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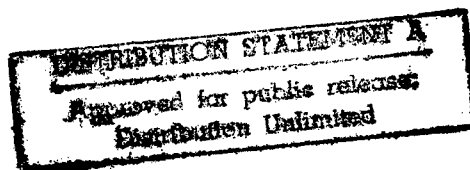
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West Europe Report

SCIENCE AND TECHNOLOGY



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30 December 1985

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

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ADVANCED MATERIALS

BRIEFS

SWEDISH FIBER COMPOSITES PROJECT--The National Swedish Board for Technical Development, STU, has just started a new project area. It is called "Technical Fiber Composites" and comprises project support in the amount of 30 million kronor until 1990. The funds will be used to improve the plastic composite technology of Swedish enterprises. STU is now seeking project applications for the new project area. The projects should, for the most part, concern suitable products and rational production methods. Practical project proposals may thus be submitted. A steering group with representatives from industry and the technical universities will help STU choose the proposals to receive project support. Those who have project proposals should submit details on their projects to STU, Kjell Lindman, Box 43200, 10072 Stockholm, as soon as possible. Call 08-7445100, and STU will send an application form. It is also possible to reach STU via the development associations in all countries. [Text] [Helsingborg PLASTFORUM in Swedish Oct 85 p 33] 7262

CSO: 3698/142

AEROSPACE

SECOND ARIANE LAUNCH PAD READY AT KOUROU

Paris AFP SCIENCES in French 14 Aug 85 pp 12-13

[Unsigned article]

[Text] Paris--Since the completion of the second Ariane launch pad (ELA-2) at the Kourou Guyana Space Center, it will henceforth be possible to launch the European Ariane rockets at one-month intervals. CNES (National Space Studies Center) has just turned it over to ESA, the European Space Agency, which at the beginning of the month has made it available to Arianespace, the company responsible for the commercialization of Europe's rockets.

With the availability of ELA-2, it will indeed be possible to launch all the existing types of Ariane rockets, even the most powerful ones, which means Ariane-4, independently of the propellant--powder or liquid--necessary to place the heaviest satellites in orbit. However, an entirely different third pad will have to be built in the Guyana jungle, where its location has been set aside, in order to launch Ariane-5 (with or without the mini-shuttle Hermes), which will not be ready before 1995.

Next December, ELA-2 will be used for the first time to launch--with an Ariane-3 rocket--two foreign communication satellites: the Brazilian Brasilsat-2 and the American G-Star 2.

CNES, ESA, and Arianespace would very much like for this second launch pad, equipped with the most modern and highest performance facilities, and which will play a strong role in the battle between the United States and Europe for the satellite launching market, to be inaugurated with great fanfare in about two months, at a high European political level.

For Europe, ESA, the French CNES, and Arianespace, this would be a consecration of their joint desire to go forward in a field in which advanced technologies play an essential role, with a thought to the Eureka program, at a time when the Ariane rockets have been recognized as strong competitors of the American shuttles.

ELA-2 will enable Arianespace to make 10 launchings per year and reduce operating costs. The installation includes two distinct areas: the launcher preparation area, and the actual launching area, separated from each other by one kilometer and connected by a runway.

The first area consists of a fully air conditioned building, 74 m high, in which rockets can be built and satellites installed under their shrouds, directly on a mobile launch platform which will be moved on tracks to the second area, the actual launching area. The advantage is that a second launch can be prepared even before the preceding rocket has been launched. The result is that the interval between two launchings can be reduced to one month.

ELA-2 was built by many companies from the 11 ESA member nations; its construction was managed by CNES on behalf of ESA, and it will have cost 153 million European account units, or one billion francs at the 1984 economic conditions. It is equipped with the latest techniques for controlling rocket components, the most modern computers, and so on.

Paradoxically, a very large truck, which looks very small, will be drawing the Arianes toward the launch pad, from which they will fly at a steadily growing speed to place their satellite-loads in orbit.

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CSO: 3698/24

AEROSPACE

HERMES PROJECT NINETY PERCENT FINANCED

Paris ELECTRONIQUE ACTUALITES in French 11 Oct 85 p 18

[Text] With the announcement of the choice of the builder for the future European space shuttle imminent, the Hermes program is already 90 percent underwritten. The CNES [National Center for Space Studies] hopes to see the principal partners in the ESA (European Space Agency), Germany and Great Britain commit themselves to this project valued at 2 billion ECU [European Currency Unit] (Fr 13.6 billion) which should culminate in the production of two flight models in 1995.

It is recalled that in Rome, at the end of last January, the ESA Council, meeting at the ministerial level, adopted two projects: the heavy Ariane 5 launcher capable of carrying two satellites of the nineties, as well as the project for the Columbus orbital station module. These two projects, valued at approximately 5.2 billion ECU, have already been more than 100 percent financed by the Europeans (from 110 to 112 percent). Remember that a memorandum of agreement for the study of detailed specifications for the European module adaptable to the American orbital station was signed at the time of the latest Le Bourget exhibition. According to Frederic d'Allest, managing director of the CNES, the construction of Hermes will constitute a second stage in the European space program, the one which is to guarantee European independence.

Insufficiency of American Shuttles

Remember that the European space shuttle will be able to carry a crew of from 2 to 6 persons and 4.5 tons of cargo in orbits located between 400 and 800 km and remain aloft for up to 30 days. According to the report made recently by d'Allest to the members of the Space Club, the three American shuttles will not be adequate to perform all the services which will be necessary in the future for the orbital station and for the SDI [Space Defense Initiative] program. Hermes will thus have a role to play. Its missions will be of a technological nature: intervention in orbit, servicing of an orbital base station or autonomous missions such as observation of the earth. Hermes will not be used for satellite launch or recovery. As for industrial use of space (production of materials in weightlessness), it does not seem, according to

the managing director of the CNES, that serious marketing studies have been made and, for the moment, transporting materials produced in space to earth does not appear on the European shuttle's agenda.

Assignment of the contract for the Hermes project is expected to be the subject of the imminent announcement of the CNES decision. At press time, it remains unknown which of the manufactures, Aerospatiale or Dassault, has been chosen by the CNES. Since France intends to keep a predominant role in this project, compared to her European partners, one of the two large aeronautics firms will lead the project. It is a truly federative project of new technologies which will involve a major part of research and development in the high tech sectors. The total cost is currently assessed at 2 billion ECU which will cover the financing of two flights and the manufacture of two space vehicles suited for the job.

Development of the shuttle itself is expected to cost 1.3 billion ECU, the ground component 0.3 billion ECU, systems work 0.2 billion ECU. Financing lines also cover the technology (80,000 ECU), payload auxiliaries (60,000 ECU) and adaptation of Ariane 5 (60,000 ECU). This program, whose effect on the ESA budget will increase progressively beginning in 1987 to reach 15 percent of the agency's expenditures in 1991 and 1992 (0.3 billion ECU), does not include the production of the satellite to relay communications to the earth. This system, called DRS 1 (Data Relay System), is financed within the Columbus infrastructure. It consists of a complex of two satellites to be operational by the middle of the next decade.

A Great Need in Software

In their rounds of the capitals of Europe, the CNES officials collected commitments for participation in the Hermes project from nine countries: Sweden, Denmark, Belgium, the Netherlands, Switzerland, Austria, Italy, Spain and Ireland. At present, 90 percent of the Hermes financing is underwritten. According to d'Allest, Great Britain, which is participating in the polar platform project, is believed to be interested in Hermes. German participation is likewise expected. As for Canada, which produces the manipulating arm of the American shuttle, its joining the project has not been ruled out.

A "federative program of the new technologies," Hermes will draw on artificial intelligence as a decision making tool. Robotics will likewise be called upon for telemanipulation. In this regard, if Canada does not join the Europeans, production of the manipulating arm will probably go to the Netherlands, whose technology in this field is quite advanced, according to a CNES source. Simulation software will be particularly developed in the Hermes program both for pure simulation or for cases of shuttle malfunction.

Software assumes special significance, since the reliability rate for the mission must reach 0.99, while it is currently 0.94 for Ariane. This rate which involves crew survival must be even higher. Remember that last July in Toulouse Aerospatiale delivered the flight simulator Epopee which could be used for training European shuttle crews. Thus, among the technologies contributing to the Hermes program, a principal role is played by software, a

significant application of which will be made in the control rooms. Likewise, and in view of reducing the electric power used, the shuttle will be equipped with flat screens and with electronic displays. To cover the supply of electricity, fuel cells will most surely be used and they will need to be "spacified."

On 25 October, the Hermes program will be presented by the CNES to the industrials as well as to the space agencies of the countries of Europe. In 1986, the file will return to the ESA seeking a financial commitment for 1987.

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CSO: 3698/78

BIOTECHNOLOGY

MORE PRIVATE CAPITAL SOUGHT FOR FRG BIOTECH START-UPS

Solothurn CHEMISCHE RUNDSCHAU in Germany 20 Sep 85 p 5

[Text] Since the beginning of this year, the Jülich Nuclear Research Center, through its "Project Management of Bioengineering" (PTB) has been managing country-wide the model experiment "Technology-Oriented Business Foundings" for the area of bioengineering.

Through the collaboration of engineering consulting agencies and providers of capital, more private capital is supposed to be made available for engineering-oriented corporate foundings. "Engineering-oriented" here means that the funded businesses concentrate on such products, processes, and services whose competitive advantages are based on bioengineering innovations.

Corresponding to the central points in the funding of bioengineering, the areas of gene engineering, cell-culture engineering, enzyme technology, and process engineering are of special interest in this model experiment. In gene engineering, plant and non-plant systems are concerned; in the area of cell-culture engineering, plant and animal cell cultures are involved. Not only the development of new cell-culture techniques is of special interest here but also the production of substances from such cell cultures. Enzyme-engineering processes anticipate the production and application of suitable enzymes in engineering and medicine; in the medical area both for diagnosis and for therapy. The process-engineering area also includes the development of bio-reactors as well as the associated measurement, control, and regulation technology, likewise equipment for the preparative production and processing of bioengineering products.

For such innovation projects, the federation grants project-bound allocations and shares the risks. Execution lies in the hands of the working team "Engineering-Oriented Business Foundings" (TOU) within the PTB. These measures should be tried out in a time-limited experiment. For promising projects, the TOU offers scientific-technical and managing consultation as needed.

8348

CSO: 3698/134

BIOTECHNOLOGY

ITALY TO COORDINATE, SUBSIDIZE ITS BIOTECH EFFORTS

Duesseldorf CHEMISCHE INDUSTRIE in German Oct 85 pp 646-647

[Article by Dipl. Chem. Dieter Rohe]

[Text] Up to now Italy has been remiss in its coordination of bioengineering research, in adequate financial funding by the government, and its readiness to finance by way of venture capital. Now things appear to be changing. The government has become conscious of this important area of innovation. Industry has already progressed further. Here collaboration exists with American and British research firms, and the intention is to market important bioengineering drugs by 1987 and 1988.

The "Farmitalia-Carlo Erba SpA", the largest Italian pharmaceutical enterprise, will use a bioengineering procedure for the first time. This involves a procedure to manufacture calcitonin, a human hormone, is very important for the assimilation of calcium into the substance of the bone. It was developed jointly by the American "Unigene Laboratories", Fairfield, New Jersey, a research enterprise founded 4 years ago, and the "Lark SpA", in Mailand. Lark, just like Farmitalia, belongs to the "Erbamont NV", the common pharma-holding of the Italian "mont-edison SpA" (73 percent) and the American "Hercules Inc." (13 percent).

Calcitonin Cheaper

Up to now, economic production of calcitonin was hindered by the difficulty of amidizing its precursor product, a peptide. By means of gene engineering Unigene and Lark succeeded in growing bacteria which produced a precursor product so pure that the end product obtained therefrom requires no further purification. This end product can be obtained without any problems in one step, by enzymatic amidization.

The Farmitalia now wishes to increase the availability of this hormone, whose world market is currently estimated at over 200 million dollars. At the same time, it wants to reduce the price so as to stimulate demand even more. The pharmaceutical enterprise sees great opportunity to reduce hospital costs caused by geriatric osteoporosis, the most important application area of the drug. In Italy alone these costs amount to 150 billion lire annually.

Since a pure process innovation is involved and the end product is already known, tedious clinical testing will be obviated. Farmitalia therefore expects to be able to offer the product on the market already in 2 years.

In the meantime Unigene is already researching the next step. It wants to obtain a bacterium by gene engineering, which will be able to produce the hormone in one step, that is including the amidation. It then wants to apply the procedure to other rare human hormones, such as gastrin and oxycotin.

Furthermore, Farmitalia wants to bring to bear its special strength, cancer chemotherapy, by combination with bioengineering. For this purpose, it is collaborating with the American research firm "Cytogen Corp.", Princeton, New Jersey. This company specializes in the area of monoclonal antibodies and has experience in their application to produce diagnostic means and substances which conduct the pharmaceutically active substances into the diseased cells.

Farmitalia believes that the procedure is a breakthrough in a country whose bioengineering research is said to lag behind. But there certainly is no lack of industrial enterprises who carry on research and development in this area. Four of these are here considered as especially advanced.

These include not only Farmitalia, which is active in protein chemistry and gene engineering, but also the Sclavo SpA (protein chemistry, recombinant DNA, hybridoma technology, molecular biology and molecular immunology), the "Gruppo Lepetit SpA" (gene engineering and monoclonal antibodies) and the "Sorin Biometica SpA" (protein chemistry, monoclonal antibodies, and immobilization of enzymes).

Interferon and Plasminogen Activator

Another enterprise is joining the above list, namely the "Industrie Farmaceutiche Menarini", Florence. After a phase of one-sided technology transfer from the British "Life Science Research", the pharmaceutical enterprise wants to carry on its own bioengineering research. Its president, Alberto Aleotti, is also president of the Italian Pharmaceutical Association Farindustria. For its bioengineering research, it is expanding its research center in Pomezia, south of Rome. In 1979 it acquired there the Centro di Ricerca Farmaceutica, which was constructed by several small and medium pharmaceutical enterprises as a joint research facility. This was expanded and, 2 years ago, with an investment of 32 billion lira, it was supplemented with a toxicological research center, which also performs studies for third parties. It currently employs 147 scientists, 38 of these from abroad. Now follows the construction of a bioengineering research center, representing an investment of 28 billion lira.

For this reason, the lion's share of the research expenditures during the years 1984-1988 is destined for bioengineering. These research expenditures will amount to 200-250 billion lira. Menarini wants to continue to collaborate with Life Science Research as well as with American and Japanese partners.

The research expenditures should effect a strong sales expansion. After 250 billion lira in the previous year, Menarini already set an objective of 350 billion lira for 1985. They are working towards the production of β -interferon, the plasminogen activator tPA and, in competition with Farmitalia, towards the production of calcitonin. It is believed that their own β -interferon will make possible much lower doses than the competition products.

tPA (tissue plasminogen activator) is an intrinsic body substance which is capable of highly specific dissolution of thrombi. With this product, too, Menarini will encounter strong competition. The product is obtained by the technique of recombinant DNA. It was cloned for the first time in 1982 by "Genentech Inc." in south San Francisco and is far advanced in clinical testing. Already in 1986, Genentech expects to achieve sales of about 90 million dollars. Its European licensee, the Boehringer-Ingelheim group with its subsidiary "Dr. Karl Thomae GmbH", Biberach, wants to take up production in the kilogram scale already by 1986. In Japan, the "Kyowa Hakko Kogyo Co." is currently putting its tPA into clinical testing and expects marketing production at the latest by 1988. The "Mitsubishi Chemical Industries Ltd." is also active in this area there.

In its tPA development, Menarini is cooperating with Crea. Aleotti comments optimistically: "Even if we are not the first, we stress being the best." In any case, the growing market should have room for several manufacturers. The American Heart Association expects that tPA will find application with half of all acute cariac infarcts, with 30 percent of all pulmonary embolisms, as well as with thromboses of deep veins and diagnosed blockages of peripheral arteries.

Sclavo, the pharmaceutical enterprise of the government "EniChem SpA", is not only carrying on bioengineering research in the above-mentioned areas. In fermentation, in the production of monoclonal antibodies, in cell cultures, and in gene expression, it has furthermore already gone over to development. Sclavo has already come on the market with monoclonal antibodies, special anti-proteins of the cytoskeleton, the most important antibodies for immuno-diagnostics, in complete kits, as well as with atoxic diphtheria toxin, human β -interferon, as well as β - and γ -interferon from yeast and human cell cultures.

Urokinase and Immunodiagnostic Systems

The Dow subsidiary Lepetit, just like the Genetic Institute of the National Research Council (CNR) in Pavia, is busy with the production of urokinase. The anticoagulant is obtained by in vitro cloning. It is identical with that produced by cells of the human body. In 2 to 3 years, it is believed that it will become marketable.

The Sorin Biomedica, which belongs to the Fiat conglomerate, is specialized to the production of artificial organs as well as diagnostic systems. The center point of its interest is the heart. On the other hand, the enterprise, in collaboration with the "Biogen NV", has also developed a diagnostic system for hepatitis B. It contains a nuclear antigen of the hepatitis-B virus, obtained by gene engineering in pure form, as well as antibodies labeled with iodine 125.

The next objective is to obtain the surface antigen. By means of this, the disease could not only be detected in infected persons but the immunity of vaccinated, healthy persons could be tested. In research and development work, biochemistry is becoming even more important in the future relative to artificial organs. The main target direction is the development of immuno-diagnostic reagents and methods. Together with Farmitalia and Sclavo, Sorin Biomedica participates in the Tecnobimedica, a company for applied research founded by the government special credit institute IMI.

Furthermore, the following enterprises are carrying on bioengineering research: the "Recordati SpA" (monoclonal antibodies), the international Ares-Serono group with its Istituto di Ricerca Cesare Serono (gene engineering), the "Soc. Prodotti Antibiotici SpA", a subsidiary of the American "G. D. Searle & Co." (immobilization of enzymes), and the government ENI group. Its research company, the "EniRicerche SpA", also does research in protein chemistry and plant-cell cultures. Its predecessor firm, the Assoreni, received the first Italian gene engineering patent 3 years ago for protein production by means of soil bacteria. The "EniChem Agricoltura SpA", a specialty company for fertilizer and pesticides, wants to cooperate with the Federconsorzo, an umbrella organization of agricultural societies, to expend 20-25 billion lira over the next 3 years for bioengineering research products concerning plant growth and plant protection.

