

# RADIO FREE EUROPE

*Research*

## EAST EUROPE

*This material was prepared for the use of the editors and policy staff of Radio Free Europe.*

POLAND/10

24 July 1970

### AUTOMATIC DATA PROCESSING IN POLAND

Summary: Increasing the efficiency of the economy -- nowadays this is the number one theme of the publicity devoted to economic problems in Poland. It brings to public attention the background elements conditioning fulfillment of this postulate. Undoubtedly, the present conditions and prospects of satiating the national economy with computers are some of the most important elements of all. On the strength of an analysis of accessible materials, it appears that, in this field -- so far a very neglected one -- not much is being changed. Even the plans, even in perspective, are rather modest, without ambition to bring the standard up to the level of not only comparable Western countries, but also the countries of the Communist bloc.

In view of the practically insurmountable barrier of technical underdevelopment, Polish specialists have concentrated on software, and in this field they have achieved very good results, often catching up with the world's leading countries.

\* \* \*

### The Assets and Character of Computers

At the end of 1969, there were a total of 143 computers in the accounting sections of various departments in use, of which only 27 were automatic data-processing machines. The remaining 116 were special purpose computers (which are probably also used for military purposes). Most of

the special purpose computers (107)) were produced in Poland. Some 90 per cent of them are first generation machines, while the remaining ones are second generation machines using germanium transistors.

The 27 automatic data-processing computers consist of:

- 12 Minsk-type computers (mostly Minsk-22)
- 7 ICL-type computers
- 6 ZAM-type computers (mostly ZAM-41 )
- 1 IBM-1440 computer
- 1 MCR-315 computer

The majority of these computers (about 80 per cent) are small machines. Their structure apparently corresponds to the size and type of the computers installed much earlier in the economically-developed Western countries. But one should take into consideration the fact that, in absolute numbers, 20 per cent of big and medium-sized computers in Polish circumstances means only about 30 machines. The principal models of computers now used in Poland are:

The Odra. The most popular version is the 1204.

This is a machine intended to serve as a special purpose computer. The new type of Odra, the 1304, is suited for automatic data processing and (after years of delay) will appear on the market this year. In any case, the delivery of eight such computers has been scheduled for the current year.

The ZAM-41 is a second generation computer for automatic data processing.

Its newest model, the ZAM-41 Z contains the logic system for third generation machines. The ZAM is probably equipped with silicon transistors. Delivery of two computers of this type is expected during 1970.

The Minsk. The most popular current model is the Minsk-22.

This is a computer of Soviet origin, probably similar to the Polish ZAM-41. Most recently, a new model, the Minsk-32, has been imported (nine machines to be delivered very shortly).

The first two of the above-described computers are of Polish production. According to original plans, they were to be produced in moderate numbers, but so far they are still being turned out virtually as prototype models.

In general, as far as the ZAM-type computers are concerned, plans were laid in 1964 to produce 74 machines by 1970. In reality, only nine machines will be ready at best by that time. Similar difficulties were (and are still) encountered concerning production of the Odra-1304. Apart from difficulties in design and organization, the basic troubles beset that part of production which deals with transistors, especially silicon transistors.

Odra computers are produced in the Elwro plants in Wroclaw. Only one third of the production capacity of these plants is employed in the production of computers. The machines made by Elwro have two principal faults: they have insufficient programming (software) and they do not reach technical and operative parameters.

ZAM computers are produced in the experimental plant of the Institute of Mathematical Machines. This plant is not really suited to industrial output. Very likely in the future it will concentrate on prototype production, while production of computers will be completely taken over by Elwro.

Therefore, including the above-mentioned computer deliveries scheduled for the current year, one can expect that, at the end of 1970, there will be about 160 computers installed in Poland (143 already operating plus 10 new machines of Polish production and a few imported ones). That will at least provide the number projected for the end of 1969.

#### The Position of Poland in the World and in the Communist Bloc

While the plans to introduce computers into the Polish economy are very modest, the execution of these plans is unfortunately even more moderate. More significant still, the gap between the plan and its fulfillment is at present greater than during the initial phase of using computers. It is the result of insufficient development of production as well as of minimal import of computers from abroad, along with simultaneous export of some of the limited number of domestically-produced machines.

