Rapacki, Ryszard

**Article — Digitized Version**

# Poland's Exports of Licenses

Economics of Planning

# ECONOMICS OF PLANNING

CONTENTS




Nos. 2–3

VOL 17-1981 ISSN 0013–0451

# ECONOMICS OF PLANNING

*Published by the Centre for Russian and East European Studies, University of Birmingham, United Kingdom, with financial support from the Swedish Royal Academy of Sciences, Stockholm, State Council for Social Research, Stockholm, Norwegian Research Council for Science and the Humanities, Oslo, Bank of Finland, Helsinki.*





**EDITORIAL AND SUBSCRIPTION OFFICE**
Economics of Planning, Centre for Russian and East European Studies, University of Birmingham, P.O. Box 363, Birmingham B15 2TT, United Kingdom. Tel. 021-472 1301 extension 3452.

**SUBSCRIPTION**
£.St. 12.00 post free 3 issues per year.
From Volume 18, no. 1, £.St. 16.00 for 3 issues per year.

**BACK NUMBERS**
*Individual* issues: £.St. 4.00 per issue. All available issues of volumes 12–14, £.St. 2.50 per issue not exceeding £.St. 22.50: *All* available issues of volumes 1–14, £.St. 2.00 per issue, total not exceeding £.St 68.00; Double numbers count as 2 issues. Prices may be changed without notice. Orders to Economics of Planning, Subscription Office. The out of print issues, currently about 8, may be obtained from Swets & Zeitlinger, B.V. Backsets Department Heereweg, 347B, Lisse, The Netherlands.

**MANUSCRIPTS**
Articles should be submitted in four copies to the editorial office.

Printed in Great Britain by Henry Ling Ltd., at the Dorset Press, Dorchester.





*Economics of Planning*, Vol. 17, Nos. 2–3, 1981, *Printed in Great Britain*


# Poland's exports of licences


*Ryszard Rapacki*


## 1. General remarks

The task of measurement and statistical evaluation of Polish licence exports is not easy. One of the reasons is a number of deficiencies in statistical recording and methodological shortcomings. Additionally, the very nature of the phenomenon is to some extent heterogeneous. It contains a variety of components, each of which is subject to different regularities.

Before trying to summarize briefly these deficiencies one should bear in mind that the 'statistical roots' of licensing exports are of relatively recent origin — the phenomenon has been formally distinguished from the other kinds of economic activity (especially from merchandise exports)[1] only in the early seventies. This means that data from before 1970 should be treated with caution — as estimates rather than exact figures.

Licence exports are not always an independent deal — quite often licences accompany bigger, more complex transactions like, for example, turnkey projects. The variety of elements constituting such a transaction and the marginal role (from the point of view of its share in total contract value) of technology transferred through licences make the precise establishing of the real value of licence exports difficult in many cases — it tends as a rule to be underestimated rather than overvalued.

Simultaneously, due to existing statistical shortcomings (lack of certain data, of a fully standardized terminology, etc.) there are often discrepancies in the accounting treatment of licence exports in different levels. For instance, the number of export transactions reported by POLSERVICE (the leading foreign trade enterprise in the field of technology trade) is much lower than in the statistics of the Central Statistical Office. The reason is that, contrary to the latter, POLSERVICE's statistics do not include annexes to already existing agreements, contracts extending earlier versions etc. This, in turn, results in the real value of licence exports being overestimated.

One more difficulty in measuring precisely the volume of licensing exports results from the fact that the 'visible' export of licences, i.e. the value reflected in financial flows, constitutes only the tip of an iceberg, being a small portion of a total of elements of technical knowledge actually transferred.[2] The substantial share of noncommercial (without a fee) transfer of technology as well as of barter transactions (cross-licensing type), though lower in Polish than in western export, contributes to underestimating the factual volume of licence exports in Poland.

The above remarks lead to the conclusion that — in view of the shortcomings in the available statistics — the data on technology exports through licences in 1945–1980

---

[1] It has become an independent subject of statistical reports, legal regulations and plan decisions at different levels.

[2] C. Freeman, C. H. Q. Oldham, E. Turckean, *The Transfer of Technology to Developing Countries with Special Reference to Licensing and Know-how Agreements*, UNCTAD, doc. TD/28, Geneva, 1967.