The State Wants to Grant More Subsidies

As the examples show, the Italian lag does not concern so much the engagement of industry but coordination based on specific objectives and the corresponding financial subsidies by the state. The government has recognized this and, several months ago, founded the National Board for Bioengineering (Comitato Nazionale di Biotecnologia, CNB). At this opportunity, the Research Minister Luigi Granelli formulated his objectives: the application of bioengineering methods in the pharmaceutical industry and in agriculture, collaboration both on an international level as well as with the Institute for Gene Engineering, which the UNIDO is building in Trieste, and the special funding of interdisciplinary projects. Granelli named the other common market countries as the primary cooperation partners, but one of the first specific results was the conclusion of a contract between the Italian Ministry of Health and the American Food and Drug Administration (FDA). This provides for a regular exchange of information concerning research, production, and the registration of new drugs obtained by bioengineering methods, and concerning bioengineering process technology.

Research must be coordinated between the industrial enterprises, the colleges, as well as the public and private research institutes. Besides the National Research Council (CNR), one must mention the National Society for Alternative Energies (ENEA), the Mailand Cancer Research Institute, the Pharmacological Research Institute Istituto Negri, and the Grain Research Institute Casaccia. As yet completely underdeveloped is the engagement of venture capital. The readiness for this form of financing is very low.

In the educational area, Verona University is preparing to introduce a course of studies for bioengineering and is striving to erect a scientific park according to the American pattern. A feasibility study is currently being begun. Priority is to be given to applications in the areas of nutrition, agriculture, and pharmaceuticals, and here especially to immuno-diagnostics and monoclonal antibodies. In the pharmacological area one hopes to be able to profit from enterprises resident in the region, especially Glaxo in Verona and Fidia in Abano Terme, whose research centers on neurology.

After taking inventory of the FAST, the Association of Technical-Scientific Societies, 86 research groups in Italy were active in the area of gene engineering in 1983, 22 were occupied with monoclonal antibodies, 11 with protein chemistry, 10 each with plant-cell cultures and enzymes and 3 with the chemistry of oligonucleotides.

The lack of financial funding by public agencies is being criticized again and again. An improvement compared to the not even 7 billion lira, which the state has made available in 1983, can be observed already. The state will contribute 63 billion lira just towards the financing of the UNIDO project of an international center for bioengineering in Trieste. Its research results should benefit especially cattle breeding and pharmacology. Forty billion lira has been made available by the CNR (with emphasis on gene engineering) and by the Cultural Ministry for a 5-year time period.

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CSO: 3698/134

CIVIL AVIATION

STUDY BEGINS FOR THIRD NEW FOKKER AIRCRAFT

Amsterdam DE TELEGRAAF in Dutch 27 Sep 85 p 3

[Article: "Preliminary Study on New Fokker Aircraft Begun"]

[Text] Delft, Friday--The National Air and Space Laboratory (NLR) at Amsterdam is beginning the development of an entirely new Fokker passenger aircraft. The order comes from the Dutch Institute for Aircraft Development and Space (NIVR) at Delft, the agency that coordinates air and space projects for the government.

Fokker President Frans Swarttouw has continually stressed the need for yet a third airliner, in addition to the Fokker 50 and Fokker 100, in order to keep aircraft manufacture lucrative.

The aviation laboratory must now sort out over the next few years what is feasible and what is not in the construction of a passenger aircraft, which must be less expensive than the competition and easier for the airlines to use.

Fokker should be able to make it through into the 21st century with the new airliner. The aircraft factory at Schiphol is beginning as early as 1988 to work actively on the new airplane, which should be in the air and available for airline use 5 to 7 years later.

Successful Formula

It is not at all known what the new Fokker will look like. However, the preference is considered to be an elaboration on the successful formula of the Fokker 100 jet, but with considerably renovated propulsion.

During the Leonardo da Vinci Symposium that came to a close yesterday at the Delft Institute of Technology, Dr G. J. M. Pronk, the head of the business strategy department at Fokker, warned that airlines should not expect from Dutch industry an aircraft with revolutionary properties.

Fokker does not see the good of the prop-fan engine for the airlines in particular. The prop-fan is a jet engine that drives a multi-blade propeller and promises a 25 percent savings in fuel consumption. All engine

manufacturers are working hard on it. The Fokker strategist does not see the point of this work because the development costs are so high that they are not offset by the savings in fuel costs. Especially not now that the cost of kerosene for aviation is so low and no dramatic increase in price is being foreseen before the turn of the century, Dr Pronk predicted.

M. G. Geschiere, chairman of the NIVR, which has now given the first boost to the new Fokker, revealed that the Fokker can perhaps benefit from the promising results of the Dutch discovery of the metal Arall. This material of the future, which is being tested at the Delft institute, is a compound of sheet aluminum and Aramid artificial fibers. The tests in Delft are revealing a material that is as light as plastic, but stronger than aluminum, of which aircraft are currently built.

A second change that will alter the complexion of the airplane is the application of the so-called flat screen television. These flat, image-producing screens hold out possibilities for advancement for all the tasks with which the airplane completes its voyage. They assume the responsibilities of the on-board computers and the automatic pilot, at a fraction of the cost and weight.

Partners

Geschiere says that it will take at least 15 years to develop an entirely new passenger aircraft. This involves so much money that the Netherlands can no longer go it alone, and will have to seek partners abroad, who will have more to say about the design than the Dutch aviation industry is accustomed to granting.

The aviation laboratory in Amsterdam is already overflowing with orders for Fokker.

12271

CSO: 3698/16

CIVIL AVIATION

BRIEFS

BELGIAN AIRBUS PARTICIPATION--Philippe Maystadt, Minister of the Budget and of Science Policy and Planning, approved Wednesday the research and development contract permitting the participation of Belgian firms in the Airbus A 320 program. Research covered by this program amounts to 1.7 billion Belgian francs, divided at the rate of 1.44 billion to SONACA (Charleroi), 188 million to ASCO (Zaventem) and 74 million to WATTEEUW (Bruges). This financial effort on the part of the state will allow these three firms to participate in the Airbus program by producing the movable leading edges of the wings and related mechanisms. These elements have the basic function of increasing hyperlift at reduced speed on landing and take-off. In its production phase (1989), the A 320 program will represent 355,000 hours of labor annually in Belgium including 50 percent at SONACA and 10 percent at WATTEEUW. [Text] [Brussels LA LIBRE BELGIQUE In French 19 Sep 85 p 3] 12666

CSO: 3698/78

FACTORY AUTOMATION

REPORT ON FRENCH PROGRAM FOR PRODUCTION AUTOMATION

Paris ELECTRONIQUE ACTUALITES in French 6 Sep 85 p 5

[Article by H. Pradenc]

[Text] Matra Automation has just broken off from Matra-Manhurin-Automatic (MAA) (its machine-tool activity), and expects to do the same with its Robotronics subsidiary.

CGE, which last year expressed worldwide ambitions in production automation, is continuing to shape its structure around CGP (Compagnie Generale de Productique).

Renault, which as part of the French production automation plan had formed Renault Automation, is uncertain about the future of the production automation activity, the automobile manufacturer being faced with fundamental difficulties.

We can thus see that less than two years after their creation, two of the three large French production automation projects find themselves in a situation which exceeds their capabilities.

In 1984, when the government started the French three-year production automation plan, and three large industrial centers were established to satisfy not only the domestic demand for production automation, but to export it as well, every hope was possible; but we are now witnessing the abandonment of some operations which the manufacturers deem to be too costly. CGE for instance, announced its goal to increase its share of the world market from 1.2 to 5 percent, so as to join the ranks of the five leading suppliers of equipment and technology designed to improve plant productivity (General Electric, Westinghouse, Hitachi, Toshiba, and Siemens). On the other hand, Matra and Renault did not quantify their ambitions. Matra automation wanted to develop key products in industrial automation, and in particular, relied on the intelligent aspect of the products by creating the Robotronics company during 1984.

Industrial Recentering at Matra

For Matra, 1985 was the year of industrial recentering, with the group wanting to drop its costly activities. Among these was the Robotronics company, whose revenue was still insignificant compared to product research and development expenses. Pending approval by the government, Robotronics will be sold to the American Allen-Bradley. With about thirty employees, Robotronics developed Visiomat, a shape-recognition system that can also be used for building surveillance, which was later to be equipped with an expert system. Syscomat, Robotronics' second work horse, was developed for controlling robots and flexible shops. Robotronics, which was expected to produce revenues of 5 MF in 1984, made only one million francs.

The recentering policy led Matra to drop MAA, which last July was sold to a Bulgarian company, Machino Export, through its German subsidiary, Webo. The Mulhouse company reported a deficit of 100 MF in 1984; it was attached to the Matra group following Manhurin's demise. MAA presented at the 1984 Salon de la Productique, a graphic interactive programmer (PIG 1000) and a real-time production controller (CP 1600). The Manhurin group retains 49 percent of MMA's capital; MMA's personnel will stabilize around 250 people, from 320 employees in 1984.

CGP Losses in 1984

During last summer, Matra also decided to drop the automatic materials handling activity of the Interelec subsidiary, whose losses amounted to 90.8 MF in 1984. The agreement reached with the company Arcante, which bought this activity, covers the MB 300 automatic materials handling system, an intelligent cart with optical guidance, which carries a load of 400 kg.

Matra's withdrawal from these losing activities does not mean that it is leaving the production automation field. On the contrary, it appears that the group will henceforth devote its efforts to the other companies of the Matra-Automation branch, which offer interesting prospects. They are Matra-Datavision, whose CAD revenues should reach 204 MF in 1985 (123 MF in 1984); Matra GCA, whose sales of microelectronics fabrication equipment returned 227 MF in 1984, three-fourths of it from exportation; and Sormel, which achieved 33 MF of revenue in 1984 from assembly systems.

CGE entered into production automation not by creating units from the ground up, but by tightening the bonds between the various resources available in the group, around a new company, CGP (Compagnie Generale de Productique), issued from CGMS (Compagnie Generale de Manutention de Stockage), an Alsthom Atlantique subsidiary in which CGE acquired 60 percent of the capital. CGP's aim is to reach revenues of 500-600 MF in three years. In 1984, it made 278 MF with losses of 2.7 MF. It should reach an equilibrium this year, and 1986 should be a profitable year. Since last July, CGP acquired two subsidiaries, CGP-Gestion for component production, with CESA for software, and CGP-Reseaux, for shop installations.

Uncertainties at Renault-Automation

CGE's production automation hub is thus steadily shaping out, and its new activities are playing an increasingly significant role compared to its conventional handling and storage activities. This smooth transition is carried out in close connection with the group's production automation activities: Alsthom and its robots, CGEE and industrial control, and Cilas with its automation components. With CGEE-Alsthom, CGP must participate in the specification of a new line of programmable automatic machines. By the same token, CGE's production automation hub has nothing to offer in numeric controls for machine-tools. A gap also exists in CAD-CAM, an area in which CGP could open up to outside cooperation, with the possibility of writing its own software using technical support from CESA.

Will the Renault group, which has just turned over to the American Allied its Renix subsidiary for automobile electronics equipment, be in a position to pursue its investments in research and development so as to remain competitive in production automation? Right now we have no tangible evidence to predict the decisions which could be taken by the automobile manufacturer about its Renault-Automation subsidiary. Nor for that matter, about the programmable automatic machine company April, whose capital is shared between Renault (55 percent) and Merlin-Gerin (45 percent), and which appears to be in good health, but which requires large investments to develop the next generation of products.

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CSO: 3698/24

FACTORY AUTOMATION

NC MACHINE TOOLS IN ITALY: 1984 SUPPLY, DEMAND

Milan AUTOMAZIONE INTEGRATA in Italian Apr 85 pp 52-67

[Text] The 17th survey is published this year simultaneously with the 6th EMO, thus emphasizing its role as reference point for the organizers. We heartily thank all those who, by filling out our forms, have made possible the compilation of the following tables.

Results of the Survey

Last year's conclusions which predicted a slight improvement in 1984 relative to 1983 have been surpassed by reality: 1,822 NC machine tools have been installed, with an increase of 38.5 percent over 1983 (1,315 units); the Italian production (2,090 units) also shows an increase of 22.2 percent over 1983 (1,710 units). The import of foreign NC [Numeric Control] machines (565 units) shows a considerable increase (48.7 percent) which we hope is not an indication that the crisis has brought lasting damage to the Italian NC industry. The export of Italian NC (833 units) shows, in fact, a modest +7.5 percent relative to 1983 (775 units). Such export is 45.7 percent of the production and is almost the same as that of 1983 (45.3 percent).

The domestic demand of Italian NC's in 1984 (1,257 units) has finally shown an increase of 34.4 percent over 1983 (935 units) surpassing that of 1982 (1,114 units) but not reaching that of 1981 (1,495 units).

Table 4 shows that lathes still have a difficult time: their percentage installation has dropped to 40.8 percent (it was 44.5 percent in 1983 and 51.5 percent in 1982). Milling machines have increased in percentage.

Table 6 shows that for lathes our market has depended substantially on imports (250 units in 1984 versus 168 in 1983). From Table 1 it is seen that the FRG has regained first place for our exports surpassing France which, on the other hand, is conducting a political campaign to promote its national products, protecting them to the utmost limits. The U.S. market remains, as always, very weak, not to mention Asia which is at insignificant levels.

Table 2, when compared to that of 1983, shows gains in the sectors "transportation except auto," "die machines," "woodworking machines," "machines for plastics," "metal furniture," and "schools."

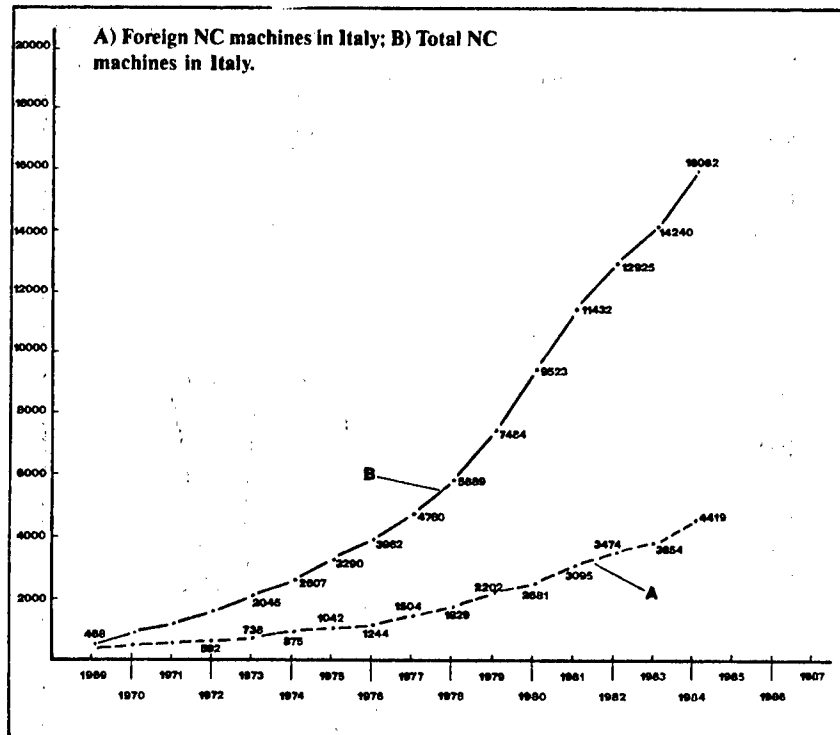


Figure 1. Installation of NC Machine Tools in Italy

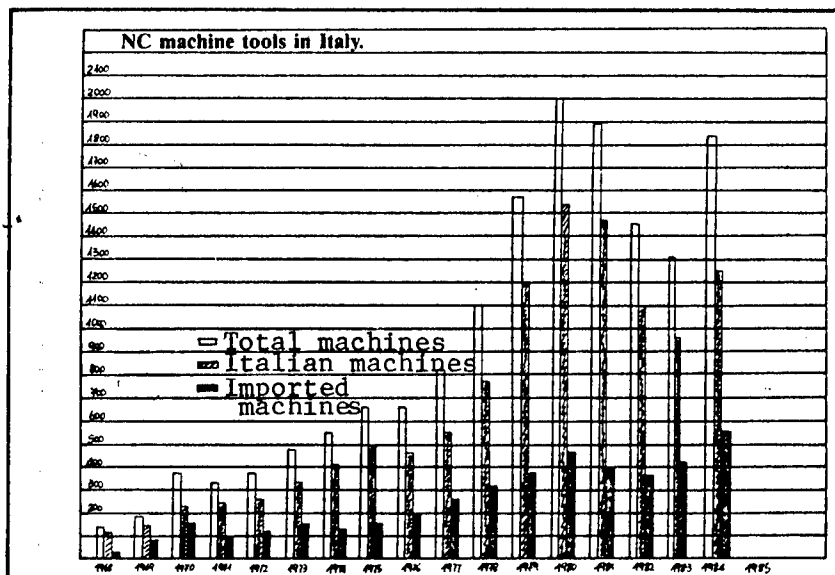


Figure 2. NC Machine Tools Annually Installed in Italy (in white the total number of NC machine tools in Italy, in black the import)

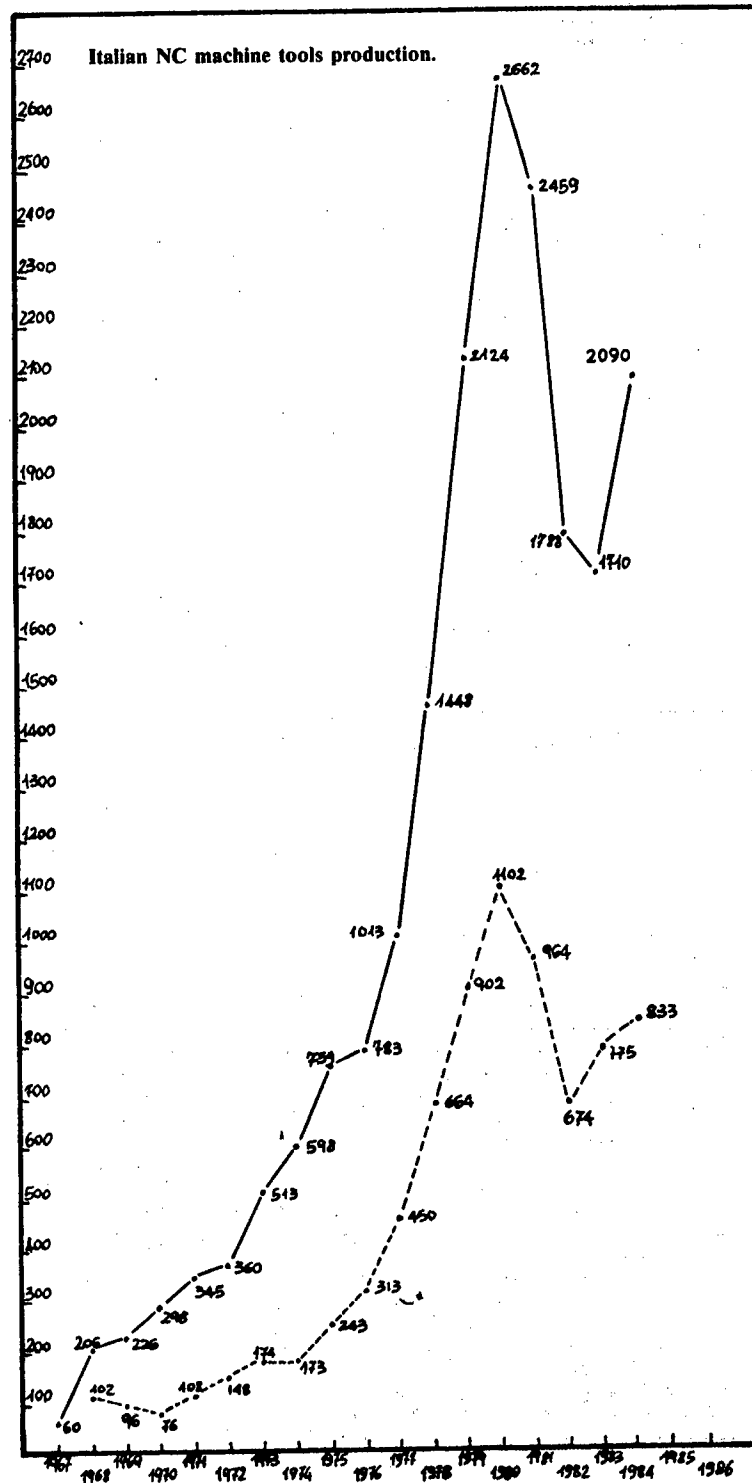


Figure 3. Italian Annual Production of NC Machine Tools. The data for 1967 is a reliable estimate; successive data are from the annual surveys conducted by NEW TECHNIQUES. The dashed line is the export.

