilities and networks

Two worldwide computer networks - BITNET and Internet - have their nodes in the Czech Republic.

BITNET. There are currently seven operational nodes of *BITNET* in the Czech Republic. *BITNET* started its operation in (former) Czechoslovakia in 1990. This network is now becoming obsolete and *Internet* is taking over. There were 11 nodes in the country at the time when *BITNET* was at its peak; the nodes are now slowly being decommissioned.

Internet. There are two nationwide *Internet* providers in the Czech Republic, *CESNET* and *COnet*; they use the name space below the *.cz* top-level name domain.

CESNET stands for the "*Czech Educational and Scientific Network*". It came on line officially in mid-1993. Its current topology is shown in Fig. 2. It serves as a national research network backbone which connects metropolitan area networks (*MANs*) in the cities connected to it (for example, *PASNet* is an academic *MAN* within Prague).

CESNET (= backbone) is operated by a joint team composed of people coming from the connected academic sites. This team is headed by the networking group of the Czech Technical University in Prague (*ČVUT*). The metropolitan area academic networks are operated in a similar way, e.g., the *PASNet* team is headed by the networking group of Charles University in Prague. The development and operation of these mainly academic networks have so far been funded from grants allocated by Government Grant Agencies and from subsidies by the Ministry of Education, Youth and Sports. The *CESNET* license now allows to sell *Internet* connectivity and services also to institutions outside the academic community, with some exceptions (it is not possible to sell *Internet* services to individuals). The Czech Academy of Sciences also has participated heavily in the joint development of *CESNET*.

CESNET operates three international lines:

- * a 512-kbps leased line to Amsterdam (the *Europenet* connection),
- * a 128-kbps leased line to Vienna (the *Ebone* connection), and
- * a 64-kbps leased line to Banská Bystrica (the *Sanet* connection). The *CESNET* factsheet can be found on the *RIPE* gopher server.

Fig. 2: *CESNET* - Czech Educational and Scientific Network

COnet operates its own 64-kbps leased line to Amsterdam (the *EUnet* connection). *COnet* now connects Prague, Brno and Plzeň (Pilsen). *COnet* is a private company; its founders have also taken part in the start-up activities of *CESNET* and in the beginnings of *EUnet's* presence in the Czech Republic in 1990. The *COnet* factsheet likewise can be found on the *RIPE* gopher server.

Corporate networks. Some of the private companies have worldwide e-mail connectivity as well within their corporate networks. These are basically international companies like Microsoft, Digital, DHL, Silicon Graphics, to name but a few of them. They usually have addresses (as well as names) within their corporate network address (and name, resp.) space (e.g., *bmo.sgi.com*) and usually use *UUCP* for data transfers.

One more company active in the Czech Republic and providing public data network connectivity for customers is *Eurotel*. This company is a monopoly provider for the public X.25 data network. It also provides X.400 electronic mail services; these are marketed under the name *ETmail*.

As concerns the computer and LAN technology used, the most popular LAN technology is Novell. Networks which rely heavily on Unix (*RISC*) workstations are still rare, as is the X-windows graphical interface, although this is changing quite rapidly. While the PC market seems to be saturated, there is a niche to be filled on the Unix machines market as well as on the *MAN/WAN* network market.

A supercomputer project of universities was funded by the Ministry of Education, Youth and Sports in 1994 resulting in the establishment of supercomputing centres in Prague and Brno. These centres are equipped with Silicon Graphics Power Challenge machines and should serve the universities' research community.

5.2 Plans for upgrading these facilities

The *CESNET* international line to Vienna has been upgraded to the speed of 256 kbps.

There have been tentative considerations to the effect that the international connectivity should be upgraded to higher speeds. Taking into account the recent development both within Europe (the *ATM PNO* pilot project) and within the Czech Republic (the *ATM* network in Prague, plus plans for several other cities), 34-Mbps connectivity for the Czech Republic seems to be reasonable and well utilized in the time horizon of 2-3 years. These considerations arose from the rapid increase of the number of hosts on the *Internet* in the Czech Republic and from the demand for new applications.

A special Government project called *INFRA* is expected to bring funding for the networking infrastructure during the 1995-1997 period. The projects which are to be submitted under the *INFRA* umbrella now are under preparation at the networking groups.

5.3 Connections between the country's network and other networks

The Internet connections were described in Section 5.1. They consist of *CESNET* lines to Amsterdam, Vienna and Banská Bystrica and of the *COnet* line to Amsterdam (Fig. 2?).

Even after the advent of Internet, organizations such as *NIS* frequently continue using their modem connections to well-established non-Internet leased telephone lines or connect to established data transmission networks (such as that set up in the Czech Republic by Eurotel Co., cf. Section 5.4) to communicate e.g., with international hosts.

Satellite connections, which also exist, fall outside the scope of this study.