TABLE 1. Number and Contract Value of Licences Exported From Poland in 1945–1980

| *Years* | *Number* | *Value* (US $'000)[a] |
|---|---|---|
| 1945–1970 | 40 | 5,762.7 |
| 1958 | 1 | 61.0 |
| 1963 | 3 | 52.8 |
| 1964 | 9 | 774.0 |
| 1965 | 2 | 42.0 |
| 1966 | 1 | 32.3 |
| 1967 | 6 | 243.4 |
| 1968 | 10 | 473.2 |
| 1969 | 4 | 3,859.0 |
| 1970 | 4 | 225.0 |
| 1971–1975 | 43 | 6,872.9 |
| 1971 | 9 | 704.2 |
| 1972 | 9 | 368.9 |
| 1973 | 10 | 1,635.0 |
| 1974 | 9 | 247.0 |
| 1975 | 6 | 3,917.8 |
| 1976–1980 | 55 | 17,178.8 |
| 1976 | 8 | 4,418.5 |
| 1977 | 14 | 4,528.3 |
| 1978 | 10 | 3,085.4 |
| 1979 | 18 | 3,644.5 |
| 1980 | 5 | 1,502.1 |
| 1945–1980 | 138 | 29,814.4 |

[a]The total value is based on two different exchange rates of Polish currency:
one, equal 1 dollar=4 exchange zlotys, was in force till the end of 1970 when a new rate, 1 dollar=3·32 exch. zlotys, was introduced.
Source: Author's calculations based on data of Central Licence Register in the Centre of Information of Foreign Trade.

shown above should be seen as an illustration of certain general trends and regularities rather than the adequate indication of the absolute level of the phenomenon that is being analysed.

**2. Volume and rate of growth of exports**

The history of Polish licensing exports started in 1958 when the first licence, worth $61,000 was sold to India. Starting from 1963, when three other contracts were concluded (with purchasers in the Netherlands, Norway, and India), it became 'stable', if this description can be applied to a phenomenon occurring every year, but consisting of individual, often scattered transactions, not integrated in a carefully planned whole.

From this one might judge that until 1970, and to a lesser extent during the seventies, Polish exports of licences have had a somewhat fortuitous character. It would also be difficult to find any trace of an explicit export policy containing clearly defined objectives as well as statements of the methods for their implementation.

During the whole period 1945–1980 licence sales nonetheless showed a substantial growth. It resulted mainly from the fact that the starting level of exports was literally



TABLE 2. Exports of Licences in Poland and Czechoslovakia in 1963–1973

| *Years* | *Number* | | *Value* (million dollars) | |
|---|---|---|---|---|
| | *Poland* | *Czechoslovakia* | *Poland* | *Czechoslovakia* |
| 1963 | 3 | 21 | 0.05 | – |
| 1964 | 9 | 26 | 0.8 | – |
| 1965 | 2 | 24 | 0.04 | – |
| 1966 | 1 | 33 | 0.03 | 0.8 |
| 1967 | 6 | 44 | 0.24 | 1.0 |
| 1968 | 10 | 45 | 0.5 | 4.5 |
| 1969 | 4 | 38 | 3.8 | 14.7 |
| 1970 | 4 | 59 | 0.22 | 9.2 |
| 1971 | 9 | 44 | 0.7 | 13.8 |
| 1972 | 9 | 32 | 0.4 | 8.0 |
| 1973 | 10 | 44 | 1.6 | 12.1 |
| 1963–1973 | 67 | 410 | 8.4 | 64.1[a] |

[a]only 1966–1973.
Source: As in Table 1 and *Licensing and Leasing*, Economic Commission for Europe, Committee on the Development of Trade, Geneva, 1976, table 3, p. 16.

minimal. Besides, while trying to evaluate and interpret this tendency it is necessary to take account of its heterogeneous character — it was composed of short-term fluctuations with great amplitude, very irregular and taking their course in different directions (Table 1).

The data contained in the table reveal that only the second half of the last decade (1975–1980), when a considerable increase in value of licence sales took place, differs significantly from the prevailing tendency of the postwar period as a whole. Taking into account, however, that this increase was not accompanied by a parallel growth in number of licences sold, it is hard to say whether the period in question marks the beginning of a new stable trend or is simply the continuation of the previous pattern on a higher level.