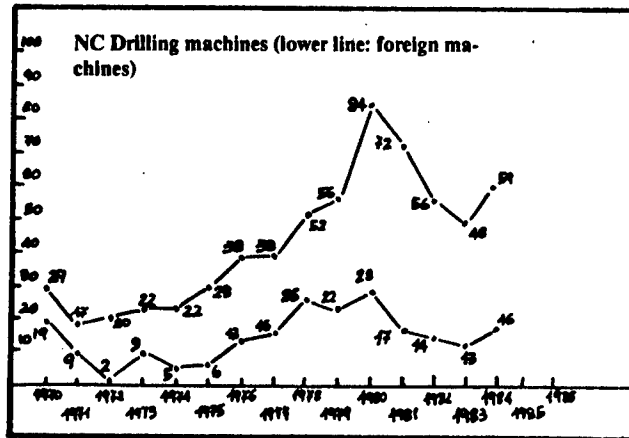


Figure 4. NC Drilling Machines Installed Annually in Italy

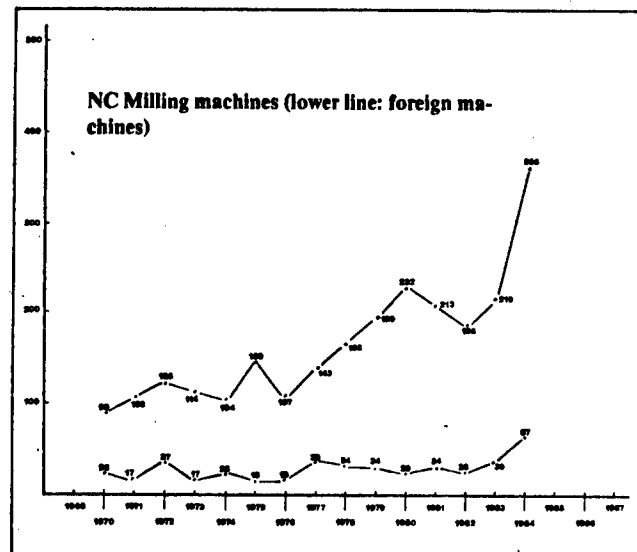


Figure 5. NC Milling Machines Installed Annually in Italy

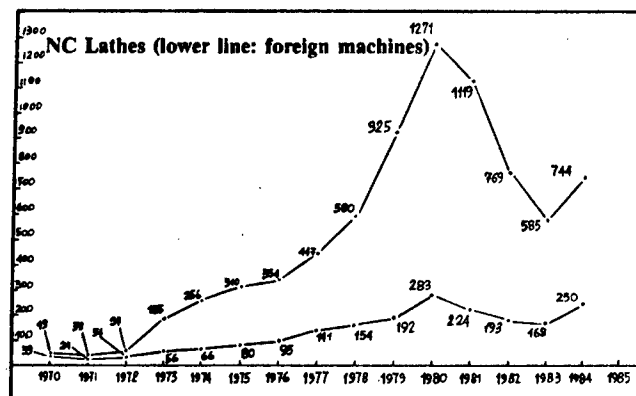


Figure 6. NC Lathes Installed Annually in Italy

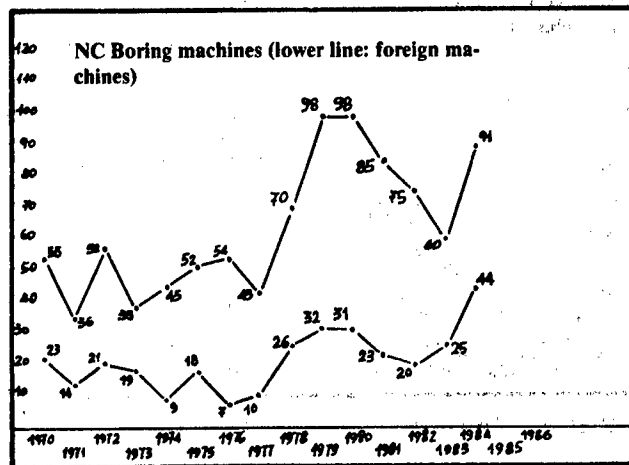


Figure 7. NC Boring Machines Installed Annually in Italy

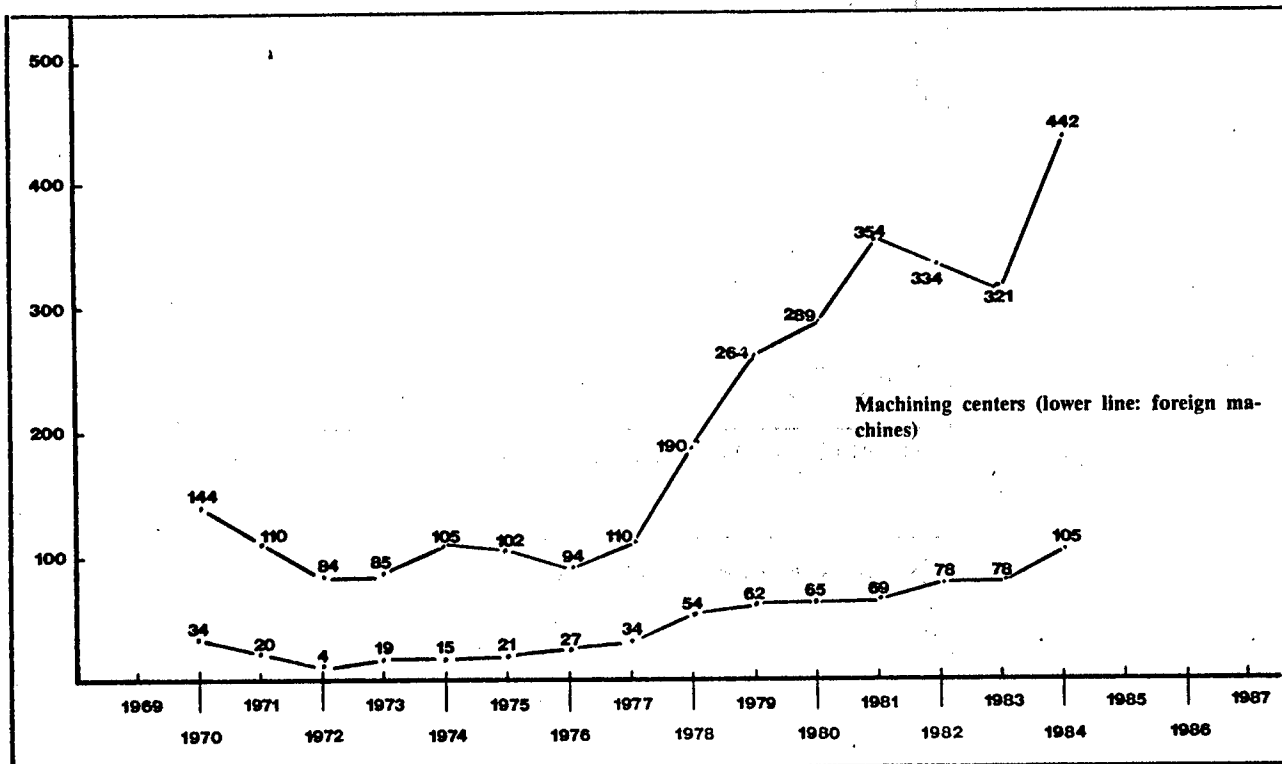


Figure 8. Machining Centers Installed Annually in Italy

Table 1. Italian Production of NC Machine Tools in 1984 (in units)

	Nation of Destination										
	Italy	United States	Great Britain	FRG	France	Countries of E. Europe	The rest of Europe	Asia	The Americas excluding U.S.	Other	Total
1. Horizontal turret lathes	411	20	18	27	25	3	40	1	22	1	568
2. Horizontal lathes with automatic tool changer	18	6	5		1					3	33
3. Vertical turret lathes	42	16	13	49	23	6	5	3	9	8	174
4. Others	23									3	26
5. Horizontal table boring machines	25			4	9		4		1	10	53
6. Horizontal mountable boring machines	15			9			3		5		32
7. Horizontal jig borers											
8. Vertical jig borers											
9. Jig borers (not installed)	7		10		9						26
10. Mass production boring machines											
11. Single milling machines	6										6
12. Turret drilling machines	24	3	6	3	1		3				40
13. Vertical drilling machines with automatic tool changer	2			10	6						18
14. Radial drills	10			12			11				33
15. Other drilling/boring machines	1									1	98
16. Single vertical milling machines	73	6	16	3		18		1	2		119
17. Vertical turret milling machines	2				8		1	1			12
18. Single horizontal milling machines	44	1	6			12				1	64
19. Horizontal turret milling machines	12										12
20. Profile milling machines	21	1	8	1		2			3	1	37
21. Milling/boring machines	124	18	15	9	11	17				1	195
22. Milling planar				2	1						3
23. Special milling machines	14	2	5	11	4	2					38
24. Other vertical milling/boring machines	8										8
25. Vertical single machining centers	36										36
26. Vertical turret machining centers	28				5		6				39
27. Vertical machining centers with automatic tool changer	105	8	1	19	18						151
28. Single horizontal machining center	13			3							16
29. Horizontal turret machining center					3						3
30. Horizontal machining center with automatic tool changer	155	3	8	17	22	37	15		2	5	264
31. Grinders	34	5	2	8			9	4	1		63
32. Various spot welding machines											
33. Punch/press machines											
34. Framing machines	4	8				8					20
35. Sheet metal machines											
36. Automatic punch machines											
Total	1257	54	113	185	154	93	146	9	44	35	2090

*atc = automatic tool changer

1. Horizontal turret lathes
2. Horizontal lathes with automatic tool changer
3. Vertical turret lathes
4. Others
5. Horizontal table boring machines
6. Horizontal mountable boring machines
7. Horizontal jig borers
8. Vertical jig borers
9. Jig borers (not installed)
10. Mass production boring machines
11. Single milling machines
12. Turret drilling machines
13. Vertical drilling machines with automatic tool changer
14. Radial drills
15. Other drilling/boring machines
16. Single vertical milling machines
17. Vertical turret milling machines
18. Single horizontal milling machines
19. Horizontal turret milling machines
20. Profile milling machines
21. Milling/boring machines
22. Milling planar
23. Special milling machines
24. Other vertical milling/boring machines
25. Vertical single machining centers
26. Vertical turret machining centers
27. Vertical machining centers with automatic tool changer
28. Single horizontal machining center
29. Horizontal turret machining center
30. Horizontal machining center with automatic tool changer
31. Grinders
32. Various spot welding machines
33. Punch-press machines
34. Framing machines
35. Sheet metal machines
36. Automatic punch machines
- Total

	United States							Destination of Imported NC machine tools by industry																											
	Great Britain	Germany	France	Switzerland	Japan	Others	Total	Aviation and motors	Automobile and others	Transportation except automobiles	Tractors	Construction machines, agricultural machines	Machine tools	Other machines except electrical machines	Electrical machines and systems	Communications	Instrumentation	Weapons/Arsenals	Die machines	Schools	Woodworking machines	Machines for plastics	Textile machines	Compressors	Pumps	Framing	Metal furniture	Other							
1. Horizontal turret lathes	4	8	11	25	82	31	241	13	35	12	8	7	7	9	4	6	7	11	18	3	7	7	18	8	1	4	31	241							
2. Horizontal lathes with automatic tool changer																																			
3. Vertical turret lathes																																			
4. Others																																			
5. Horizontal table boring machines																																			
6. Horizontal mountable boring machines																																			
7. Horizontal jig borers																																			
8. Vertical jig borers																																			
9. Jig borers (not installed)																																			
10. Mass production boring machines																																			
11. Single vertical milling machines																																			
12. Turret drilling machines																																			
13. Vertical drilling machines with automatic tool changer																																			
14. Radial drills																																			
15. Other drilling/boring machines																																			
16. Single vertical milling machines																																			
17. Vertical turret milling machines																																			
18. Single horizontal milling machines																																			
19. Horizontal turret milling machines																																			
20. Profile milling machines																																			
21. Milling/boring machines																																			
22. Milling planar																																			
23. Special milling machines																																			
24. Other vertical milling/boring machines																																			
25. Vertical single machining centers																																			
26. Vertical turret machining centers																																			
27. Vertical machining centers with automatic tool changer																																			
28. Single horizontal machining center																																			
29. Horizontal turret machining center																																			
30. Horizontal machining center with automatic tool changer																																			
31. Grinders																																			
32. Various spot welding machines																																			
33. Punch-press machines																																			
34. Framing machines																																			
35. Sheet metal machines																																			
36. Automatic punch machines																																			
Total	48	24	187	27	44	11	87	22	84	30	25	18	18	9	17	14	72	54	8	17	24	24	13	12	19	17	87	254							

Table 3. Imported NC Machine Tools Installed in Italy in 1984

Table 4

Type of NC machine	Number of NC machine tools installed in Italy		Percentage of NC machine tools	
	1983	1984	1983	1984
Drilling machines	48	59	3.7	3.2
Milling machines	218	365	16.6	20
Lathes	585	744	44.5	40.8
Boring machines	60	91	4.5	5
Machining centers	321	442	24.4	24.3
Others	83	121	6.3	6.7
Total	1,315	1,822	100	100

Table 5

Type of NC machine	NC machine tools produced in Italy		Percentage of NC machine tools	
	1983	1984	1983	1984
Drilling machines	85	98	5	4.7
Milling machines	338	488	19.8	23.3
Lathes	750	801	43.9	38.3
Boring machines	87	111	5.1	5.3
Machining centers	391	509	22.8	24.4
Others	59	83	3.4	4
Total	1,710	2,090	100	100

Table 6

Type of NC machine	Italian machines installed in Italy in 1984	Percent of partial total	Foreign machines installed in Italy in 1984	Percent of partial total	Partial totals by type NC machine tool
Drilling machines	43	3.4	16	2.8	59
Milling machines	298	23.7	67	11.9	365
Lathes	494	39.3	250	44.2	744
Boring machines	47	3.7	44	7.8	91
Machining centers	337	26.8	105	18.6	442
Others	38	3.1	83	14.7	121
Total	1,257	100	565	100	1,822

Table 7. Acquisition Orders for Italian NC Machine Tools (in units) in 1984

	Destination										Total
	Italy	United States	Great Britain	FRG	France	Countries of E. Europe	The rest of Europe	Asia	The Americas excluding U.S.	Other	
1. Horizontal turret lathes	295	11	30	17	25	8	31	2	11	6	436
2. Horizontal lathes with automatic tool changer	13	16									29
3. Vertical turret lathes	43	40	9	37	22	5	19		1		176
4. Others	15						8			8	31 672
5. Horizontal table boring machines	30			5	1	3	2			1	42
6. Horizontal mountable boring machines	17						2			1	20
7. Horizontal jig borers											
8. Vertical jig borers											
9. Jig borers (not installed)	8		9			7					24
10. Mass production boring machines											86
11. Single milling machines	4										4
12. Turret drilling machines	20			9	3		3				35
13. Vertical drilling machines with automatic tool changer	4			4	6		2				16
14. Radial drills	8			8		8	8				32
15. Other drilling/boring machines		1									1 88
16. Single vertical milling machines	78	20		17	12	2	15	1	3	7	155
17. Vertical turret milling machines			9				1				10
18. Single horizontal milling machines	69		3	10			6			1	89
19. Horizontal turret milling machines	18										18
20. Profile milling machines	14	3		1				6	1		25
21. Milling/boring machines	108	2	9	26	5	8	25	1	1	2	187
22. Milling planar	2										2
23. Special milling machines	17	1		10	11				4		43
24. Other vertical milling/boring machines	8					1	1				10 539
25. Vertical single turret machining centers	11	11		3							25
26. Vertical turret machining centers	37				6		3	3			49
27. Vertical machining centers with automatic tool changer	90		9	1	14	1					115
28. Single horizontal machining center	10	3									13
29. Horizontal turret machining center											
30. Horizontal machining center with automatic tool changer	155	3	6	13	41	9	10	2	1		240 442
31. Grinders	26	2	2		3		12		1		46
32. Various spot welding machines											
33. Punch-press machines											
34. Framing machines	15		4								19
35. Sheet metal machines											
36. Automatic punch machines											
Total	1115	113	90	161	149	52	148	9	28	27	65
Global total											1892
*atc = automatic tool changer											

Machines with positional servomechanism are excluded from this survey

Table 8. Acquisition Orders for Foreign NC Machine Tools (in units) in 1984

		Producing nation										
		Italy	United States	Great Britain	FRG	France	Countries of E. Europe	The rest of Europe	Asia	The Americas excluding U.S.	Others	
1.	Horizontal turret lathes	5	3	72	9	32	8	44		6	179	
2.	Horizontal lathes with automatic tool changer					1					1	
3.	Vertical turret lathes				1						1	
4.	Others							8			8	189
5.	Horizontal table boring machines					10					10	
6.	Horizontal mountable boring machines					16				3	19	
7.	Horizontal jig borers											
8.	Vertical jig borers					1		1			2	
9.	Jig borers (not installed)						4				4	
10.	Mass production boring machines					4					4	39
11.	Single milling machines											Da questa categoria sono
12.	Turret drilling machines											11
13.	Vertical drilling machines with automatic tool changer											2
14.	Radial drills					9						9
15.	Other drilling/boring machines				1							10
16.	Single vertical milling machines				10	1						11
17.	Vertical turret milling machines				2							2
18.	Single horizontal milling machines					3						3
19.	Horizontal turret milling machines											
20.	Profile milling machines											
21.	Milling/boring machines				34	1						35
22.	Milling planar				1							1
23.	Special milling machines				1							1
24.	Other vertical milling/boring machines											53
25.	Vertical single machining centers			6		1						7
26.	Vertical turret machining centers				2							2
27.	Vertical machining centers with automatic tool changer			6	3		3	3		3	18	
28.	Single horizontal machining center				3	1						4
29.	Horizontal turret machining center				14							14
30.	Horizontal machining center with automatic tool changer	12	2	1	4		6	6	3	3	37	82
31.	Grinders		1			1				3	5	
32.	Various spot welding machines	18	4	8	4	2						36
33.	Punch-press machines											
34.	Framing machines			2	2							4
35.	Sheet metal machines		2		5							7
36.	Automatic punch machines				25							25
Total												
Global total		30	14	26	103	12	97	21	59	18	450	

Machines with positional servomechanism are excluded from this survey

The second part of Table 3 shows that foreign machinery has gained in the sectors "automobiles and motors," "tractors," "machine tools," "weapons/arsenals," "die machines," "machines for plastics," "compressors," and "framing."