5.4 Survey of data transmission networks in the Czech Republic

Network	Protocol	Transmission rate	Territorial coverage	Remark
public telephone network	e.g., MNP5	from ca. 2.4 up to ca. 19.2 kbps (in multiples of 0.3); on dedicated lines max. ca. 64 kbps	worldwide	higher transmission speeds only with quality modulation
private data transmission networks			Czech Republic	e.g., PVT a.s.; Ministry of Finance
Internet	TCP/IP	in the CR mostly 64 kbps, max. 512 kbps; world max. 45 Mbps	worldwide	
BITNET	NJE		worldwide (EARN in Europe)	for E-mail; lacks interactive capability
EUnet	TCP/IP	same as Internet	European network	Internet connectivity
Eurotel public data transmission network (Czech abbreviation, VDS)	X.25, X.28, X.29, X.32 (CCITT)	max. 19.2 kbps	Europe, with world connection	operator in the CR: EUROTEL, then SPT TELECOM - NEXTEL
APS/Net	X.200, X.400	max. 19.2 kbps	Czech Republic	operator: EOS
Metronet (optical cable network)	various protocols	of the order of Mbps	Prague	multimedia transmission
satellite networks via VSAT terminals and "hub stations"		min. 64 kbps	worldwide	Intelsat, Eutelsat, ...

bps

X.25, ...

TCP/IP

bit/s

signal parameter, sequencing, and transmission standards

protocol to connect computers operating under UNIX type operating systems; Transmission Control Protocol/Internet Protocol

6 PROPOSALS REGARDING *IBIS*

The proposal outlined below regarding *IBIS* architecture and functionalities stems from what once was described as a model for the Czech Republic National Information Center, *NIS*. This is an activity model having defined elements and defined links.

Inasmuch as the *IBIS* project does not intend to set up either new data bases or new information agencies, the designation "*IBIS*" appearing in the model outline can be substituted in each country by the designation of the participating institution, such as "*NIS*", "*NCT*", or "*OMIKK*" while maintaining the regional (international) *IBIS* link throughout.

Future *IBIS* activity model³³

Elements:

- **Information Referral** which is the Front office of *IBIS*, i.e., the *IBIS* interface with its clients. Into the Referral office should be routed all general contacts, that is,
 - personal visits
 - correspondence
 - phone and fax
 - general E-mail.
 Even calls and correspondence addressed to other *IBIS* destinations should be rerouted to Referral if not specific.
- **IBIS sources** which is all the data bases, studies, and other information products of *IBIS* available to the clients. This does not include unfinished products being developed.
- **IBIS development** is all the data bases, studies, and other information products being developed, and all projects underway at the participation institutions. On completion of a project, or once a data base is brought to a level where it can be commercialized, a decision should be taken on that project or product as to
 - whether this is an information source to be retained

³³The business of any information agency is to provide information. This, of course, applies to business information, too. A Government information agency, especially one focused onto assistance to private enterprise, should only engage in development activities such as collection and processing of information if

- they are worthwhile for the nation and
- no one else is providing them, and they can be
 - either non-commercial, or
 - commercial.

The Government agency's operations should then ideally be limited to activities which are non-commercial, whereas the commercial ones should be transferred to other agencies or subsidiaries run on the principles of private enterprise, because there, in a commercial environment, they will be more profitable.

- if so, which source should keep it and/or operate it.
- Knowledge of the product and source should be transferred to Information Referral.
- IBIS agencies take the form of joint venture companies, associates, and possibly information training and information management training. Their role is to provide information which can be sold at a profit. Therefore, it is a commercial operation which can be done better in a commercial or quasi-commercial environment.
 - Outside sources basically are of two kinds:
 - Government and outside institutional sources
 - private organizations (companies active in the information business).

Links:

- Links between Referral and each of the sources by which
 - queries from Referral are directed to Sources
 - information on sources and their products is transmitted back to Referral (so that Referral can always keep up-to-date)
- Links between IBIS development and IBIS sources and agencies by which finished information products are transmitted from Development to Source.
- Link between Referral and IBIS development should carry market³⁴ information on the information gaps.
- Link between Government and IBIS Development carries Government requirements and raw sources into IBIS.
- Links between outside commercial sources and IBIS Development are used to acquire information to fill in information gaps in IBIS.
- An IBIS Home Page should be set up, with the member organizations contributing.

³⁴Marketing has two main roles:

- to inform the outside public about what NIS can provide
- to inform NIS development about what the public require which is not already available.

APPENDIX

Appendix 1: Information on Czech companies at the NIS

REFERRAL INFORMATION

- * Annual reports of Czech joint stock companies (Societ s Anonymes) (Xerox copies of original Annual reports)

ONLINE SEARCH IN THE INFONIS SYSTEM

* INFORMATION ON CZECH COMPANIES

Seven basic types of information are offered:

- ** basic company data (company name, address, Business Register identification number, legal status, major areas of activity, no. of employees)
- ** comprehensive information on important Czech companies and corporations (up to 52 items of contact and business data)
- ** certified information on companies (*i.e.*, verified by the companies themselves)
- ** business information on companies taken over from the press
- ** information on debtor companies (full version of NEFI data base)
 - *** information on debtors
 - *** information on creditors
- ** information from Annual reports - Xerox copies of client-specified parts of Annual reports
- ** cross sectional company information from other sources.