In the Fifties, Poland held second place to the USSR



in the Communist bloc in computer production. At that time, the difference between Poland and (for instance) England or France was not nearly as big as it is today. The Odra-1013 computer was -- at least in the bloc countries -- particularly attractive, eagerly sought and purchased. In 1958, the XYZ-type Polish computer was up to world standard technically. The same could have been said about the data storage computer. But the world, including Poland's immediate neighbors, quickly went forward, while Poland has stuck to the use of silicon transistors (the second stage of the second generation) and did not advance. But even within the stage of germanium transistors, it was possible to manufacture machines with the logic system developed to the level of third generation computers. Therefore, technical difficulties and licensing problems were not the only things to be blamed for the current shortcomings.

Therefore, if one studies even the slightly outdated information, one gets a fair picture of this unfortunate state of affairs. It is enough to compare the earlier mentioned 143 computers already installed in Poland with the number of computers operating in 1966 within: West Germany (2,500), Great Britain (2,000), Switzerland (over 350), Spain (130).<sup>(1)</sup> Comparisons with the Comecon countries are also unfavorable to Poland. According to current statistics, Czechoslovakia at the moment possesses approximately the same number of computers as Poland, but of considerably higher efficiency (several good computers of the third generation among them). It is known, for example, that there are over 50 Minsk-22 computers in Czechoslovakia, which indicates an incomparably broader use of computers for automatic data processing than in Poland.

Furthermore, Czechoslovakia is now producing the Gamma-140, based on an American license, bought from Bull-Electric in France (it is a medium-sized computer, closest in type to the IBM-360). The Czechoslovaks intend to produce 150 of these machines by 1971. According to 1966 statistics for the Comecon group, only Rumania and Bulgaria were behind Poland in developing automatic data processing centers. At present, even these two countries are more advanced in the field than Poland.

What is still more significant, in some of these countries one can see the changed attitude of the government to the need to develop automatic data processing. As mentioned above, Czechoslovakia bought a license from France. Apparently, Hungary has also purchased a license from France, this time for a small third generation computer which will go into production in 1971.

---

(1) These figures from IFIP were quoted by Polityka on 8 February 1969. At present many of the above-mentioned countries have twice that number or even more.

The GDR, which commands considerable production potential in the field of small machines (calculators, bookkeeping machines) has at present halted the export of computers, giving decided priority to its own needs.

As a result of all these deficiencies, there are now in Poland about 400,000 people employed for every computer used in automatic data processing. In the heavily industrialized area of Warsaw, there are 140,000 people employed in the national economy for every computer used in automatic data processing. In comparison, in France there is one for every 9,000 or so wage earners, while in the US, the figures are one computer for every 2,000 wage-earners.

#### Chances for Improvement

Poland's stage of development in applying computers leaves her far behind other countries, which have introduced automation with increasing speed. Japan provides a particularly vivid example here. In 1958, this country, like Poland, possessed only experimental machines (as far as domestic production of computers was concerned) and 11 imported computers. But in 1961, 307 machines had been installed. By 1962, Japan already possessed 500 computers, and by 1964 the number had risen to 2,000. Moreover, since then, the production rate has not slackened and because it began mass production of its own computers, by the end of March, 1969, Japan had about 5000.(2) This figure included about 1,600 machines which had been installed in the short space of time between April, 1968, and March, 1969. Therefore, during one year alone, the absolute increase of new computers equaled half the number previously installed.

In the case of Poland, such a rate of increase doesn't even come into the picture. According to the proposal of the government representative concerning automatic data processing, installation of about 350 computers for automatic data processing and 80 special purpose computers is scheduled for the years 1971 to 1975. If this program is carried out, Poland would have about 500 computers in 1975 (taking into account the necessity to withdraw at least 80 already obsolete computers). The fulfillment of this program would involve expenditure of about 17 thousand million zloty. If this plan were accepted and fulfilled fully (which is not always the case), Poland's relative position even within Comecon, would not be greatly improved.

- (2) Net, after adjusting for over 800 old computers withdrawn from use. According to Datamation of January, 1970.

Because, during that same time span, the GDR is planning to increase its computers to 800 machines, and Czechoslovakia to 650 (including a considerable number of third generation computers). Hungary also plans to install about 600 computers in the coming years.

According to present forecasts, computers made in Poland will still be second-generation type machines, with possibilities of switching over to third generation techniques by the time of the next five-year plan.