Table 3, which concerns the Italian market served by imports, when compared to that of 1983 confirms that Japan is advancing in a decisive way (118 units versus 85 in 1983, 74 in 1982, and 33 in 1981). The FRG has made good progress with 186 units compared to 121 in 1983, as has Switzerland (56 units versus 38 in 1983).

Production, Import, and Installation of NC's

Tables 4, 5, and 6 summarize by machine type the data reported in the preceding tables. Foreign NC's installed in 1984 (Table 6) represent 31 percent of the total installed, versus 28.9 percent for 1983, 25.4 percent for 1982, and 21.7 percent for 1981; it appears, therefore, that the increase of foreign NC's in our market has stabilized.

An examination by type shows that foreign NC's represent 27 percent of the drilling machines, 18.4 percent of the milling machines, 33.6 percent of the lathes, 48.4 percent of the boring machines, 23.7 percent of the machining centers, and 68.6 percent of "other."

These "other" (see Table 3) are mainly spot welding machines, sheet metal machines, and automatic punch machines.

Concerning installation of NC's in the nation (see Table 9), it has reached 16,062 units on 31 December 1984. A comparison by column shows that rotating tool machines have had a good year.

Some Data on Japan

These are extracted from the article "NC Machine Tool Output Drops After 7 Years of Prosperity" which appeared in the January 1984 issue of the Japanese journal METALWORKING ENGINEERING AND MARKETING published in English. The data reported by the journal are extracted from SURVEY INTO ACTUAL PRODUCTION OF NC MACHINE TOOLS OF 1982 edited by JMTBA (Japanese Machine Tool Builders Association).

Table 10 shows the production of NC machine tools by companies which are members of JMTBA.

Table 11 shows the destination of Japanese NC machine tools. Table 12 shows the installation of government units (notice the meager foreign presence on the line showing the non-Japanese CN-Foreign makers).

Forecast Data for 1985

These are based on Tables 7 and 8 and on perceptions from the market which appear in slow recovery starting the second half of 1984.

Table 9. Installation of NC Machine Tools in Italy

Year	Drilling machines		Milling machines		Lathes		Boring machines		Machine centers		Others		Totals by year	
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%
Up to 1969	60	12,8	96	20,5	38	7,7	97	20,7	142	30,4	37	7,9	468	100
1970	29	7,8	90	23,8	49	12,9	55	14,5	144	37,8	13	3,4	380	100
1971	17	5,1	108	32,2	38	11,4	36	10,7	110	32,8	26	7,8	335	100
1972	20	5,3	125	33,2	57	15,1	58	15,1	84	22,3	33	8,7	377	100
1973	22	4,5	114	23,4	185	38,1	39	8,3	85	17,5	40	8,2	485	100
1974	22	3,9	104	18,5	256	45,6	45	8	105	18,7	30	5,3	562	100
1975	29	4,2	150	22	310	45,4	52	7,6	102	14,9	40	5,9	683	100
1976	38	5,7	107	16	334	49,5	54	8,1	94	14	45	6,7	672	100
1977	38	4,7	143	17,5	447	54,6	43	5,2	110	13,5	37	4,5	818	100
1978	52	4,7	168	15,2	580	52,3	70	6,3	190	17,13	49	4,4	1109	100
1979	56	3,5	199	12,5	925	58	98	6,1	264	16,8	53	3,3	1595	100
1980	84	4,1	232	11,4	1271	62,3	98	4,8	289	14,2	65	3,2	2039	100
1981	72	3,8	213	11,1	1113	58,3	85	4,4	354	18,6	72	3,8	1909	100
1982	56	3,7	185	12,4	769	51,5	75	5	334	22,4	74	5	1493	100
1983	48	3,7	218	16,6	585	44,5	60	4,5	321	24,4	83	6,3	1315	100
1984	59	3,2	365	20	744	40,8	91	5	442	24,3	121	6,7	1822	100
Totals by type of NC machine tool	702	4,4	2617	16,3	7699	47,9	1056	6,6	3170	19,7	818	5,1	16062	100

Table 10. NC Machine Tool Production (JMTBA members); the upper number is in million yen, the lower number represents units

	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	Percentage distribution %	'83 projected
NC lathes	18,599 1,238	33,756 1,364	15,746 1,018	21,940 1,561	33,749 2,923	51,163 4,090	83,070 6,457	137,789 9,911	190,932 12,895	154,667 10,852	34.9 44.7	117,691 9,270
NC drilling machines	2,360 232	3,130 277	1,663 115	1,687 195	1,654 149	2,253 281	1,832 202	1,798 195	2,148 264	2,405 218	0.5 0.9	2,425 225
NC boring machines	3,140 104	2,528 54	2,321 44	1,299 25	2,236 41	13,448 119	11,114 150	11,600 158	13,454 209	13,284 176	3.0 0.7	15,312 261
NC milling machines	5,280 349	6,378 414	3,751 248	5,399 273	5,976 405	8,468 523	14,893 1,086	23,910 1,775	42,424 2,734	42,370 2,411	9.6 10.0	36,223 2,255
NC grinding machines	1,434 57	1,752 47	935 26	2,157 65	407 18	2,091 44	2,538 119	4,420 183	5,595 264	7,537 317	1.7 1.3	5,880 220
NC special-purpose machines	1,631 19	1,447 26	1,028 17	452 11	1,288 35	1,088 37	3,295 59	6,022 113	9,182 101	10,465 171	2.4 0.7	14,377 504
Machining centers	11,035 582	16,748 594	12,401 398	14,906 531	23,999 1,093	32,623 1,335	63,116 2,712	108,902 4,820	159,971 7,084	159,147 6,576	36.0 27.1	148,531 6,661
NC EDMs	—	—	—	—	—	10,329 939	17,716 1,600	29,571 2,355	40,738 3,057	47,829 3,429	10.8 14.1	41,235 2,970
Misc. NC machines	26 2	1,687 20	905 69	5,006 423	6,537 533	1,425 18	803 20	1,345 54	1,132 7	4,563 111	1.1 0.5	5,445 184
Total	43,506 2,583	57,427 2,796	38,750 1,935	52,846 3,084	75,846 5,197	122,888 7,386	198,377 12,405	325,357 19,544	465,576 26,615	442,685 24,271	100.0 100.0	387,575 22,292

Table 11. Destination by Industry

User Industries	'74	'75	'76	'77	'78	'79	'80	'81	'82
Steel/nonferrous metals	2,216	1,656	1,883	1,309	2,801	2,155	2,953	3,069	6,695
	42	34	49	50	84	126	98	100	129
Fabricated metal products	4,784	2,161	5,662	4,027	8,647	10,851	14,655	23,132	18,319
	284	93	384	299	458	643	909	1,342	951
General machinery	21,830	16,327	14,415	23,947	31,510	52,360	78,700	104,449	124,242
	1,052	788	857	1,558	2,071	3,355	4,537	5,347	6,460
(Machine tools)	1,204	695	104	541	1,056	3,635	5,407	9,939	11,479
	46	32	5	37	33	197	239	330	387
Electrical machinery	4,226	2,174	3,205	4,353	3,812	7,870	9,956	15,700	16,878
	186	108	203	248	210	513	619	1,001	986
Automobiles	3,961	1,739	3,820	5,376	10,506	14,046	25,413	32,669	34,236
	175	82	172	310	506	782	1,495	1,815	1,862
Shipbuilding/other transportation equipment	4,498	3,102	2,793	2,496	2,254	6,218	9,382	8,573	13,467
	134	76	120	92	86	235	261	220	230
Precision machinery	1,363	714	1,206	2,498	3,452	7,322	10,303	8,882	10,268
	84	47	69	197	267	457	548	627	631
Misc. manufacturing	818	384	1,281	1,653	2,113	5,855	2,366	4,050	8,946
	50	29	52	188	142	363	162	238	553
Government agencies/schools	870	478	365	475	335	478	593	5,888	1,198
	52	35	52	21	31	41	42	344	77
Trading companies/agencies	1,644	3,767	2,121	1,451	5,243	7,711	14,795	15,050	26,745
	111	285	204	149	577	801	1,295	1,265	2,181
Exports	3,297	6,187	14,964	27,123	54,636	81,336	109,826	130,317	115,070
	176	362	949	1,735	2,869	4,950	6,563	7,395	5,951
Other sectors	296	77	849	44	23	706	522	944	1,776
	10	3	50	3	2	41	31	74	111
Total	49,762	38,766	52,565	74,753	125,362	196,908	279,464	352,723	377,840
	2,356	1,942	3,131	4,850	7,303	12,307	16,560	19,768	20,122

Table 12. Number of Units Shipped by NC Machine Tool System Manufacturers

Companies	No. of units shipped (Percentage distribution %)			
	'79	'80	'81	'82
Fanuc	7,333 (59.3)	11,236 (58.8)	15,681 (61.8)	12,947 (54.9)
Mitsubishi Electric	1,557 (12.6)	2,436 (12.7)	3,370 (13.3)	2,189 (9.3)
Nippon Electric	117 (1.0)	148 (0.8)	212 (0.8)	140 (0.6)
Oki Electric Industry	209 (1.7)	89 (0.5)	8 (0.0)	—
Toshiba	12 (0.1)	7 (0.0)	2 (0.0)	—
Yaskawa Electric Mfg.	411 (3.3)	1,143 (6.0)	1,991 (7.9)	1,315 (5.6)
Okuma Machinery	—	—	—	2,187 (9.3)
Toshiba Machine	—	—	—	190 (0.8)
Machine builders	2,646 (21.4)	3,848 (20.1)	3,595 (14.2)	4,482 (19.0)
Other domestic makers	54 (0.4)	100 (0.5)	123 (0.5)	109 (0.4)
Foreign makers	25 (0.2)	120 (0.6)	392 (1.6)	15 (0.1)
Total	12,364 (100.0)	19,127 (100.0)	25,374 (100.0)	23,574 (100.0)

Italian manufacturers have received orders for 1,892 units (the same table for the preceding year showed 1,691 units); foreign manufacturers are assured 450 orders (these were 258 the preceding year).

It appears, therefore, that 1985 should better 1984 figures with installations of between 2,100 and 2,400 units. Consequently, the total installed NC machine tools should surpass 18,000 units by 31 December 1985 and maybe approach 18,500 units.

13120/9365
CSO: 3698/63

MICROELECTRONICS

SIEMENS HIRES SCIENTISTS, JOINS TOSHIBA ON 1 MEGABIT MEMORY

Dusseldorf VDI NACHRICHTEN in German 19 Jul 85 p 1

[Article by E. S.: "Siemens Seeks Engineers and Scientists: Cooperation With Toshiba Should Accelerate Development of 1 Megabit Memory"]

[Text] In the current fiscal year, which runs until the end of September, Siemens AG wants to invest more than originally planned: instead of DM 3.5 to 4 billion, nearly DM 4.5 billion. And the company is continuing to hire "good people" by the hundreds from the areas of science and technology; some 3,500 new engineers and scientists are needed in the current fiscal year, and not nearly all of these people have been hired yet. Moreover, in September 1984, Siemens employed approximately 28,000 engineers and scientists, who thus constituted approximately one-sixth of the giant company's employees.

However, orders are running ahead of investments, and here as well developments have been positive. The overall receipt of orders in the current fiscal year rose by 12 percent compared to the previous year, while the receipt of foreign orders went up by as much as 18 percent. Sales could reach approximately DM 54 billion by the end of September, although this is being affected by exceptional factors, since allowances are presently being made for three nuclear power plants. Worldwide sales last year came to DM 48 billion, and it could reach approximately DM 50 billion again next year. At the same time, the return on yield for the entire fiscal year is rising to 2.4 percent after 2.3 percent in 1984. That business is presently booming for Siemens can be seen in the fact that capacity has risen from 81 percent in 1984 to 85 percent in 1985.

Responsible for this level of sales were some 338,000 employees, of which 231,000 work in the FRG. The new employees are earmarked in particular for the "new technologies": communications and data technology, medical technology, and the realm of component parts. According to information from the company, new hiring is being considered for the coming year as well if the economic situation continues to develop favorably.

In investments as well, the level of DM 4 billion could again be exceeded in the coming year, whereby resources would go to the growth sectors of semiconductors, automation and production, office technology and public communications networks in particular. Siemens also wants to increase its

investments in the entire Mega Project, the development and production of one megabit memory. The volume of investment in this should come to approximately DM 1.5 billion. In addition, the company has great hopes for an acceleration of the development of the one megabit memory through its cooperation with the Japanese company Toshiba, which with 114,000 employees achieved a level of sales of DM 40 billion in the last fiscal year.

12271

CSO: 3698/106

MICROELECTRONICS

ERICSSON OF SWEDEN NOW 52 PERCENT FOREIGN-OWNED

Stockholm DAGENS NYHETER in Swedish 18 Oct 85 p 11

[Article by Jan Wifstrand]

[Text] The Ericsson concern is now owned for as much as 52 percent by foreign interests. In late summer, the point was reached where the foreign ownership share exceeded the Swedish ownership share.

As much as 42 percent of the shares of the Ericsson concern is in American hands and another 10 percent is distributed among shareholders in Great Britain--between 4 and 6 percent--West Germany, Norway and other European countries.

In terms of share capital Ericsson is thus no longer "Swedish," but due to the large difference in voting power between A and B shares, the large foreign ownership share yields less than 1 percent of the voting power within the concern.

It is primarily large institutions, such as pension funds and share investment funds, which have purchased large quantities of Ericsson shares both in the United States and certain countries in Europe. A sharp increase has taken place in the share of foreign interests of recent years. As late as in 1982, approximately 32 percent of Ericsson shares were foreign-owned. Following a large issue of shares in the United States in 1983, the foreign share increased to approximately 40 percent and, subsequently, to 44 percent in 1984. As pointed out by DAGENS NYHETER, the foreign share reached approximately 50 percent in the spring, but the trend remains the same--the share of foreign interests in the Ericsson concern keeps increasing.

One Thousandth of a Vote

As mentioned earlier, the growth in the share of foreign interests has no major influence on the Ericsson concern, but should a change in the regulations governing the difference in voting power between the various forms of shares take place, the situation may change in the long run. The present

voting power committee will present its proposal next year, but it is not clear at all whether it will be technically feasible to introduce any major changes when it comes to shares which have already been issued.

The Ericsson B-share now has only one thousandth of a vote, whereas the A-share gives a whole vote. The large Swedish shareholders are thus not removed too easily--it is possible that a continued increase in the foreign ownership share may be impeded if voting power differences for newly issued shares in the future are prohibited or limited. The large increase shows, if anything, that foreign interest in Ericsson shares is still great, despite the difficulties in the U.S. market and quite unstable foreign exchange developments during the past year. Ericsson shares accounted for as much as 25 percent of the net export of shares from Sweden during the first 8 months of the year (805 million kronor out of a total of 3.1 billion kroner). Last year, the corresponding share was 31 percent.

It is primarily institutions which are not eager for ownership responsibility that invest in the Ericsson concern. The 21 largest funds in the United States own approximately 7 percent of the shares and the 29 largest institutions of a different type own approximately 16 percent. Among the largest investors may be mentioned Capital Guardian Trust with 1.6 million B-shares, Kemper Financial Services, Capital Research, Ford Foundation, etc.

The total number of shares in Ericsson today is nearly 37 million, 3.7 million of which are A-shares with one vote. The remainder, the well over 33 million B-shares are all free, but even if all these would be purchased by foreign investors, their voting power share would not exceed 0.9 percent.

Certificates

Of the total number of shares, well over 15 million are the so-called ADR's, American depositary receipts, which are certificates, representing Swedish shares (in order to avoid having to send the share certificate physically abroad). Besides in Stockholm, Ericsson shares are today quoted in New York, London, Oslo, Hamburg, Dusseldorf, Frankfurt and Geneva. The largest Swedish owners in Ericsson are Industrivarden and others associated with Svenska Handelsbanken [Swedish Commercial Bank], 35 percent of the vote (5 percent of the capital) and Investor and Providentia and others within the Wallenberg group, 29 percent of the vote (nearly 4 percent of the capital).

7262

CSO: 3698/142

SCIENTIFIC AND INDUSTRIAL POLICY

FINLAND'S NOKIA, FRANCE'S BULL IN EUREKA PROJECT

Helsinki UUSI SUOMI in Finnish 25 Oct 85 p 32

[Article: "Joint Eureka Projects. Nokia and Bull into Closer Cooperation"]

[Text] Nokia and Bull, a French data technology company, are increasing their cooperation and offering joint products to the Eureka project.

According to the renewed agency agreement, Nokia continues to represent Honeywell products with exclusive rights in Finland. Bull, on the other hand, agrees to sell Nokia's terminals in the Nordic countries as part of its systems which are based on Honeywell's DPS equipment. Nokia already has been selling separate software products to the Bull companies in the Nordic countries.

Staffan Simberg, the director of international activities at Nokia electronics, estimates that the new agreement will increase Nokia's terminal sales by "thousands of terminals."