* INFORMATION ON BANKS IN THE CZECH REPUBLIC

- ** contact data on the bank specified by client
- ** comprehensive data on the bank specified by client
- ** list of banks and their Hqs addresses
- ** list of bank trading points and their addresses

* INFORMATION ON THE REPRESENTATIONS OF FOREIGN COMPANIES IN THE CZECH REPUBLIC

- ** name and address of parent company; scope of activity

- * **INFORMATION ON SUPPLIERS OF AUTOMATIC IDENTIFICATION SYSTEMS³⁵ AND RELATED SERVICES**
 - ** the supplier company, its products and services
- * **DATA BANK OF CZECH AND SLOVAK ENTERPRISES**
 - ** verified, wide-spectrum company information
- * **INFORMATION FROM ABROAD**
 - ** most variegated information ranging from data accessed by online dialog with international host to official EU publications and to "information society" programs and projects of the EU and G-7 group countries.

DATA ON DISKETTES

- * **BANKS AND THEIR TRADING OUTLETS IN THE CZECH REPUBLIC**
 - ** comprehensive data base on diskette:
 - *** banks and their services; their trading outlets in the Czech Republic (latest version, or annual subscription to continually updated versions)
 - *** fulltext information on the banks (in Czech or in English)
 - ** specific sub-base on diskette:
 - *** banks - basic data (50 items of information per record)
 - *** banks and their services to businesses and businessmen
 - *** banks and their services for individuals/citizens (not engaging in business)
 - *** trading outlets of the banks, and their services
(always the latest version, or annual subscription to continually updated versions)
- * **REPRESENTATIONS OF FOREIGN COMPANIES IN THE CZECH REPUBLIC**
 - ** data base on diskette
- * **DIRECTORY OF INFORMATION PROVIDERS AND LIBRARIES IN THE CZECH REPUBLIC**
 - ** data base on diskette

³⁵ *e.g.* bar code systems

* **SUPPLIERS OF AUTOMATIC IDENTIFICATION SYSTEMS AND RELATED SERVICES**

** data base on diskette

EUROPEAN SME BROKERAGE - EURO INFO

* information on Czech and foreign companies engaging in business contacts

NIS PUBLICATIONS

* "How to come across information about companies in the Czech Republic" (in Czech, *i.e.*, Kam pro informace o firmách působících v ČR). NIS, 1995, 271 pp.

Appendix 2: Selected private hosts in the Czech Republic

BANKS

Banks such as the *Československá obchodní banka a.s.*, *Komerční banka a.s.*, and *Investiční a poštovní banka a.s.* all operate their bancomat networks.

CCS Ltd.

Operates a Czech-and-Slovak credit card online network for purchases of fuel etc. at gas stations.

Computing Corp. (Podnik výpočetní techniky, a.s., PVT)

Enjoys a specific position in the CR: the largest network; 342 branch offices on the network (formerly used as registration points for voucher privatization); ca. 3000 staff; 29 computing centers. Provides individual owners of [privatization] vouchers as well as individual and corporate shareholders with [offline] information on the Investment Fund., companies, and corporations which took part in voucher privatization. Is active in setting up other territorial and local information systems to be run on their computer network. Owns the *RM-System, Co.p.* (cf. below).

Czech Savings Bank (Česká spořitelna a.s.)

Operates a bancomat network.

EOS Ltd.

Operates the *APS/NET* network serving mainly for local government E-mail (also used by *NIS* for communication with *NIS* Regional Offices).

MEDISTYL Ltd.

Use *NIS*'s X.25 line for their online connection to foreign hosts. Specialize in patent information (World Patent Index, WPI) and chemical information (Chemical Abstracts Service, CAS). Represent *STN* Karlsruhe in the CR.

RM Systém Corp. (RM-S)

Subsidiary company of *PVT Corp.* Offers stock trading information; provides information on the buying and selling of securities, the ownership of stock, auction prices, volume of trading, number of emissions traded online, and also on the situation of Investment Fund Companies.

SPT Telecom Corp. - IAT Praha

Operates the Czech videotex system allowing for both unrestricted and restricted access services.

Stock Exchange Corp. (Burza cenných papírů a.s.)

Offers information on stock market development and trading in securities (also see Section 4.2.1). Shares information via BBS with the *NIS* host.

TANGER Ltd.

Offer a range of public-domain information in their *EOTEL* host to entrepreneurs, marketing personnel, management, brokers, and banks. Some of their data bases are of interest to SMEs. Offer direct-mail advertising and ordering and E-mail.

The *EOTEL INFO* online host offers

- *a referral data base [of information sources]*
- *business information*
 - Companies in the CR and the SR
 - Companies abroad
 - Data base of the Services of Economic Chambers
 - EDB "Infodis"
 - Data base of debtors
 - Exchange rate and customs tariff information
 - Stock market information (EOTEL INVEST)
 - Technology transfer & innovations data base (EOTEL TECHNO)
- *juridical information*
 - ASPI system laws
 - City bylaws (Prague)
- *sector-specific information*
 - Tourism data base (EDB)
 - Software catalog (EDB)
 - Experts data base.