### Personnel and the Organization of Automatic Data Processing

Thus, chances to develop so modern a production branch and one of such importance for the national economy have been forfeited. As a result, a feeling of despondency has spread within these professional circles concerned with the production field. There is a comparatively large and excellently trained elite in the field of automatic data processing which concentrated on software, achieving results well up to world standards. Many of these specialists have found posts abroad, where some of them attained high positions. The exchange of specialists in this branch is quite considerable, fostered by frequent chances for specialized training in the Western countries. (3) Connections established while studying or during periods abroad have resulted in some cases in continuous collaboration with the same firm.

There are quite a number of highly-specialized technicians in Poland and at least 20 among them are qualified to be supervisors of computer construction. One can say, therefore, that there are enough specialists for even very ambitious development plans. So far as lesser-grade technicians and operators go, the picture appears to be less satisfactory. But, on the other hand, they can be trained in a comparatively short period of time, so that this problem alone should not hamper development. There is a project for the years 1971 to 1975 to train a "basic" corps of 16,000 people (including 7,000 programmers).

Everything connected with automatic data processing is managed by the government representative specially designated to handle this field. He is responsible mainly for programing development, co-ordination of training, and setting up automatic data processing centers. All automatic data processing centers, which are in every voivodship capital, come under his jurisdiction. Departmental, branch, and plant centers are also being set up. Only 15 industrial plants possess such integrated data processing centers. In addition many specialists are employed at special purpose computers in technical and scientific research centers.

- 
- (3) For example, in 1969, 12 Polish specialists had UN study grants.



The professional organization for these specialists is called the Polish Automatic Data Processing Committee. This committee has branches in the voivodships. Poland is represented at the International Information Processing Federation (IFIP) and a Pole, Professor Leon Lukaszewicz, (4) is vice-chairman of this organization. But this widely expanded administration and the network of professional organizations do not function smoothly; they compete with each other and waste the energies of specialists on unimportant matters. Besides, there is a lack of co-ordination between these organizations and industry as well as the Institute of Mathematical Machines.

### Current Problems

Owing to considerable delays in fulfilling the plan for introducing automatic data processing in the 1966-1970 period, there is a sad probability that the 1971-1975 plan will also not be completely fulfilled. Fearing this, specialists suggest tactical changes. They propose improving organization, increasing the existing amount of peripheral equipment, extending the programming of existing computers. And where domestic production is concerned, they suggest perfecting logic, which could be done even with use of the outdated germanium technique. Those are the suggestions made by the realists, who are fully aware that they are unable to solve the basic existing problems. On the other hand, it is clear that the efficiency of computer use in Poland to date leaves much to be desired. It is worth pointing out how much inadequate input-output equipment, because of its imperfection, limits the efficiency of the central processing units. This concerns in particular magnetic tape storage, readers, line printers etc. This equipment is being produced in the plants at Blonie, near Warsaw, but the scope of production is far from adequate. Besides, it is urgently necessary to improve domestic production of such things as punch cards or magnetic tapes, which are still imported.

Another important matter is the necessity to set up an efficient repair service. To date even the slightest malfunction puts a computer out of service for a long time.

The most important problem, however, is to change the grudging attitude of the government to investing resources for the purpose of increasing production of computers or of importing them. The fact that neither investment nor labor priority was granted to the computer industry clearly expresses that unfavorable attitude. This creates a paradoxical situation, because at the same time the papers literally overflow with articles about the necessity of selective development, with priority for those

---

(4) A brilliant specialist in computer languages.

branches of industry which can help modernize the national economy. The fact that up to now -- in spite of all the possibilities -- the computer industry in Poland has not been granted the priority due to an evolutionary industry proves that the people who decide the direction of national economic development show lack of vision and have a poor sense of responsibility. Another proof that the problem of speedily developing this important branch of industry is being grossly underestimated by the government can be found in the reports of the Fourth Plenum where this problem is only vaguely mentioned. However, it is expected that this problem will be one of the items discussed before and during the Sixth Congress of Polish Technicians (in February, 1971).

Antoni Marek

Bibliography

Polityka, 8 February 1969; 18 October 1969; and 25 April 1970.

Kultura, 11 May 1969.

Zycie Gospodarcze, 16 and 23 November 1969; 24 May 1970.

Maszyny Matematyczne (Mathematical Machines), issues from 1968 to June, 1970.