Bull and Nokia have also decided to increase their cooperation in the area of research. According to the official announcement, the companies will cooperate in the joint development of decentralized communication networks and standards. In practice, Bull and Nokia will also offer joint software projects in the scope of the Eureka project.

The French Bull is a data technology enterprise with a turnover of 13.6 billion francs (well over 9 billion markkas), and it is in close cooperation with American Honeywell and now with the Japanese data technology giant, NEC.

12956

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SCIENTIFIC AND INDUSTRIAL POLICY

NETHERLANDS PARTICIPATION IN ESPRIT, EUREKA, SDI

Rotterdam NRC HANDELSBLAD in Dutch 20 Sep 85 p 11

[Report by editorial staff: "Dutch Share in ESPRIT Greater this Year"]

[Text] The Hague, 20 Sep--Dutch companies and institutions will probably participate in 27 of the 99 projects in the second round of the ESPRIT program, which is to stimulate European research in information technology. Of the 88 projects last year, 22 were participated in.

The share of the medium- and small companies is increasing. They participated in 5 projects last year and will now participate in 11 projects. Philips' share of the winnings was distinctly lower this year; it is now participating in eight projects and last year in ten. Participation of Dutch research institutions is declining from 17 to 13 projects.

These figures came out yesterday during the presentation of an overview of the technology policy by the department of economic affairs. It is a temporary estimate because all contracts have not been signed yet. The project list for the second round of ESPRIT, which was launched officially in January of this year with a first round, will be announced next Wednesday. Just as in the first round, the second round involves an amount of 1.9 billion guilders in EEC money. In addition, companies and institutions also contribute that same amount.

Minister Van Aardenne of Economic Affairs said that the effects of the technology policy are clear from the expenditures of industry for research and development. These expenditures, which barely increased in the seventies, have increased by 4.5 percent annually since 1981. Van Aardenne pointed to the great importance, in his view, of multinational enterprises for technological development. "We must conserve that resource." Van Aardenne expects a greater growth in industrial research efforts in the coming years.

The minister said that the French EUREKA initiative, on which official deliberation is currently taking place, "might very well have additional financial consequences" for the Netherlands. Until now only France and the Federal Republic of Germany have made money available. The brokerage role in EUREKA would not have to be very costly to the governments, according to Aardenne. It could be a different matter, in his view, if the government's

role were that of the purchaser of high-technological material. According to Van Aardenne the money would then have to be found by redistributing money from another part of the budget.

Participation in the American strategic defense initiative, also known as Starwars, van Aardenne saw as "a matter for industry." He does not find it "obvious" for governments to participate, because it is a case of an individual American project. Potential participating companies would receive the "usual support," according to Van Aardenne.

The minister called the unification of the European market a condition for the catch-up maneuver in order to eliminate the lag of European technology. As to the regulation for stimulating innovation, INSTIR, which can subsidize part of the research costs of companies, he said that it is going well. Van Aardenne said he was thinking of increasing the ceiling per company, which is now 5 million guilders.

8700

CSO: 3698/71

SCIENTIFIC AND INDUSTRIAL POLICY

FRG FUNDS EUREKA IN 1986, SETS TERMS FOR FURTHER FINANCING

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 2 Sep 85 p 13

[Text] K B Bonn 1 September. The Federal Government evidently wants to make plans now for support funds for the expanded technical European cooperation within the Eureka program (agreed upon at the "Milan Summit"). It is expected in Bonn that the government will submit to the Bundestag Budget Committee during its impending discussions a plan that is to introduce binding appropriations authority for Eureka into the 1986 draft budget. This authority includes provisional calculations of expenditures for the project development in later years.

Direct cash contributions to the Eureka program are not to be made at the present time. The Research Ministry insists that cash contributions will be required in 1987 at the earliest. It is conceivable, however, that direct appropriations will be made for research projects that have already been started and that the FRG as a rule supports with a contribution of 50 percent of the costs after consultation with the partner enterprises or research institutes in European cooperation projects. The French government has already announced that it plans the equivalent of DM 300 million as first installment for Eureka. The British government, on the other hand, believes that the projects could be financed mostly by private industry if they are selected correctly, i.e., with the proper market orientation.

The fact that binding appropriations authorizations for Eureka are already included in the 1986 budget is considered by the Federal Government as an additional indication from Bonn for the European partners that the FRG is ready for close cooperation in the Eureka program. CDU budget expert Lutz Stavenhagen, who is in charge of research appropriations, considers the Eureka initiative as an opportunity to develop jointly advanced technology for the market of 280 million Europeans. Stavenhagen however also warns of going astray with the Eureka project. He believes that through the influence of other countries previous mistakes of German support must not be repeated to the extent that public financing is used for something that nobody needs afterwards. An example of this kind of mistake was support for the AEG computer during the first computer program of the Federal Government. In the end, this expensive computer was turned over as a gift to several universities.

In regard to the development of the Eureka program Stavenhagen makes the following demands: the market for technology in Europe must, first of all, be made uniform through norms, standardization and a procurement policy, reaching beyond national boundaries, of public employers, especially the postal and railroad systems. This is even more important, Stavenhagen believes, than the selection of appropriate projects. In selecting projects, he continues, strict attention must be paid that no money is spent and no development begun blindly, but rather that there is a clear analysis of marketing prospects for a development. In cases where there is a need but not yet a market, as is the case with some environmental protection projects, Stavenhagen believes that it is a public responsibility to guarantee financing. The stronger the market orientation of a project, the less the government should be expected to pay. This basic attitude of orderly political progress in support policy cannot be imposed on all other 16 Eureka partners by the Federal Government, but the Federal Government does not have to cooperate when projection and development of a planned project does not correspond with its orderly policy.

In determining if and to what extent the Federal Government assists in financing certain projects, pressure may be exerted from the outside on the government. The Federal Government would practically be forced to give assistance if a German and a French firm wanted to materialize a large project and if Paris participated from the beginning in financing this project. Individual German firms have already informed the Research Ministry that they can participate in certain projects only if Bonn gives financial support.

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CSO: 3698/58

SCIENTIFIC AND INDUSTRIAL POLICY

CRITERIA FOR FUNDING TECHNOLOGY-ORIENTED FIRMS IN FRG

Dusseldorf VDI NACHRICHTEN in German 19 Jul 85 p 9

[Article by F. Brandi: "Establishment of Technology-Oriented Firms: Better a First-Class Company and a Second-Class Product Than the Other Way Around"]

[Text] The VDI [Association of German Engineers] Technology Center for Information Technology in Berlin, within the framework of the experimental program known as Establishment of Technology-Oriented Firms (TOU), is especially in charge of the "microelectronics" sector of technology for the entire nation. In nearly 2 years, some 450 projects have been examined with a view to whether they are possible candidates for support in the experimental program. At present, about one-fifth of the proposals are being accepted.

The bases for the analysis and evaluation of a project are the plans for operations, formulated in writing, as well as advisory discussions with the entrepreneurs or company founders. In addition, market surveys, patent inquiries or demonstrations of the product idea with functional models serve to provide an assessment of the prospects for realizing and successfully marketing a product.

The high standards set for young entrepreneurs should provide as much a guarantee as possible that they will succeed in remaining on the market. This explains in part the relatively small number of accepted proposals, which at present amounts to approximately one-fifth of all applications.

If the stipulations of the experimental program (the company must be under 3 years old, have no more than 10 employees, be pursuing technological innovation in connection with high-risk development, and not have significant resources of its own) are met, then the prospects for entrepreneurial success remain the most important--as well as the most difficult to determine--criterion for judging whether a program merits support. The selection process is quite comparable to the work of a "capitalist" financial backer (venture capitalist) making decisions about investments.

The formula "Better a first-class company and a second-class product than the other way around" is in effect here as well. The most important standard of

success is the personality of the entrepreneur or entrepreneurs. Scientific qualifications in the realms of technology that are crucial for the company are important and are unconditionally required in the TOU experimental program. However, there must additionally be entrepreneurial capabilities present, which are certainly better gained through professional practice than through educational training. Resumes provide important clues in the process, but the personal discussion between the entrepreneur and an advisor of the VDI Technology Center is the decisive factor.

If a company has been in existence for some time, then its economic success thus far is naturally an important indicator. Regardless of whether it is already in existence and is just being founded, a business perspective--an individually characterized strategy--must be discernible, as a sort of guideline for the orientation of all coming activities.

The focus of the company's activities is initially the product that is being developed. For the projects being supported at present, measuring, analysis and testing equipment as well as electronic arrangements and controls can be identified as the main emphases in technology. Against the background of the "state of technology," the innovative nature of the new product ideas must be clarified. To this end, an explanation must be provided of what the function of the end product should be--in the form of data sheets, for example--as well as how the technical construction of the product is being projected such that its planned functions can be realized. A rough calculation of unit cost should already exist so that delimitation from other products already on the market is possible, both in terms of characteristics and price.

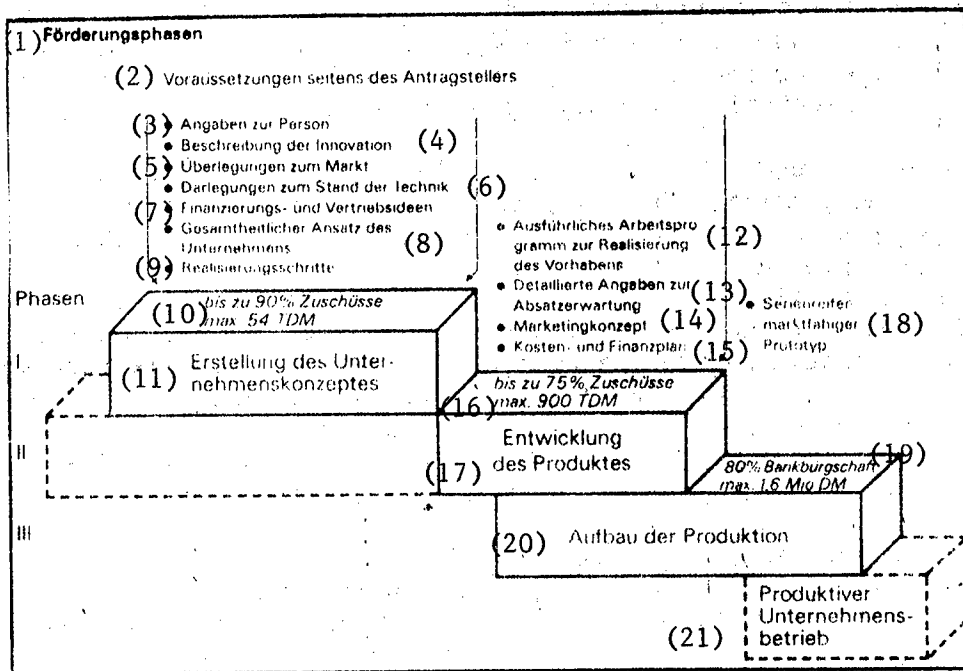
As the next step, the size of the market volume and of the specific targeted segment is estimated, both nationally and internationally. Not only the present situation, but also developmental tendencies must be taken into consideration.

Since the financing of developmental expenditures is of priority in the TOU experimental program, extra emphasis is put on the description of developmental planning. Individual job packages must be defined, with temporal length and dependencies as well as the necessary personnel and their qualifications. What services are required by third parties and when? This includes investments, the awarding of contracts and material needs. There must be a preliminary calculation at the end indicating the entire financial requirements for the development project. However, there must be similar clarity concerning what technical problems are to be overcome at what stage. Possible solutions from a current standpoint should already be outlined.

Even if all technical problems appear to be surmountable and there are promising prospects for successful marketing, a company is feasible only if the basic requirements for liquidity and viability are given. The business planning necessary for this combines expenditure planning for the development project, the planning for other expenditures for production and sales (including investments), ready stock and claims with planning for turnover and the employment of potential financial resources such as one's own capital, credits and public subsidies. The VDI Technology Center for Information Technology also offers active support in this area--which is often one of

great difficulty for qualified beginners--in part through the offer of a planning system support by data processing.

All of the above-mentioned topics are taken into consideration by the VDI Technology Center in making its final evaluation and recommendation, which follows a intensive process sometimes lasting months. There are no simple, quantifiable evaluatory algorithms for this process. The highly diverse composition of the establishment projects demand instead a critical and complete assessment of each individual case.



The sequence of a support project can be divided into four phases in which persons who wish to direct a technology-oriented firm can participate. However, the firm cannot have been in existence for more than 3 years and cannot have more than 10 employees.

Key:

1. Support phases
2. Prerequisites on the part of the applicant
3. Personal details
4. Description of the innovation
5. Market considerations
6. Explanations of the state of technology
7. Financing and sales ideas
8. Total company appropriations
9. Steps towards realization
10. Up to 90 percent subsidies, maximum of DM 54,000
11. Drawing up of the company draft plan
12. Detailed working plan for realization of intended goal
13. Detailed information on expected sales

14. Marketing plan
15. Cost and finance plan
16. Up to 75 percent subsidies, maximum of DM 900,000
17. Development of the product
18. Prototype ready to go into production and onto the market
19. 80 percent bank surety, maximum DM 1.6 million
20. Production
21. Productive enterprise

12271

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SCIENTIFIC AND INDUSTRIAL POLICY

ROLE OF FRG BANKS IN PROMOTING START-UPS, VENTURE CAPITAL

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
30 Sep 85 p 3

[Article by Dr. Ludwig Trippen]

[Text] What can we do to prevent the lack of private business capital and thereby the problem of financing from becoming an obstacle to establishing new companies and experimenting with innovations? What contributions are banks making to solve this problem? What can they do? In the following, the author will deal with questions of this kind. His conclusion: In the future, the main challenge will be to create profitable investment opportunities. The author, Dr Ludwig Trippen, is assistant director of the board of Westdeutsche Landsbank Girozentrale in Duesseldorf. [Editorial staff]

Banks are conscious of the eminently important role they play in establishing new businesses as well as in supporting manufacturing and processing innovations for the benefit of the continual renewal and adaptation process of our national economy. Only a dynamic economy that is constantly regenerating, is capable of adapting to technologically challenging products, new markets and more productive methods will keep its productive strength in international competition under changing domestic and world-wide conditions. Future growth perspectives of highly developed national economies will be essentially determined by investments in new production facilities, and these investments as a rule are innovative and risky. On this depends our future productivity development and thereby our ability to compete. We are faced with the challenge of mobilizing by way of higher production increases those growth capacities that guarantee high employment and a firm position in international competition.

Two features characterize technology-oriented, newly established companies in particular and also innovations for already established companies: a strongly increased risk and a relatively long initial operation phase until the profit threshold is reached. Approximately 75 percent of all businesses that became insolvent last year were made up primarily of young companies that had existed less than 8 years. In the majority of cases, an essential cause of insolvency

was the lack of finances. In the initial years, there are especially great challenges to the risk capability of new businesses. The capacity to take risks, however, is basically determined by the amount of a firm's own capital that carries the risks.

One of the oldest rules of financing is therefore: those investments that are connected with high risks that are difficult to see should be financed with the firm's own capital. A sufficient basis of such capital is, in a way, a buffer that, if need be, must handle losses incurred by the firm. The long-range and/or exclusive financing with outside funds, especially bank credits, would only intensify, because of interest and capital repayment obligations, the problems of research, development and market preparation that exist anyhow in the early phase of business establishment. As simple as it may sound: a firm's own capital is the only kind of funding that does not have to be repaid as either interest of capital in the case of business failure. On account of its liability and guarantee functions toward all creditors, the firm's own capital gives the firm the capacity to undertake risky ventures. This means that furnishing own capital is the basis for developing future technical-economic innovation potential and thereby for maintaining and strengthening competitive capacity.

Faults Lie With Incentive System

This is true economically, on the one hand, for the individual firm: an insufficient amount of venture capital, possibly in addition to unfavorable payment deadlines of outside funds, means weakened resistance capacity, increased dependence and decreased freedom of decision making for business management, less acquisition potential as well as high liability in regard to erratic variations in capital market interests. Ample demonstration of this situation is given by the high interest phase of the years 1980 to 1982. And whatever is true for individual firms is, as a rule, true also for the entire national economy. Because--as Vice President of the German Federal Bank Dr Schlesinger once put it--"the long-range economy of a country can be no better than the financial position of its businesses."

Unfortunately we must notice increasingly in practice that rising investment and innovation ventures are in no way matched by rising venture capacity of the businesses. On the contrary: it concerns us to have to state that there is a contrary development of venture demands and venture capacity.

The proof could not be more obvious: in the total business volume of German firms the average share of firms' own funds amounts to a total of only about 18.5 percent. In other words: on the average, not even every fifth mark is firm-owned capital for German companies. In 1965, when the German Federal Bank began to evaluate business balances, firm-owned funds had a share of 30 percent of the total capital invested. With all due systematic care in regard to international comparisons, it must be stated that German businesses are almost at the bottom in regard to this kind of capital structure--only Japan's comparative figures appear to be lower, but that is under completely different collateral conditions. The long-range, stealthy erosion of firm-owned funds bases has contributed considerably to the fact that many companies

are no longer capable of dealing with the burdens and risks of past years. About 12,000 cases of insolvency in each of the past 3 years speak an eloquent language.

Shrinking earnings in the longest stagnation and recession period thus far in the post-war period, in addition to high interest rates, resulted in the fact that the year-by-year expansion of outside funds grew into a life-threatening danger. In this development in the wrong direction which has lasted for many years I see an essential cause of the fact that the transition to a new reliable road of growth--inspite of most recent improved tendencies in business earnings development--has been set into motion only with great difficulty.

The high share of outside funds proves yet another point: with their tendency to "grow deep into" the finances of German firms, German banks have shown--if not intentionally, at least de facto--much courage and venture enthusiasm. Today, banks must assume risks that are logical from the point of view of business venture but hardly from that of the supplier of outside funds. The level now reached points out clearly that a stronger financial funding of our businesses is also in the interest of the banks themselves.

A great number of reasons account for the negative development of the past two decades. The following should be mentioned here especially:

--tax discrimination against firms' own capital as compared with outside capital with the appropriate results on financing practices of businesses,

--tax favors for the earnings taken out of a business instead of those invested in the business,

--insufficient reserves,

--the not always satisfactory mediation functions of our organized capital markets and, last but not least,

--a decline in business earnings which in the Federal Republic was much stronger than in competing countries and therefore clearly weakened the firms' own financing strength.

One thing is certain: we are in a critical situation at the present time. On the one hand we no doubt need a growth above proportions of capital funds and especially also an investment structure with a higher share in risky and long-range investments. On the other hand, risk and innovation capacities of businesses are weakened in many cases

Venture Capital in the Federal Republic

It would certainly be a misinterpretation to blame the unsatisfactory capital structure of businesses on a general lack of capital.