The volume of Poland's licence exports is far from being satisfactory, especially in relation to the country's economic, scientific and technological potential as well as in comparison with the licence exports of other countries with a similar level of development. Even among the socialist countries Poland is amongst the smallest exporters of licences, and is very far behind the leading sellers in COMECON, i.e. Hungary and Czechoslovkia (Table 2). The fact that in only 4 years (1970–1973) Czechoslovakia sold abroad more licences (179, worth 43.1 million dollars) than Poland in the whole postwar period (respectively: 138, worth 29.8 million dollars) needs no comment. As a further illustration it is worth mentioning that in 1976 the value of Hungary's licensing exports amounted to 16.2 million dollars; in 1977 Czechoslovakia exported 114 licences worth 16.1 million dollars.[3]

The share of licence sales in the total exports of goods was very low in Poland, not

[3]Licensing statistics of both countries.

exceeding 0.2% (0.07% in 1971 and 0.16% in 1977), i.e. some 7 times lower than is average in market economy advanced countries at the beginning of the seventies.

The rate of growth of licence exports was higher in Poland than that of total exports but lower than that of sales of technological documentation and technical services. As a result, its share in exports of disembodied technology (covering licences and documentation) decreased from 29.1% in 1975 to 11.7% in 1977. Simultaneously, its share in technology sales taken together with technical services and so called other services (predominantly construction) also diminished from 0.8% in 1975 to 0.3% in 1974.[4]

Polish exports of licences were also very modest if considered in relation to Poland's existing scientific and technological infrastructure. For instance, the number employed in R and D in Hungary and Czechoslovakia, the leading exporters of licences in COMECON, was in 1975 much lower than in Poland (the respective figures were in thousands: 49.8, 103.2 and 182.0). The number of scientific personnel was also smaller in Great Britain and similar in the GFR.[5]

As a result, Poland's share in world's licensing exports was merely symbolic, amounting in 1976 to 0.06%. At the same time the country's share in merchandise exports amounted to 1.1% and in world manufacturing output to 2.3%.[6]

While assessing the licensing exports one should bear in mind that the number of licences sold is normally bigger than that of the technical solutions or inventions which are the subjects of licensing agreements. In Poland, for instance, this gap reached nearly 1/3: 115 licences exported before 1978 were based on 83 technical solutions. Among them was the method of forging crankshafts (so called TR method), which was sold to nine countries under 15 separate licences. This should be considered as the biggest 'export success'. Some other solutions, sold several times abroad, were the following: 'Metalock' method (repair of cracked pulleys and casings of machines and equipment) — six times; 'Syncor' technology — three times; method of aluminium oxide production — three times.

### 3. Geographical and Branch Structure of Licence Exports

The biggest buyers of Polish licences were in the West where 86 out of the total number of 138 licences have been sold since the war (62.3%). Forty-four licences have been exported to socialist countries (including Yugoslavia — i.e. 31.9% of the total) and only 8 (5.8%) to less developed countries (Table 3). The proportions change if we take the value of exports: the share of socialist countries increases to 41.3%; that of market-economy countries diminishes to 34.4% and that of five Third World countries (Iraq, Libya, India, Thailand and Turkey) increases to 24.1%.

The biggest individual importers of Polish licences were (in quantitative terms): GFR, GDR, USA, Czechoslovakia, Japan, France, Great Britain and Hungary, whereas in terms of total contract value the leading importers were: Iraq, GDR, Czechoslovakia, Yugoslavia, GFR and Canada.

The data on geographical structure permit several conclusions. These cannot be absolutely certain, in view of the limited statistical sample, but even so they are highly suggestive.

Firstly, it should be stressed that there is a considerable dispersion in the geographic directions of Polish licensing exports. This may well testify to the occasional character

[4]Author's calculations based on Central Statistical Office data.

[5]*Rocznik Statystyczny 1978*, Warsaw, 1978, p. 527.

[6]*Rocznik Statystyczny GUS*, Warsaw, 1980 and author's calculations.