An insufficient formation of savings and capital in the total economy cannot be seen in our national economy. Neither is there a lack of money for venture-oriented investments. The boomlike development of different kinds of write-off

and loss allocation societies or likewise the rapidly growing streams of capital going across our borders indicate that there is a sufficient amount of capital offered. It is my opinion that the mistake lies in the incentive system where erroneously tax-oriented points of view dominate rather than the interests of the national economy. The question is how to direct existing capital to the place of its most productive use and here the banks play an important role in their functions as national and international turntables.

Banks have always been active as mediators for domestic as well as foreign capital but much less as immediate suppliers of venture capital. Banks see their primary function in the transformation of amounts, deadlines and risks of accepted funds, and less in sharing in risky non-banking ventures. To take on these risks and thereby the full integration of venture financing would destroy the context of normal banking activities. One of the main obstacles is the scarcity of business-owned funds--their quota in the German banking business is below 5 percent.

Those who demand a higher venture engagement by the banks should consider that banks operate with outside funds. For each bank the security of a customer's deposits must be of highest priority. The risk of banks to finance credit from these deposits can only go as far as a tolerable deficit quota. That this deficit quota has often surpassed in recent years the degree to tolerance in many credit institutions is a clear sign that in past years banks have often taken considerable risks in granting credits. Many bank credits had in fact assumed in the seventies--without doubt not intentionally but as a result--more or less the character of partnership or even business capital surrogates. The insolvency wave of recent years that is not receding in spite of improved business condition has therefore left deep scars in bank balances.

Limits for a continued direct involvement of banks in venture financing are set by the fact that bank personnel cannot in all cases give comprehensive judgement of technical innovation activities and their marketing possibilities. Technological innovations in fields like microelectronics, information and communication technology, laser technology and other new research fields can be judged in to their future marketing possibilities only by technology-oriented specialists who also have many years of experience in management and possess specific business knowledge. Only profound knowledge of this kind makes it possible to estimate sufficiently prospects of economic success in potential domestic and foreign markets. A judgement capacity of this kind can be established only by large or particularly specialized financial institutions in their own personnel infrastructure. In the Westdeutsche Landesbank, e.g., we have a group "business analysis" whose purpose it is to sharpen our judgement also for the technological sector. Our house also has a partner counseling sector "mergers and acquisitions". These special groups help domestic and foreign businesses in the process of materializing new product ideas, new process and marketing concepts in the acceleration of innovation processes and in the preparation of mergers, takeovers, participations as well as sales. So far results have shown that attainable synergy effects are considerable.

Banks also play a very important part in the development of the establishment of government supported new businesses and in innovation support. For

the challenging initial phase the government has available an extensive and varied set of support means. Federal and state government support start-ups, business openings, business expansions and relocations through long-term loans at low interest rates which at times even assume the character of a firm's own capital, as well as through granting guarantees.

First place here, according to the number of annual approvals as well as to the amount of credits granted, goes to the FRG ERP start-up program that has been offered since 1960. The Equalization of Burdens Bank in Bonn financed last year 29 150 individual projects through this program. Of growing importance is also the firms' own capital support program in force since 1979 whose funds are combined in most cases with ERP start-up credits. If maximum support amounts of these two programs alone are completely utilized, an amount can then still be increased by the supplementary program of the Equalization of Burdens Bank.

Noteworthy also is the test case of the FRG Ministry for Research and Technology with the goal to stimulate more than in the past the establishment of new businesses in future-oriented fields of technology. Also, each state has additional specific support opportunities for start-ups and innovative businesses in future-oriented fields of technology. Also, each state has additional specific support opportunities for start-ups and innovative businesses, such as in Nordrhein-Westphalen the "job-oriented support program" and the "technology program for industry." In addition to these financial support programs there exist possibilities that guarantees will be assumed by the state or by credit guarantee associations that are organized in state-wide branches.

All of these public start-up supports can hardly be made effective without active participation by the banking system. As a rule, credit institutions are the first starting point for interested founders of new companies. It is understood by the customer that his credit institution will assist with various kinds of information and aid in applying for public start-up support programs. The development of these programs and the qualified counseling by banks play an important role; because there is a confusing number of programs and without counseling by the bank the potential founder would have considerable difficulties to guarantee suitable financing for his project under optimal utilization of existing support alternatives. The bank takes care that public support is administered according to principles of credit economy and--at least as a rule--in unbureaucratic efficient fashion so that this support can be utilized in the most effective manner. The large "run" on start-up support programs demonstrates that this government offer has many takers and that the banks are ready to give considerable support.

Hardened Financial Structures To Be Broken Up

But the banks also offer help with modern financing forms of innovation financing during the period of maturity in a business that is already introduced to and established at the market. Banks are faced with especially difficult problems when judging the credit aspects of start-up businesses and/or the introduction into the market of new products and processes. The standards of classic credit worthiness are not applicable here as a rule. The

traditional judgement of business soundness that is based on "classic" security bases and, in addition, is limited to balance analyses of past years will no longer apply in such cases. Innovation financing means: not the accounting of more or less outmoded balance figures but rather an appraisal of future perspectives beyond the balance of the past, an estimate of the dynamics of the company.

For this purpose criteria are necessary that judge the future. Therefore, a somewhat reliable estimate must be made of the following:

- the market, market volume and development (including possible substitute products),
- the competitive situation, also an appraisal of possible reactions of other firms submitting offers and, above all
- the future marketing concept of the credit customer, and that means, among other things, an evaluation of the quality of management, price policy, product program, distribution policy, public-relations, in one word: it includes the total marketing concept.

This means that in the context of examinations of credit worthiness by the banks the specific kind of security does not play a central role. Rather, a business prognosis has to take place at the examination of credit worthiness of start-up business and innovation processes. But here too the proof of a firm's own capital in whatever form must be given special consideration. It is also important that the person in charge of the new business can submit a realistic funded solvency accounting and a capital requirement plan. Banks play an important part in the critical examination of these factors. It means that persons starting a new business and innovators are faced with the challenge of carefully quantifying the expected economic success of their companies.

In addition to the cases discussed so far: "businesses without a past" and businesses in the maturation phase, there is still another market segment that, looking back over the past 2 years, is discussed intensively and described more nebulously than exactly by the slogan "venture capital." This term has everywhere resulted in a noticeable stir and hectic activities. Hardly a week went by that there was not a public meeting on this topic, that new proposals were not submitted and new initiatives announced.

What is behind this financing method of "venture capital?" It means essentially that guaranteed means are raised and made available, that is to say a firm's own capital for technology-oriented, innovative, growth-oriented companies. The "venture capital idea" comes from the United States. There venture capital associations are in most cases closed partnership funds for venture capital, and these associations fulfill at the same time the functions of a business counseling association.

According to my information, there are at the present time on the American market about 500 venture funds, among them about 70 venture capital departments of industrial firms and banks, more than 100 independent private firms

as well as 340 publicly licensed so-called small business investment companies, i.e. investment funds for middle-class businesses. So far these associations are assumed to have invested about \$8 billion. This venture financing is by no means only a passive capital investment but rather an active business engagement. Venture capital supporters are interested not so much in continuous earnings but rather in achieving above average market results at the end of a particular deal that is limited in time.

Small Venture Capital Means Weakened Resistance Strength

The American model cannot simply be transferred to the FRG. The differences are too great in regulations on creditor protection and deposits for banks and insurance companies, in investor mentality, in venture readiness by businessmen and managers as well as in the context of social and tax legalities. Therefore, venture capital will in the future certainly not reach the importance in the FRG that it has in the United States. But in modified form a venture capital market might be further built up in the FRG. The infrastructure of the venture capital market has considerably expanded in a short time. Individual banks and savings institutions have taken initiatives. As much as this interest by the banks is welcome in principle, it should not give a false impression about the existing limitations of a direct participation by banks in this field. Banks will always be able to be direct suppliers of venture capital in only a limited way. Much more important, however, is their role in mediation and consultation. In the future, the know-how developed by the banks in judging business and market concepts will be even more important than before.

Different from the original venture capital associations is a method that German banks started about 15 years ago: Since the establishment of capital-sharing associations in the sixties, banks make their true contributions in order to strengthen the risk capacity and resistance potential of good businesses that are not capable or willing to undertake capital flotations. In the savings bank system nine branches of state banks and savings banks are active in this field. At the present time there are about 2 dozen capital sharing associations operative in FRG markets. Within the context of partnership financing capital is offered for a certain time to growth-oriented businesses with strong earnings and innovative technological potential within the context of partnership models--mostly in the form of a typical silent partnership (no change in legal form, no partnership in silent reserves, that also means no business evaluation at beginning and end of project). After the offer of guaranteed capital with limited sharing of earnings is made, qualified specialists with long years of experience in different fields of technology and market sectors are ready for real management consultation. It is exactly the supplementing of pure financing components with these business service components that bridges a gap felt by middle-class businesses, but does not comprise the idea of venture capital because these companies cannot and do not want to accept this kind of risk.

There is no doubt that credit economy has developed in the last few years a variety of possibilities in order to improve the financial situation of dynamic companies. In this respect it should not be overlooked that there are a

number of starting points in which the risk capacity of businesses can be directly improved:

First starting point and primary goal must be to overcome in a solid manner the "gap of profitability." Because there is no doubt that the gap in venture capital is also the result of a continuous decline of earnings since the middle of the sixties. Only recently did the earning situation of businesses become again stabilized as the Bundesbank emphasized in its March report. But a longer period of higher earnings will be needed in order to gain a lasting strengthening of firms' own capital basis. One of the most important conditions for this development is an economic policy directed toward stability and supported by reasonable tax regulations.

The second starting point consists of conditions within the tax system. In the FRG the tax on businesses does not have a neutral effect considering the alternatives of firms' own capital or outside capital, but rather has a discriminating effect considering the formation of own capital--with the result that the minimization of own capital often became the "cheapest" tax strategy. In spite of a stronger "venture capital-oriented" tax policy in the last few years, additional steps in this direction will certainly be necessary. In this regard the dual charges of property taxes should be mentioned, a practice that has been moderated but is still in force. Also the discrimination against own capital in business taxation and the price increases in share financing by the corporative and share transaction tax. In addition there is in international comparison an above-average total taxation of business which allows own financing only within a relatively limited scope. It must be emphasized, however, that tax policy can on the one hand make venture capital formation easier but, on the other hand, can do no more than that, if the profits do not add up then tax easements or appropriate changes in the tax system can hardly be of help.

A third starting point for the solution of capital deficiency is the participation of employees in the productive capacity within the context of business and tax agreements. After years of a passive attitude toward property policy, property formation policy is now concentrating more strongly on productive capital participation. Not only the 4th property formation law but also the planned law on business participation associations have as their goal a stronger participation by employees in the production capital. Just how much the planned participation funds available are apt to contribute to attaining this goal will depend essentially on the particular contents of the law and the additional side measures.

Banks Offer Broad Production Spectrum

The fourth starting point finally lies in an improvement of the financial system through social and finance law easements that will make it possible to facilitate the market availability of risk capital. The function of organized capital markets to furnish own capital is often considered insufficient. Admissions conditions that are too restrictive, considerable administrative costs in the process of changing a personal company to a stock company, high "entry fees" and excessive publicity obligations--these are the essential

points of criticism and therefore the background reasons for a stronger and desirable tendency of "going public" especially in the middle-class sector. Thus it has come about that at our eight German stock markets only about 450 German companies are registered at the present time. Increasing interest in trading at the stock market in the last year cannot hide the fact that stock ownership, which thus far amounts to a mere 4 percent, comprises only a very small part of the financial means of private budgets.

Meanwhile, there has been considerable progress in the plans to break up hardened financial structures and bring fresh wind into the stock market facilities. Stimulated by proposals of the financial experts' commission, the FRG government is at the present time examining several alternatives for easing admissions conditions to the stock market for small and medium-size companies. The tendency of the discussion of different opinions seems to be to utilize the advantages of official trade as well as regulated free trade without incurring their disadvantages.

There is no doubt that "innovations" are necessary in capital markets whenever they facilitate financial innovations and the investments of our companies. But here too the following applies: the transformation of financial capital into productive capital will succeed only if there are sufficient profitable investment opportunities available. This is the central challenge for the future--and in meeting this challenge all sectors of industry and society must cooperate. I have the impression that we are on the right road in the FRG, but the road is long.

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SCIENTIFIC AND INDUSTRIAL POLICY

FRG STUDIES STATUS OF, PROSPECTS FOR TECHNOLOGY PARKS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
22 Aug 85 p 7

[Text] The Fraunhof Institute for Systems Technology and Innovation Research (ISI) has prepared a study commissioned by the Federal Ministry of Economics on the status and prospects for the establishment of technology parks in the FRG. A summary of the examination was published by the Association of German Machinery and Equipment Construction (VDMA) in its VDMA NEWS (August 1985).

At this time, the Fraunhof Institute is not yet able to say much about the efficiency of technology parks. The scientists believe that some centers will prove to be failures. From the point of view of growth, competition and employment, the many initiatives to facilitate the establishment of technology-oriented enterprises are desirable, they say. However, the institute does not foresee a significant effect on employment.

As of December 1984, of a total of 58 technology parks, 8 were completed, 3 were under construction, 30 were in the planning stage, and 17 were at least seriously under discussion. About half of these 58 technology parks, which are in different stages, are in North Rhine-Westphalia and Lower Saxony (see table).

Technologieparks in (1) Deutschland

Berlin 2 Parks	Paderborn Siegen Schwerte Wuppertal
Hamburg 2 Parks	Saarland Saarbrücken
Bremen 1 Park	
Schleswig-Holstein (6)	Hessen Frankfurt Kassel
Flensburg Osteinbek Quickborn	(7) Rheinland-Pfalz Mainz Kaiserslautern
(2) Niedersachsen	
(3) Braunschweig	Baden-Württemberg Baden-Baden Freiburg Furtwangen, Heidelberg Heilbronn Karlsruhe Mannheim Rastatt Reutlingen St. Georgen Stuttgart Ulm Villingen-Schwenningen
Buxtehude Emden Hannover Hildesheim Lüneburg Nordhorn Oldenburg Osnabrück Syke Uelzen	
(4) Nordrhein-Westfalen	(8) Bayern Bayreuth
Aachen Bielefeld Bochum (2 x) Dortmund Duisburg Essen Gelsenkirchen	(9) München (2 x)
(5) Köln	(10) Nürnberg Regensburg
Münster Oberhausen	

KEY:

(1) Technology Parks in the FRG	(6) Hesse
(2) Lower Saxony	(7) Rhineland-Palatinate
(3) Brunswick	(8) Bavaria
(4) North Rhine Westphalia	(9) Munich
(5) Cologne	(10) Nuremberg

When people talk about "technology parks," they hardly ever agree on what they actually mean. The Fraunhof Institute defines them as follows:

--as a "founders center," a group of companies in the manufacturing industry or the production-oriented services sector.

--as a technology park or center, an area where young enterprises which want to develop, manufacture or market technical innovations have established themselves. To do so, close contact with research institutes is usually necessary. The founders of these enterprises are frequently associated with nearby universities or research institutes.

--Research parks have, in most instances, a national and sometimes an international orientation. They often are in the vicinity of universities which offer young enterprises or development departments of established companies attractive living and work conditions. The purpose is to facilitate close cooperation with scientific institutions.

According to Fraunhof Institute, technology parks set up or planned in the FRG pursue widely different goals. Aachen, Berlin and Hanover want to appeal strongly to university graduates. Karlsruhe and Heidelberg, on the other hand, make a much larger effort to attract existing companies, the institute says.

Technology centers are to make it easier for company founders to concentrate on product development and market penetration. As a rule, they offer services that either are not available at all or only at great cost. Among them are:

- a flexible amount of space,
- central community facilities,
- include variety of services,
- the opportunity to establish intensive contacts and to collaborate with other enterprises in the park or with neighboring research institutes,
- a full-time professional center manager who advises the founders in matters of management, marketing and financing and, where necessary, arranges for suitable advisers,
- possibly, central research and development facilities.

The center manager works simultaneously as agent, advisor and administrator. Based on his past experiences, he arranges many different contacts, which extends to opening up distribution channels. Beyond this, he is responsible for the center's public relations work.

The Fraunhof Institute also found that the types of institutions that are interested in technology parks vary greatly. Communities are primarily interested in improving the local economic structure and in creating new jobs. Credit institutions are looking for a positive public image by supporting technology centers; in the long run, they also ensure a solid core of customers. Large enterprises seek increased market recognition and subcontractors. Finally, the real estate industry uses the opportunity to market buildings that are hard to sell or lease at a profit. Cooperation among the different types of institutions, which provide risk capital, buildings or facilities in line with existing interests and business operations, leads to lower costs.

In most instances, the technology parks are supported by cities. The supporting entities--as in the case of the Berlin Innovation and Founder Center--may be entirely state-owned; they may have a mixed economic organizational structure (in which land, communities, specific authorities [Kammern], banks and/or companies are the participants), or--as with the industrial park in Cassel--they may have been initiated, or be supported, by purely private enterprises. The Technology Center Ruhr in Bochum, the High-Bettenhausen are the results of private initiative. The Fraunhof Institute reports similar

efforts in Hamburg and Munich. However, even in these instances, the support of public institutions in the form of subsidies or less expensive credits must not be underestimated.

In its study, the Fraunhof Institute reports first signs of competitive subsidizing. It is equally critical of the hectic rush and poor planning in several cities. It is important that technology parks are supported by many local and regional initiatives, it says, because only then ceases the park to be an isolated element that must pursue its own interests on a regional basis. The public hand must be aware of its function to act merely as a stimulant. It should gradually withdraw from this function and ensure that, increasingly, enterprise founders are facing realistic costs. The Fraunhof Institute also reports that the existence of a variety of private initiatives in this area is proof of a growing cost awareness.

The 24-page summary is available at the FKM [expansion unknown], Lyoner Strasse 18, 6000 Frankfurt 71 (Telephone 069/6603-315).

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SCIENTIFIC AND INDUSTRIAL POLICY

INDUSTRIAL PARK BUILT NEAR DORTMUND UNIVERSITY IN FRG

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 3 Sep 85 p 19

[Article by Hans Juergensen]

[Text] Companies who set up operations in the vicinity of Dortmund University, one of the large new learning factories in the Ruhr Valley, need to make no concessions to the environment. There is no trace of any mining activity for miles around. Attractive residential areas are closeby. The connection to the autobahn net couldn't be better. That may explain why the Dortmund Technology Center, located near the university, and looking like an offshoot, at once attracted a substantial number of interested parties. The office and factory buildings of the DM 10 million center had been fully leased to 35 enterprises by the time it opened last May. By the end of this year, 165 highly qualified employees are expected to work there. Their current number is already 60.

To date, 34.5 hectares are available which originally had been set aside as a construction site for the university. Negotiations with 12 applicants have now reached the stage where preparations for the infrastructure can start on the site. Most of the buildings probably will not be built by the landlords themselves but by investors. If necessary, the available area, currently still state-owned, but expected to be bought by the city, could be increased four to fivefold. Interested parties in the FRG and abroad are by no means being lured by low rents and real-estate prices, but by the quality of the site which, according to the center's promoters, is among the best in the FRG. Once the technology center, which is expected to be out of the red after 3 years, has been fully leased, rents will be higher than in any other technology center, and the price of the building site prices, at DM 50 plus DM 20 for development, can't be considered low either.

The highly scientifically and technologically oriented university nearby doesn't only play a decorative role for the center. It is, in fact, an important factor of the concept upon which the center and the adjoining industrial parks have been founded. The center is primarily designed as a point of departure only for those companies that expect to benefit from being near the university. An example is the French software group GFS Metra, an international leader in the development of computer graphics. It chose the

center because the university, with its 1,900 students, is one of the largest training grounds for computer scientists in the FRG and because it maintains close relations with industry in the development of software.

There are rumors that a not-known U.S. computer firm does almost all of its software development in the FRG in collaboration with the computer scientists in Dortmund. The Danish company Scanray, which specializes in X-ray quality control of materials, has been set up in the center because the quality control field is very well represented at the university and the latter has already done research for the firm. Other firms hope that collaboration with the Fraunhofer Institute will stimulate transportation technologies and product distribution or that its departments for mining and storage, material technology, or machine design and handling technology will have a stimulating effect.

Only companies who are working, or plan to work, as entrepreneurs in these areas, can expect the Dortmund Technology Center and its technology part to welcome them with open arms. Sales offices without research and development of their own are not what the technology park is looking for. In addition, the management of the Dortmund center emphasizes its private-enterprise and non-subsidy orientation. It doesn't think much of being a national park for companies feeding on the "public trough. As a result, "private industry" is heavily represented among the residents of the Technology Center Dortmund Ltd. Besides the City of Dortmund and the Chamber of Industry and Commerce, the residents are the Gesellschaft fuer Prozessautomation [Society for Process Automation], the Commerzbank, Deutsche Bank, Dortmunder Volksbank, Dresdner Bank, the Savings Bank of the City of Dortmund and the Westdeutsche Landesbank's clearing house.

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SCIENTIFIC AND INDUSTRIAL POLICY

OVERVIEW OF SWEDISH VENTURE CAPITAL MARKET

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
6 Sep 85 p 4

[Article by Professor Dr Rolf Wolff: "Venture Capital and Venture Management: Swedish Experiences with the Management of Venture Capital"]

[Excerpts] Small and medium-scale businesses in the course of their development pass through a series of critical financing thresholds. Venture capital and venture management attempt to provide the means to overcome these developmental thresholds. The following contribution describes the structure, problems and experiences of Swedish venture capital companies. The author directs the research field of "Business Policy" at the Stockholm School of Economics. (Editor)

The investment structure of large-scale Swedish businesses has shifted in recent years. Material investments are declining in relation to investments in intangibles. Investments in information and know-how as well as in personnel qualifications have become key concepts for all large-scale industries that are capable of further development. Viewed against the background of the present favorable liquidity situation, it is not surprising that large businesses participate in the form of venture capital commitments in the development of smaller and mid-sized businesses. This is a cost-effective way of acquiring know-how and makes it possible for companies to participate in developments which otherwise would lie beyond their competence.

Small and mid-sized businesses pass through critical developmental thresholds which can present themselves as capital or management problems. Venture capital companies offer not only capital for these problem thresholds, but frequently also offer the needed consulting resources as well.

The venture capital discussion in Europe concerns a form of cooperation that originated in the United States. Sweden's venture-sector is much more developed than that of Germany, although Sweden's economic potential in no way approximates that of the FRG.

Research results from America and Sweden indicate that the number of business start-ups in a region or in a business sector depends on positive environmental infrastructures and that the factor of venture capital plays an essential role

in the establishment of new businesses. The number of start-ups in a region or a branch can be interpreted as an indication of the economic vitality of the region or branch.

Venture Capital Companies in the Public Sector

Company	Start-up Year	Start-up Capital in Mill. S.Kroner	Owners
AC Invest*	1980	35	The state-owned capital shares fund
Malmöhus Invest*	1979	35	The state-owned development fund in the federal state of Malmö
Oxelöinvest	1978	7.5	Oxelösund community, state-owned steel industry, labor unions
Regioninvest	1977	25	State Enterprises AG
Start Invest*	1979	15	Development funds in the state Goeteborg and Bohus
Upplandsinvest*	1981	2.5	State government in Uppsala
Z-Invest*	1980	35	The state-owned capital shares fund

* Preferred minority involvement

The second brief preliminary consideration refers to the structure of start-up and innovation processes. We differentiate between the invention phase and the innovation phase. The invention phase constitutes the period from the origination of an idea to the technological maturity of the product. The innovation phase is the period of economic maturity. We can determine that the period of economic maturity, i.e. until the product is introduced onto the market, is longer than the process of technological maturity. This is frequently overlooked, and it is precisely at this point that venture capital and venture management can fill an important gap. They can contribute to a shortening of the time-span between invention and innovation, and thus to the economic success of the venture. We can identify four dominant criteria which are used to evaluate the feasibility of backing a particular project:

1. Management Team: knowledge/experience, to what extent are team members involved with their own investment; required minimum share in investment 60 percent.
2. Growth Potential: 5x5 rule, which means that the business that is being supported should be able to increase its sales and profits by 500 percent in five years.

3. Substantial Special Features: patents, technological know-how, marketing abilities.

4. "Reasonable Exit Potential": this means that investors should be able to sell their shares after an appropriate time lapse.

In 1983, Swedish venture capital companies invested approximately DM 200 million as new private risk capital. It should be stressed that Sweden--like England and the United States--has an OTC (over the counter) market, which as an exchange specifically for small and mid-sized businesses makes it easier for the venture capitalist to "exit" by "going public."

In 1982, venture capital companies invested in about 150 Swedish businesses of various sizes, from start-ups to companies that were ready for the OTC market. In 1983, this number doubled, and there is no sign that the trend will change. For 1985 it is predicted that about 700 businesses will receive venture capital backing.

Venture capital involvement is ordinarily linked to the use of a venture management team. The venture capital companies have consultants or teams of consultants who support individual firms or groups of firms. The consultation covers all development phases of the business, from the invention itself to start-up and learning phases. In contrast to American procedures, venture capital companies are often involved in the phases of penetration and expansion. Here too it is important to shorten each of these phases, so that costs and risks can be minimized. According to the industrial sector and the developmental course of the product, invention and innovation phases comprise a time period of from one to fifteen years.

One feature of this practice as it exists in Sweden is linked to the technical consulting groups. These are usually engineers who work at solving technical problems, without wanting to be involved directly in their economic exploitation. They leave the utilization of their product ideas to professional venture capitalists. For example, there is in Lund a company with about thirty engineers who in recent years have initiated the start-up of a multitude of new companies. Work on "technical problems and solutions" thus belongs to the features of the venture capital sector, which undertakes the economic exploitation (innovation).

In contrast to practices in the US, venture capital management in Sweden is characterized by early involvement, by little formalizing of the specific requirements and by the working out of business plans together with the companies which are being backed.

In 1984 there were 47 venture capital companies of various sizes, structures and goals in Sweden. We distinguish among three groups: supra-regional companies, regional venture capital companies and regional venture capital companies in the public sector.

Eighteen companies, which were founded primarily in 1982/83, are active on a supra-regional level. Only two of these companies were founded earlier, and in both instances the state provided 50 percent or more of their start-up capital. The capital of the groups amounts to a total of approximately DM 180 million. The individual companies are primarily the property of corporations, banks, insurance companies and consulting firms. Half of these companies have primarily majority participation, while the rest have minority involvement.

Minority involvement usually extends over a period of from five to ten years, after which exits, usually in the form of OTC offerings, are planned. The sectors which enjoy the strongest backing are the computer industry, electronics, medical technology and biotechnology. For this reason the companies involve themselves very early in the investment process of the companies being backed. Companies that are not disposed towards high technology companies undertake engagements in other sectors and later developmental phases of the business.

The group of regional venture capital companies consists of 22 businesses with a total capital of about DM 115 million. The Landskrona company, with a capital of about 35 million, represents a special case. It originated in the shipbuilding crisis in Landskrona with the help of state capital. The Wermia company is exemplary for many other businesses. The company was begun in 1981 by 30 businesses in the Vaermland region. The company was able to complement its capital by means of state credits. Fourteen businesses in this group work completely without public sector financing. The firm Soederhamm Tillvaext is partly owned by the Soederhamm community.

The businesses in this group are primarily interested in majority involvement, as is shown by an analysis of previous investments. The political function of the businesses is taking place primarily on a regional level. As an organizational form, they make it possible for local and regional interests to be taken into consideration in the sale of businesses and when a new generation of management takes over. By taking over a particular business, they can prevent the business from being sold to foreign or supra-regional interests. Furthermore, specific synergistic effects are achieved. Investors are active in the supervisory board, a fact which frequently leads to mutual assistance and cooperation. In the case of marketing strategies, purchasing, joint production and similar areas, developmental possibilities are opened up which would otherwise not be available to an individual company. Consultants can also be called in, a move which individual small and mid-sized companies might not be able to afford on their own.

In contrast to the supra-regional companies, investment in high technology businesses is not stressed above all else. Short-term profit interests are overshadowed by local and long-term developmental considerations. Nonetheless, and perhaps precisely because of this, these businesses are very successful. It is these very businesses which have helped to stimulate regional stock markets for small and mid-sized businesses. After all, 18 companies in this group were founded in 1983.

The involvement of the savings banks, the counterpart to the German "Sparkassen," is noteworthy in seven businesses. The savings banks originated as regional banks for small savers and even today they stress their important regional political role.

Regional Venture Capital Companies

Company	Start-up Year	Start up Capital in Mill. S.Kroner	Owners
Alma Invests AG	1983	5	Management company of the savings banks, entrepreneurs and private individuals in Uppland
Blekinge Invest* ¹	1983	18	Management company of the savings banks, 4 Pension funds, Skandia, Trygg-Hansa, Folksam, 1400 private individuals
Bothnia Invest	1983	8	80 companies of the Norbotten region
Camforel ¹	1983	12	companies in Jaemtland
Contortal ¹	1983	18	companies in Vaesterbotten
Dala Tillvaext	1983	15	S-bolagen, Stora Kopparberg, Dalarnas, Foesaekringsbolag, Alvesta Steel Mill, c. 80 entrepreneurs and private individuals
Finnveden Invest	1982	5	management company of the savings banks (50 percent), as well as 15 entrepreneurs
Gnosjoe Exchange	1983	3	Foeretagskapital AG and entrepreneurs
H-Invest	1984	17	4th Pension Fund, investment bank, Folksam and private individuals
Landkrona Finans ²	1981	103	large companies in the MTAB region, state subsidies
Margaretainvest	1983	2.5	Foeretragskapital AG and companies in Kalmar
Mellainvest	1983	6	management company of the savings banks, companies in the region
Mittinvest ¹	1983	15	14 private investors in Norrland
Skaneinvest	1983	14	management company of the savings banks, 25 companies, Skanska Brand, state insurance

Regional Venture Capital Companies (cont'd)

Company	Start-up Year	Start-up Capital in Mill. S.Kroner	Owner
Smalandinvest	1983	14	Forsheda, Herenco, Almaenna Brand, Finnvedan
Soederhamns Tillvaext	1983	5.7	Kockums, Industri, Korsnaes Marma, Ljusne Kaetting, Stora Kopparberg, Soederhamns Utvecklings AG
T-Invest	1983	6	management company of the savings banks, Hasselfors, jet invest, R. Ahlbeck et al.
Skeppet Kronan	1983	5	Sekretaeren, Elja Invest, Sydostinvest, state insurance, M. Dahlberg
Syostinvest	1982	16	Skrinet, SIB, Folksam, Scapa Inter, state insurance, others
Ventex	1983	6	Sparbank in Gaelve, state insurance, 15 companies in the federal state of Gaevleborg
Vaettterninvest	1983	20	Allmaenna Brand, Cloetta, Minskjoe, Argentud, Oktogonen and others
Wermia	1981	18	30 companies in Vaermland
Ostgoeta Holding	1983	50	Owner of the Ostgoetabank, Skandia, SPP and others

*primarily minority participation

1about 65 percent of the start-up capital consists of preferred state loans

2exclusively state capital

Total available capital c. DM 130 Million

The seven venture capital companies in the public sector originated as an instrument of state industrial policy. It was originally the goal of these businesses to contribute by means of aggressive policies to the frequency of start-ups and to the development of existing businesses in the region. All of these businesses originated as the result of structural industrial crises. Only with a law passed in 1982 were these businesses more emphatically called on to show a profit. To be sure, this objective is very difficult to fulfill, since many businesses which over the years had not shown any economic profitability were bought up. This type of venture capital company functions less in terms of industrial policy than in terms of labor policy. Up to now, these companies have secured the availability of jobs.

In Sweden today there are just as many new high-technology businesses started up each year as there are existing venture capital companies. The discussion

centering around risk capital therefore greatly overestimates the scope and the (total) growth potential of these types of businesses. In the case of venture capital companies, there is a tendency to stay within familiar branches. Thus it is forgotten that the learning effect which is to be achieved by means of homogeneity also leads to the reduced spread of risk. Moreover, many Swedish businesses have too small a capitalization to be able to meaningfully fulfill their tasks in the long run.

Supra-regional Venture Capital Companies
as of January 1984

Company	Start-up Year	Start-up Capital in Mill. S.Kroner	Owners
Consafe Venture AB	1983	6	Consafe Finans AG, Goetabanken Hasselfors AG (91 percent), Con Nova (9%)
Corolys Invest AB	1983	5	
Fabege Utveckling Four Seasons*	1983	unknown	Fabege AG
	1983	90	Alfa Laval, 4th Pension Fund, SPP, AMF
Foeretagskapital AG	1973	24	state 50 percent, commercial banks 50 percent
MVC Management	1983	24	Enator AG, Skandia AG, Skrinet, Praktikertjaenst
ProVex AG*	1982	10	B & B Invest AG 40 percent Wermia 40 percent, A/S Nevi 20 percent
S-Bolagen Tillvaext*	1982	10	Svenska Standardbolagen
SIB-Invest	1984	50	Swedish Investment Bank
Skandia Investment*	1983	110	Skandia
Svecia Invest AB*	1982	5	Founder Sveabanks as well as 300 shareholders
Svetab*	1978	75	State Enterprises AG
Svenskt Tillvaext AB	1983	10	Agro Finans, SPP, Cardo, state insurance
Technik Invest	1983	11	Industrievaerden, Cardo, SIB
Ven. Cap. AB*	1982	8	SCG, Hexagon, Carnegie, Probo
Ven-Tech AG*	1982	12	Ahlsell, Fannyudde, STC Finans
Venture KB*	1982	11	Ahlsell, Tornet, Eldon, Eken, Folksam, 4th Pension Fund, stock savings fund of the savings banks, management company of the savings banks
Ventronic	1983	40	4th Pension Fund, Tornet, G. Westerberg

*Enterprises with mainly minority participation. Total risk capital c. DM 180 Million.

Venture capital companies are also currently in vogue. Therefore it is inevitable that speculators will become active in this market and damage the image of the branch. Companies with limited capitalization are not fully able to allocate funds for consultative purposes. This is not in keeping with the idea of venture capital. Venture capital is really meaningful only in connection with venture management. In order to discuss these problems in a meaningful way, the Swedish venture capital companies have joined together in an association.

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SCIENTIFIC AND INDUSTRIAL POLICY

DETAILS ON SWEDEN'S LARGEST VENTURE CAPITAL FIRM

Stockholm DAGENS NYHETER in Swedish 4 Nov 85 p 12

[Article by Peder Carlquist and Jan Wifstrand]

[Text] According to information received by DAGENS NYHETER, Management Venture Capital, MVC, which is owned by Enator, Praktikertjanst, Skandia and Herakles, will now be liquidated.

The state-owned venture capital enterprise Svetab (Svenska Industrietablerings-aktiebolaget [The Swedish Industrial Establishment Corporation] will get a new managing director and will be coordinated with the other state-owned venture capital company, SU (Svenska Utvecklings-AB) [The Swedish Development Corporation]. The activities of Svetab will become intensified.

Some weeks ago, VenCap, owned by Hexagon, Carnegie and others, suspended its activities; the owners did not want to make any further investments in the corporation, and its activities were thus discontinued.

These are three examples of the consequences to the Swedish venture capital market. Far too many unsuccessful projects in some companies, owners who do not have the patience to wait for several years for their investments to pay off, who are too optimistic for a number of liquidations, cutbacks and owner exchanges.

MVC will be liquidated at around the turn of the year. One of the projects of that enterprise that have attracted most attention is EBS, a European satellite project for business communication. MVC will now try to find new interests for that project.

MVC's other interests will also be sold. The enterprise has already sold its interest in the furniture enterprise Design Funktion [Design Function]. Among MVC's other involvements are a couple of computer enterprises.

The reason for the setback is mainly a lack of interest on the part of the various participants in increasing their investments within the venture capital area.

MVC was formed in 1983 and, at the time, started with a capital of 24 million kronor. It was at that time that the old Skrinet, together with Enator, Skandia Investment and Praktikertjanst each contributed one fourth of the capital.

It was when the old Skrinet got new owners and changed its name to Herakles that the basis for MVC started to fail. Herakles, whose major shareholder so far had been Gustaf Douglas, financier, declared at an early point that the concern had no interest in venture capital projects but was interested in larger projects, primarily in corporations quoted on the stock exchange.

Internal Difficulties

Also Praktikertjanst gradually developed difficulties in acting as active owner. A constant internal difficulty within Praktikertjanst, for example, was that the partners were extremely critical of the investments in the satellite project of MVC.

Skandia Investment invested in MVC purely for reasons of investment and, according to information obtained by DAGENS NYHETER, Enator has not been sufficiently actively interested either in further involvement in MVC. The decision to liquidate MVC was reached already in September, but that decision was not made public. It is possible that the name of the enterprise itself will continue to exist, though the activities, in that case, will be different from now.

DAGENS NYHETER has not been able to obtain any comments from Jan Engstrom, the spokesman of MVC, nor from Per Hallerby, the managing director who took over last February after having left Utvecklingsfonden [The Development Fund].

Largest Corporation

The largest venture capital corporation, in a class by itself, is formed through a coordination of SU and Svetab within the state-owned Procordia. The initial step has been taken through the appointment of the managing director of SU, Orwar Gustafsson, as managing director of Svetab as well.