TABLE 3. Geographic Structure of Poland's Licensing Exports in 1945–1980

| *Country* | *1945–1970* | | *1971–1975* | | *1976–1980* | | *1945–1980* | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| GFR | 5 | 205.0 | 10 | 213.9 | 6 | 2006.8 | 21 | 2425.7 |
| GDR | – | – | 6 | 3855.8 | 6 | 208.9 | 12 | 4064.7 |
| Czechoslovakia | 2 | 101.6 | 1 | 5.4 | 8 | 3490.8 | 11 | 3597.8 |
| USA | 5 | 529.0 | 2 | 96.6 | 3 | 254.5 | 10 | 880.1 |
| Great Britain | 5 | 580.9 | 2 | 69.0 | 2 | 706.0 | 9 | 1355.9 |
| Japan | – | – | 5 | 641.7 | 4 | 788.9 | 9 | 1430.6 |
| France | 6 | 202.9 | 2 | 148.7 | 1 | 2.6 | 9 | 354.2 |
| Hungary | 1 | 7.1 | 5 | 340.6 | 1 | 8.0 | 7 | 355.7 |
| Yugoslavia | 3 | 185.5 | 1 | 8.5 | 1 | 2440.0 | 5 | 2634.0 |
| Italy | – | – | 3 | 424.1 | 2 | 61.7 | 5 | 485.8 |
| Canada | – | – | – | – | 4 | 2491.8 | 4 | 2491.8 |
| Romania | 1 | 32.3 | 2 | 896.6 | 1 | 535.5 | 4 | 1464.4 |
| Bulgaria | 1 | 7.1 | – | – | 3 | 606.1 | 4 | 613.2 |
| Spain | 2 | 100.1 | 1 | 84.3 | 1 | 154.4 | 4 | 338.8 |
| India | 3 | 102.2 | – | – | 1 | 120.0 | 4 | 222.2 |
| Denmark | 2 | 156.5 | 1 | 18.1 | – | – | 3 | 174.6 |
| Norway | 1 | 7.2 | – | – | 2 | 175.0 | 3 | 182.2 |
| Austria | – | – | – | – | 2 | 29.5 | 2 | 29.5 |
| Netherlands | 1 | 4.3 | 1 | 15.1 | – | – | 2 | 19.4 |
| Iraq | 1 | 3500.0 | – | – | – | – | 1 | 3500.0 |
| Turkey | – | – | – | – | 1 | 1801.2 | 1 | 1801.2 |
| Libya | – | – | – | – | 1 | 1189.8 | 1 | 1189.8 |
| Sweden | – | – | – | – | 1 | 36.8 | 1 | 36.8 |
| Finland | – | – | – | – | 1 | 33.0 | 1 | 33.0 |
| Lichtenstein | – | – | – | – | 1 | 24.6 | 1 | 24.6 |
| Switzerland | 1 | 18.3 | – | – | – | – | 1 | 18.3 |
| Belgium | – | – | – | – | 1 | 20.0 | 1 | 20.0 |
| Thailand | – | – | – | – | 1 | 9.0 | 1 | 9.0 |
| Cuba | – | – | 1 | 2.2 | – | – | 1 | 2.2 |
| Market economy advanced countries | 28 | 1804.2 | 27 | 1711.5 | 31 | 6785.6 | 86 | 10301.3 |
| Socialist countries | 8 | 333.6 | 16 | 5109.1 | 20 | 7289.3 | 44 | 12732.0 |
| LDCs | 4 | 3602.2 | – | – | 4 | 3120.0 | 8 | 6722.2 |
| TOTAL | 40 | 5740.0 | 43 | 6820.6 | 55 | 17194.9 | 138 | 29755.5 |

1. Number of licences.
2. Value in US $'000.
Source: Author's calculations based on Central Licence Register data.

of individual transactions. Added to the fact that (in the light of a number of studies on Polish economic co-operation with foreign partners) the correlation between exports of licences and other forms of external economic ties (especially merchandise exports, industrial co-operation, etc.) is rather insignificant, it provides further evidence of the inconsistency of Poland's licensing policy which, in theory, should be derived from and integrated with the scientific, technological and economic policy of the country.

Secondly, it is worth stressing the disproportion in the share of the respective groups of countries in the number of and value of licences bought. It means that the unit value

of a licence exported to market economy countries was much lower than in the case of the other two groups.

Generally speaking, the structure of Polish licensing sales seems to be inadequate to the country's level of development and existing scientific and technological infrastructure. The predominance of advanced capitalist countries as receivers of disembodied technology and the marginal share of less developed countries in Poland's exports is also to some extent incompatible with overall trends prevailing in the international licensing market. There is a strong tendency for world licensing turnover to be concentrated on technical solutions of the 'penultimate generation'. By the same token, technology which is not an absolute novelty on a world scale may constitute a relative novelty which is attractive for countries with lower level of development. It is logical, therefore, that the flow of technology tends to be unidirectional: the advanced countries are almost the exclusive exporters of licences to medium-developed (like the majority of COMECON countries) and less developed countries.[7] The former, while importing licences from economically and technologically advanced countries, undertake their exports of technology (either locally produced or constituting improvements of previously imported solutions) to the Third World countries where the 'intermediate' technology from medium-developed economies may still be attractive, especially in some branches and for specific projects. Of course, there are instances of the reverse flow of technology: medium-developed and even some of the less developed countries are able to export their innovations to the advanced economies, but this flow constitutes only a small portion of the overall transfer of technology. Looking at the problem from this angle the peculiarity of the structure of Poland's licensing exports lies not on the fact that it sells its licences at all to the West but that it does not sell a sufficient number of licences (from the point of view of the country's potential) to the less developed countries.[8]

At the same time, the major part of international licensing trade is based on solutions already tested in the production, whereas the share of so-called 'green innovations', i.e. inventions, concepts and ideas which are still in the stage of laboratory testing, prototype or semi-technical scale, is relatively insignificant.

It seems probable that the peculiarity of the geographical structure of Poland's licensing exports can be explained through their composition: as we shall see, the major part of licences has been granted for technical solutions which had not been previously fully tested and implemented in the production process. In many cases they are absolute novelties on a world scale: self-advertising, in a sense, and self-promoting with respect to sales abroad. Solutions of this kind can be very attractive for the most advanced countries. Firms in these countries may decide to take a certain risk connected with the import of an unfinished innovation and to complete the whole R & D cycle on

[7]We exclude all the horizontal flows of licences taking into consideration only the vertical transfer of technology. Of course, the *horizontal* trade in licences, i.e. predominantly between the advanced countries, and to a much lesser degree between socialist countries and which is almost nonexistent among LDCs, constitutes the major part of world's licensing turnover. (According to author's estimations, in 1976 the intra-industrialized economies exchange of licences amounted to 72.5% of the total; see R. Rapacki, Miedzynarodowy transfer wiedzy technicznej, *Sprawy Miedzynarodowe*, 1981, no. 6.) However, we have considered here the two smaller segments of the world market, not weighted by their share in international transfer of technology.

[8]One possible explanation of this fact may be the role of multinational corporations in stimulating licensing trade. According to some estimates 2/3 to 3/4 of licensing imports of the LDCs can be attributed to the affiliates of the multinationals in those countries. Poland, as a country with no direct investment abroad, has no such source of licence-promoting effects.



their own. As a result Poland is exporting to the advanced market economies predominantly so called 'pure' licences covering smaller improvements to more complex production processes. As less-than-fully developed innovations which have not been tested in production, they are not accompanied by complementary technical services, training of personnel, know-how, supplies of raw-materials, parts and components, machinery and equipment necessary to put in service the licensing production.

The same considerations may explain the difficulties in promoting licence sales to the LDCs. Since economic underdevelopment is positively correlated with a low capacity to produce autonomously, adapt efficiently, absorb and diffuse technology, the less developed countries prefer imports of technical knowledge in the most complex ('package') form. This is why it is difficult to sell in the LDCs only the patent licence without a parallel flow of technical assistance, capital goods etc. — they are simply not in a position to develop and/or implant an invention or an idea which is available from Poland's export offer.

Data on objects of licences exported support the above assertions. The major part of licences exported in 1945–1978 (approximately 70%) has been granted for designs (59 out of 83 solutions exported); nearly 20% (16) were process technologies and only 7 licences were associated with the transmission of know-how, being an outcome of previously accumulated productive experience. Since both granting licence for know-how and — in great measure — for process technology must have their roots in production which is not the rule in the case of design technology (prototypes, semi-technical scale, information sample etc.), the low share of the former in total exports may testify to the dominant role of less-than-fully developed innovations in Polish exports of licences.

The data on institutional sources of technical solutions sold under licences throw additional light on the subject. The R & D sphere was the direct supplier of the majority of licences. Research institutes (of which only some were directly associated with industry), entities subordinated to the Ministry of Science, Higher Education and Technology and the Polish Academy of Sciences provided altogether 62% (86 out of 138) of all the licences during the period 1945–1980. The remaining 38% (52 licences) may be attributed to the production sphere. It does not necessarily mean that all of those solutions have been implemented and tested in production, because a number of them (the existing statistics do not reveal how many) could well be created in industry, in the R & D departments or design offices of the enterprises or their associations, without leaving the development, laboratory testing or similar stages.