According to Orwar Gustafsson, the reason for that step was that the activities of the two companies were becoming increasingly related.

Svetab is a regional company and has been involved in a large number of projects. In 1984, the company suffered a minor loss. Gustafsson states that he will concentrate investments in Svetab primarily in the area of computers, electronics and biotechnology. The most important project of SU is within the area of computers (picture processing, speech transmission, artificial intelligence).

Gustafsson, moreover, finds that, in its investments, Svetab may have attached far too much importance to its evaluations of contractors/originators of projects at the cost of the projects themselves.

Did Not Want to Invest

The owners of VenCap, Hexagon, Carnegie, Skanska and Probo, did not find that the yields on their investments were sufficiently large. That is why they did not want to invest the additional 50 million kronor that were needed to continue the activities of the company. The original capital of VenCap was only 8 million kronor.

An experienced 'venture capitalist,' with whom DAGENS NYHETER has discussed the matter, finds that 50 million kronor is the lowest figure for the capital basis to achieve steadiness and scope of action.

In other venture corporations, the owners have become tired and have withdrawn their investments. This applies, for example, to Ven Tach, where the chief investor, Fannyudde (Beijer) withdrew, Venture, where the stock departments of Sparbankerna [The Savings Banks] sold their shares, Lunden in Norrköping, where Lundbergs purchased the shares of Investro/Providentia as well as Active.

Footnote: Venture capital enterprises are investment corporations which invest in ideas and projects and develop them into economically sound enterprises. According to the orthodox venture capital philosophy, imported from the United States, venture capital corporations will always have to have a minority interest in projects. Around 2-3 years ago, a number of venture capital enterprises were formed in Sweden, the owners of which were primarily insurance companies, investment corporations, and the like. There are approximately twenty venture capital enterprises in Sweden which operate on a national basis and a few dozen which work on a regional basis.

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SCIENTIFIC AND INDUSTRIAL POLICY

NINETY-FIVE NEW ESPRIT PROJECTS FINANCED IN 1985

Paris AFP SCIENCES in French 26 Sep 85 p 8

[Unsigned article]

[Text] Brussels--The EEC has decided to finance 95 new projects in 1985 as part of the Esprit information technology research program. This announcement was made on 25 September by Michel Carpentier, director general of the task force responsible for this program at the EEC.

A total of 176 projects will have been launched since this program started in 1984, aimed at enabling Europe to eliminate within ten years its technologic gap with Japan and the United States. The projects will be financed one-half by the EEC and one-half by enterprises.

Involved in these projects are 263 industrial enterprises, 104 universities, and 81 research institutes, covering advanced microelectronics, software technology, advanced information processing, office automation, and computer-integrated manufacturing. Nearly 1300 researchers will be working in Esprit projects by the end of 1985, and Spanish and Portuguese companies will be able to join the projects starting next year.

According to Mr Carpentier, and to representatives from Thomson (France), ICL (Great-Britain), and Philips (Netherlands), the Esprit program is progressing more rapidly than anticipated, and has already obtained positive results.

Among Esprit's first successes, Mr Carpentier mentioned an agreement on computer standards among 12 European computer manufacturers, an agreement among six large European manufacturers on the use of UNIX 5 as operating system compatible with their products, the creation of a large European joint venture, European Silicon Structures, for custom chip design.

Esprit's goal, the commission points out, is to promote European industrial cooperation in precompetitive research and development in the information technology sector, to provide the European industry in 5-10 years with the basic technologies it needs, and to pave the way for common European standards.

11,023

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SCIENTIFIC AND INDUSTRIAL POLICY

UPDATE ON EUROPEAN 'ESPRIT' PROGRAM PROGRESS

Paris ELECTRONIQUE ACTUALITES in French 27 Sep 85 pp 1-3

[Article by F. Grosvalet]

[Text] Brussels--Eighteen months after its start, the Esprit program, designed to encourage transnational cooperation in the EEC and allow the European information technology industry to become and remain competitive in the world through the coming years (see ELECTRONIQUE ACTUALITES of 2 and 9 March 1984), is proving to be a success.

The major portion of the Phase 1 program, which was to be spread over four years and involve an EEC commitment of 750 million ECUS, is already underway.

At present, 173 projects covering the five topics adopted for Esprit, are being carried out. They involve 448 organizations (263 manufacturers, 104 universities, and 80 research Institutes) and 1300 researchers.

At the conclusion of the call for bids issued in March 1985 (see ELECTRONIQUE ACTUALITES of 1 February 1985), 95 new projects (out of 400 proposals) were accepted with a budget allocation of 215 million ECUS.

Even though most of the program is already committed, financing possibilities still exist for future years (according to the Brussels Commission, 15-20 percent of the projects should conclude of their own accord before the end of Phase 1), and a new call for bids should be issued in 1986.

Of the 95 projects accepted this year, 24 concern advanced microelectronics, 16 software technology, 20 advanced information processing, 23 office automation, and 12 computer-integrated manufacturing. France is involved in 66 of them, with Thomson in a leading position.

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SCIENTIFIC AND INDUSTRIAL POLICY

BRIEFS

FRG FUNDS TO EUREKA--Bonn--An agreement of principle was reached by the FRG cabinet, to finance the Eureka European technical cooperation. On 5 September, the Ministry of Research indicated that this financing could amount to one billion DM from 1986 to 1990. During an evening meeting one day earlier, chaired by Chancellor Helmut Kohl, the ministers concerned, namely Gerhard Stoltenberg, minister of finances, Martin Bangemann, minister of the economy, Heinz Riesenhuber, minister of research, and Hans Dietrich Genscher, minister of foreign affairs, also decided that a first line of credit of 50 million DM will be included in the research budget for Eureka's preparatory phase. The Parliament must approve the total expenditure of one billion DM over four years. FRG had at first been reticent to agree to a large financial participation in this program, whose idea was proposed by France in May. Of the 17 participating countries, only France (1 billion francs) and FRG have so far announced financing for Eureka. [Text] [Paris AFP SCIENCES in French 5 Sep 85 p 10bis] 11,023

PEKING INTERESTED IN EUREKA--Peking (AFP/dpa) Possibilities of cooperation in the peaceful use of space were discussed yesterday at a meeting of French Foreign Minister Dumas with his Chinese counterpart Wu Xueqian [as published] in Peking. Members of the French delegation report that the ministers discussed disarmament problems. Both sides are reported to have emphasized unanimously that space should not be used for military purposes. It was reported that Wu Xueqian listened to a thorough explanation of the French Eureka project of European cooperation in developing first-rate technologies, a project that the Paris government envisions as an alternative to the U.S. SDI program. The report continues that Peking is in favor of the Eureka project and is interested in examining possibilities of cooperation between France and China in peaceful space exploration. [Excerpts] [West Berlin TAGESSPIEGEL in German 31 Aug 85 p 5] 8889/9435

ITALY IN 12 ESPRIT PROJECTS--Turin--On 11 September, the Italian press reported that Italy is participating in 12 projects--and is a leader in four of them--as part of the EEC's Esprit information technology research program. These 12 projects are conducted by CSELT, a Turin center of studies on advanced technologies, founded 21 years ago by STET, the telecommunication branch of the IRI (Institute for Industrial Reconstruction) public group, which supports 407 researchers out of 673 employees. Last year, CSELT had revenues of 46 billion lire (230 million francs) and filed 210 patents. On 31 December, it had amassed 1515 patents, amounting to 4.5 patents per researcher, or in its words, "the highest average in the world." CSELT is thus the creator of the future IBC telecommunications network, recognized by most of the European industries, and already adopted by the stations of the EEC and Scandinavian countries. [Text] [Paris AFP SCIENCES in French 12 Sep 85 p 5] 11,023

SPAIN PREFERS EUREKA TO SDI--Madrid--Madrid will turn to President Reagan's Strategic Defense Initiative (SDI) if the Eureka project does not offer technologic development possibilities for Spain, declared the president of the Spanish government, Felipe Gonzalez, on 30 August. Questioned about the Eureka project and SDI by Chinese reporters as he was leaving Tuesday for China and Japan, Mr Gonzalez declared that he backed the project launched by France, which according to him had the advantage of "having a civilian rather than military final goal." However, the Spanish president stated that Spain did not want to be "disengaged from the technologic revolution" that is now underway. "Spain," he said, "wants to be among the countries which participate fully in the technologic revolution, ... and wants to participate in the Eureka project. ... But if this project does not offer us (sufficient) possibilities, we will study those that offer us other projects, such as SDI." [Text] [Paris AFP SCIENCES in French 5 Sep 85 pp 3-4] 11,023

CSO: 3698/17

TECHNOLOGY TRANSFER

PIRELLI OPENS NEW HEADQUARTERS IN MOSCOW

Milan FATTI E NOTIZIE in Italian Jun 85 pp 8-9

[Text] It Manages the Interest of the Whole Group. Until now, Pirelli has availed itself of the services of Novasider to look after its interests in the USSR. It has, now, decided to be on its own and has opened an office in Moscow. How come? Says its Director, Ennio Castaldi, "It is only in this way that we can be more useful in the promotion of our business in the three sectors in which we operate: cables, tires and diverse products."

With 1985 comes an innovation. After receiving, on January 1, accreditation from the State Committee for Science and Technology in the USSR, Pirelli has opened an office in Moscow. Previously, this opportunity had been given only to very few selected western companies. Among the Italian, we recall Fiat, Olivetti, Montedison, Finsider, Eni and Merloni Finanziaria.

Headed by Ennio Castaldi, Director of the DIF (Plants and Supply of the Diversified Products Sector Board) the Pirelli office in Moscow will manage the interests of the whole Pirelli Group, both in the Diversified Products and Tires Sector, and in Cables, and it will avail itself of the continuing on-site presence of Franco Cattaneo, an engineer who has the advantage of extensive experience in the Soviet Union as a Montedison executive. He will be flanked by Egle Sassi and, in the role of consultant, former Novasider executive Carlo Barni.

Until now, for the promotion of its business with the USSR, Pirelli has availed itself of the services of Novasider, a representations firm which landed in the Soviet Union when the Iron Curtain was still up, and which to its credit was able to introduce Pirelli, along with Fiat and other Italian companies, to this important market. It has, among other things, allowed Pirelli to sign contracts such as those of Balakovo 1 and Balakovo 2, worth about 400 billion lire at current rates. These contracts will allow Pirelli to build the biggest plant in the world for the manufacture of rubber accessories for autos. Other contracts--those of Chiesa Bianca and of Nizhenekamsk--valued at over 150 billion, at current rates, will permit Pirelli to supply plants for the production of tires for vehicles.

In light of so many successes, how can Pirelli's decision, to act on its own now, be explained? Answering is Ennio Castaldi who, besides being its director, was responsible for the birth of the Pirelli Office in Moscow.

"Times have changed," he says. The pioneering era has ended. That was an era when we broke the ice with our products, which [by now] have had ample time to demonstrate the reliability of our technology. Our products have been our best calling card in the country. Since relations with the client have become increasingly more frequent, we have felt the need for a direct presence on this market. This, then, is the reason for the new Pirelli office in Moscow. We are sure that only in this way we can improve our relations with the USSR and be more useful in the promotion of our business in the country in the three sectors in which we operate: cables, tires, and diversified products. For the Pirelli Group, it will be just like having a long hand capable of activating and taking care of relations with the clients, exactly as the various Pirelli units in charge of commerce with the USSR will, from time to time, deem opportune."

Supplying plants, machinery and technology as well as products and semi-manufactured goods (for example steel cord) constitute the objectives of the many contracts already signed and the numerous on-going negotiations in the Soviet Union. Let us look at the roles the [signed contracts and negotiations] have played in the past, and those they are likely to play in the future. Castaldi still speaking: "In the field of plant, machinery and technology supply, we can say that we have provided the opportunity for modernizing and updating the Soviet rubber industry. This is true for all sectors, from tires to the most diversified products to the extent that we found ourselves supplying not only the plants for the manufacture of auto accessories, but also the plants for the manufacture of accessories destined to industry and, further, plants for the production of elastic wire, gloves for household use, and synthetic leather for shoe manufacturing."

"But for exceptional cases, to our knowledge no company other than Pirelli has ever been called upon to help which, thus, ended up playing, at least in this sector, the role of the big partner. But there is, if you will, the exception of the cables sector which, in a sense, can also be considered part of the rubber industry. This is so because of a precise choice by our company who in this sector has never believed in supplying plants and machinery to other countries, be they Western or Eastern, enabling them to produce."

In the sale of products and semi-manufactured goods in the Soviet Union, Pirelli's activity has been limited to some specific sectors, given the fact that the USSR is a very big producer and exporter of rubber products in the Comecon countries. "The sectors in which we have contributed the most" Castaldi explains, "are those of transmission belts for industrial use and agricultural machines, high-pressure tubes, and steel cord, metallic cord, tire production of which, in 1984 alone, there were quantities of over 5-6 million dollars supplied. As can be noted, they are all highly technical products in which, moreover, we are particularly competitive. The latter fact should not be underestimated, since we often find ourselves vying with very many, qualified, trained competitors. Moreover, we have sold radial tires as the

first Soviet manufactured automobile equipment for exportation. But this," concludes Castaldi, "only because the plant intended for their production, acquired 3 years ago, has not yet begun operating."

And for the future? What forecasts can we make? Castaldi replies: "As far as the sale of products and semi-manufactured goods is concerned, we can state at once that we face a budget item destined to be reduced in proportion to the Soviet industry's ability to increase its production. And in addition to other factors, our own contribution. I will explain by two examples: Let's take the case of transmission belts. The fact that great quantities of the product have been supplied in the past has surely permitted it to become known and appreciated for all its effectiveness. Consequently, it has been adopted by their industry. Going from this to the Soviet request for the supply of a plant of our design which would permit the production at home of this product was a small step. After an initial agreement signed in August of 1984 (20 million dollars approximately), there was another, in January of this year, for an additional 5 billion lire and others will probably follow closely. For the metallic cord, an analogous situation occurred. Not more than 3 months ago, the Soviets signed an enormous contract in which Voest Alpine, Danieli and Pirelli collaborated. The latter is committed to supply the technology and processing for the product, in addition to technical assistance. And it is not at all improbable that other contracts in the same sector will follow shortly."

"What can we conclude? That the sale of products and semi-manufactured goods has not only the immediate advantage of contributing to help increase the assets of the company's balance sheet, but also of effectively supporting the sale of plants, machinery and technology. On this basis, the fact that the Soviets, once they have placed themselves in a position--with the technology we have supplied them--of manufacturing products at home, will no longer come to ask us for products, should be considered of secondary importance. On the other hand, let us try to look at the problem from another aspect: if their 5-year investment plans foresee the acquisition of specific technologies and the installation of related plants, the supplying will be done any way, if not by us, by our competitors. Therefore, the syllogism our technology, soviet autonomy, reduction in our sales of products and semi-manufactured goods, is only the result of an economic reality. It goes without saying that what I have stated is also true for all products and semi-manufactured goods which we currently supply to them."

But as far as the sale of technology is concerned, will it still be possible to expect successes of the Balakovo 1, Balakovo 2 and Chiesa Bianca type? "On this subject," says Castaldi, "the USSR is a market which still offers very great possibilities, inasmuch as it always expands at a remarkable pace. The very fact that it continues to need to buy so many products from the West demonstrates that it does not yet have the industrial infrastructure to enable it to face all its domestic needs, which are immense. With the technology which we have developed in the last few years, (both on new products as well as updating of the traditional ones) we are in a position to help it further develop its rubber industry. Of course, contrary to what happened in the past, today the competition makes itself felt. The USSR is now a country open to the best qualified exporters, not only Italian, but especially German, French, English, Japanese and American."

"Do you want an example? In order to obtain the contract signed last August for a plant to manufacture the special transmission belts for use in the field of agricultural mechanization, we had to compete with eight American, European and Japanese competitors." What is there left to do then? "The important thing is not to get discouraged and to sharpen one's weapons. That is to say, change tactics and strategies. But did we not just open a Pirelli office in Moscow? And it is precisely in this light that the new initiative must be viewed."

There is something new in the field of technology sales to be pointed out. Today, the Soviet Union presents itself as a big partner not only in the field of plants for the manufacture of industrial products, but also in the manufacture of consumer-oriented products. "It is true," admits Castaldi, "there now appear new opportunities never before seen. To confirm this, there will also probably be the next 5-year plan, 1986-1990, which will deal not only with industrial production, but also consumer-destined products. It is not, therefore, to be excluded that one may find oneself supplying the Soviets with plants for tennis balls or other consumer-oriented products, designed by us." The USSR is undoubtedly a big market. Are there others as interesting with respect to the sale of plants, machinery and technology? Says Castaldi, "I would say that the USSR is a market hardly comparable with others, in that it presents a series of peculiarities that are not found in other countries, even with similar socio-political structures. As a matter of fact, the needs are very noteworthy and increasing (the USSR, let us remember, is the second or third economic power of the world). Furthermore, they are centralized, and finally, they are organized at making contracts, demands and performance, in a single ministry and in one commerce organization. It is also true that other countries of the Comecon are structured in the same way, but evidently the needs of each of these are, by far, inferior. China" continues Castaldi, "above all in prospective, could be the country most likely comparable to the USSR in this aspect: enormous territorial extension, a population which has exceeded a billion people, an industry which will have to assume adequate dimensions to meet that reality."

"Now, in our specific sector (which we could place within light industry), China has decided upon, and effected, ample administrative decentralization, giving autonomy to most of the provinces. There are more than 600 organizations currently qualified to deal in foreign commerce: the consequence is and will be the increased marketing for the same product, the same machinery, the same technology, which will be the objective, from time to time, not of a single contract, but of a series of contracts of moderate size."

"Let us be clear; this, from a certain viewpoint, can be advantageous to us, in that contracts of the type indicated above are more easily managed with respect to 'major' contracts such as Balakovo. On the other hand, once a given contract is signed in a given sector in China, it is then relatively easy, through persistence, to underwrite additional ones with other provinces."

Other markets besides the USSR and China? "The world crisis which has touched all the countries, especially underdeveloped ones which are, in substance, our true partners and, therefore, the area in which we can deploy our promotional efforts have been restricted some."

"On the other hand, however, we are perfectly aware of our strengths, which are qualified but also limited. It would be a grave error to disperse them in excessive initiatives with the risk of being unable to follow any one of them with the necessary aggressiveness and efficiency. For some time now, we have concentrated our efforts on negotiations which are reduced in number but selected in relation to the markets (diversification is imperative), to technologies and naturally not least, to the probabilities of short-medium range success."



Photo Caption: Mr. Ennio Castaldi (on the left) pictured with Franco Cattaneo.

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