The branch composition of Polish licensing exports is another aspect of the problem that provides a basis for a number of interesting conclusions.[9] The biggest licensors, in quantitative terms, were the engineering industry and metallurgy which have exported 31 and 29 licences respectively. Chemical industry (21 licences), mining (9), 'science'[10] (13) and construction (7) were ranked among the medium-scale suppliers of licences for exports. The remaining, small part of licences (21) has been sold by five other branches, the Polish Academy of Sciences and the co-operative sector. Seven licences covered small inventions created by individual inventors.

In terms of value, in turn, chemical (10.0 million dollars, 33.5% of the total) and engineering industries (5.4 million, 18%), construction (3.6 million, 12%) and the food

[9]The data obtained from the Central Licence Register give only the 'departmental' (i.e. by existing entities of state administration) breakdown of licensing sales which can only roughly be identified with branch composition.

[10]i.e. establishments of higher education, and other organizations subordinated to the Ministry of Science, Higher Education and Technology.

TABLE 4. Balance of Licensing Trade in Poland in 1945–1978 (millions of dollars)

| Years | Exports | | Imports | | Balance | Exports/Imports Ratio |
|---|---|---|---|---|---|---|
| | Number (1) | Value (2) | Number (3) | Value (4) | (2)–(4) | (2):(4) |
| 1945–1965 | 15 | 0.9 | 71 | 27.3 | –26.4 | 1:30 |
| 1966–1970 | 25 | 4.8 | 121 | 67.4 | –62.6 | 1:14 |
| 1971 | 9 | 0.7 | 42 | 60.2 | –59.5 | 1:87 |
| 1972 | 9 | 0.4 | 57 | 52.6 | –52.4 | 1:145 |
| 1973 | 10 | 1.6 | 83 | 58.4 | –56.8 | 1:36 |
| 1974 | 9 | 0.25 | 67 | 120.5 | –120.2 | 1:500 |
| 1975 | 6 | 3.9 | 67 | 147.9 | –144.0 | 1:38 |
| 1971–1975 | 43 | 6.9 | 316 | 439.6 | –432.7 | 1:64 |
| 1976 | 8 | 4.4 | 55 | 160.5 | –156.1 | 1:36 |
| 1977 | 14 | 4.5 | 28 | 17.3 | –12.8 | 1:4 |
| 1978 | 10 | 3.1 | 30 | 30.3 | –27.2 | 1:10 |
| 1976–1978 | 32 | 12.0 | 113 | 208.1 | –196.1 | 1:17 |
| 1945–1978 | 115 | 24.7 | 621 | 742.4 | –717.7 | 1:30 |

Source: Author's calculations based on Central Licence Register data.

industry (3.1 million, 10.4%)[11] have contributed in the greatest degree to the overall revenues from the sales of licences by Poland in 1945–1980.

The above figures indicate a relatively weak correlation between the shares of individual branches in exports and in imports of licences. The most striking example is the case of engineering industry. Its share in the total value of licences imported to Poland during the period 1945–1978 was 44% (in 1971–1975 this ratio was even higher — 54%[12]) while its contribution to the total licence exports in the same period did not exceed 23% (in terms of number) and 18% (in terms of value). This divergence constitutes the indirect evidence (apart from other manifestations of limited innovative propensity) supporting the claim that the advantages resulting from the remarkably increased inflow (especially in the first half of the seventies) of modern technology of foreign origin remained partly potential. It would not be far from the truth to say that the imports of technology into the engineering industry (and presumably in other branches) rarely stimulated the recipients to undertake local research and development work aimed at improving the object of licence and/or at elaborating their own original version of the imported innovation which, in consequence, could become an attractive item in Polish exports of technology.

The branch composition of Poland's licence exports confirms the widespread opinion that, as a derivative of past investment priorities and the current production profile, there is a definite type of specialization in Poland as well as in other socialist countries in the field of applied research, development and elements of know-how. This type of specialization leads to achieving relative advantage over other countries in certain branches of heavy industry characterized by high input of raw-materials, labour-intensity, relatively simple technologies etc. The weight of such branches as metallurgy, mining, construction and some segments of engineering industry (building machinery for example) in the total licensing sales seems to support this opinion.

[11]Author's calculations based on Central Licence Register data.

[12]Calculated on the basis of Central Statistical Office statistics.



TABLE 5. Balance of Licensing Trade in Czechoslovakia and Hungary in 1966–1977 (millions of dollars)

| Years | Czechoslovakia | | | Hungary | | |
|---|---|---|---|---|---|---|
| | Revenues 1 | Expenditures 2 | Ratio 1:2 | Revenues 1 | Expenditures 2 | Ratio 1:2 |
| 1966 | 0.8 | 3.9 | 1:5 | – | – | – |
| 1967 | 1.0 | 4.7 | 1:5 | – | – | – |
| 1968 | 4.5 | 28.7 | 1:6 | 0.17 | 0.94 | 1:6 |
| 1969 | 14.7 | 47.4 | 1:3 | 0.29 | 0.54 | 1:2 |
| 1970 | 9.2 | 46.7 | 1:5 | 0.44 | 1.49 | 1:3 |
| 1971 | 13.8 | 40.6 | 1:3 | 0.73 | 6.72 | 1:9 |
| 1972 | 8.0 | 53.1 | 1:7 | 0.94 | 5.25 | 1:6 |
| 1973 | 12.1 | 47.8 | 1:4 | 2.99 | 3.61 | 1:1.2 |
| 1976 | – | – | – | 16.2 | 47.6 | 1:3 |
| 1977 | 16.1 | 63.5 | 1:4 | – | – | – |

Source: *Licensing and Leasing*, table 3, p. 16; J. Maciejewicz, *Obrot licencjami miedzy RWPG a Zachodem*, Rynki Zagraniczne, 1980, no. 138.

## 4. Exports of licences — an evaluation

Comparing the level of Poland's licensing sales with her stage of development, her R & D potential, the volume of licensing imports and with the relevant export indicators in other socialist countries, one can easily come to the conclusion that the exports of licences has a symbolic character in Poland.

This is clearly seen if one compares the number and value of licences exported and imported, making the so-called 'licensing balance of payments' (Table 4).

According to the figures in the table the balance of trade in licences was in Poland very unfavourable, as is also the case if compared with the situation of other socialist countries, especially Czechoslovakia and Hungary (Table 5).

During the whole post-war period the revenues from licensing sales have been 30 times smaller than the outlays on imports of licences in Poland, the exports/imports ratio varying in different years (periods) from 1:4 to 1:500. In Czechoslovakia the same ratio amounted to 1:4 on average in 1966–1977, which is similar to that of Hungary in 1968–1976. In order to have a rough idea of to what extent the situation in Poland was typical (or not) and compatible with overall trends prevailing in the international market of licences, it is imperative to underline that only three countries in the world have had a positive balance of licensing turnover (USA, Switzerland and Great Britain) during the last two decades. All the rest of the industrialized countries 'suffered' a deficit in licence trade. In 1976, for instance, the exports/imports ratio amounted in the Netherlands to 1:1.5 (i.e. exports earnings covered 58.9% of imports), in Belgium-Luxembourg — 1:2 (53.8%), in Sweden — 1:2.5 (42.3%), in GFR — 1:2.5 (38.0%), in France — 1:3 (33.1%). Japan, Italy and Spain recorded the highest relative deficit in licensing trade, the ratio being respectively 1:4.5 (22.0%), 1:4 (23.2%), and 1:3.5 (29.2%).[13]

It should be stressed that in 1976–1978 the exports/imports ratio has increased substantially in Poland, especially if compared to the 1971–1975 period (respectively: 5.9%

[13]Author's calculations based, amongst others, on data given in the *Economist*, 26 July–1 August 1980, p. 75.

and 1.9%). Nonetheless, it is still hard to be optimistic. Firstly, this figure of nearly 6%, translated into absolute figures, gives a deficit in the trade licences in 1976–1978 of approximately $196 mn, i.e. over one-fourth of the total deficit in the post-war period.

Secondly, the relative narrowing of the gap between exports and imports of licences did not result mainly from export expansion and the emergence of new qualitative features indicative of greater dynamism. It was the direct outcome of administrative cuts in imports in view of the worsening general economic situation.

There is one more observation that is suggested by figures from table 4. The divergence between the number of licences sold and bought (1:4) was much smaller than the analogous gap in value terms (1:30). This points to the fact that the unit value of one imported licence has been on average 7.5 times higher than the exported one. Indirectly, it may support the assertion that Poland has predominantly been selling abroad smaller inventions — improvements of the production process — while importing major advances — fully developed innovations covering more complex processes.

On the basis of the above remarks doubts arise as to whether in the case of a medium-developed country, like Poland, the export of less-than-fully developed innovations, not implanted in production, is justified. One might of course say that it is better to export anything than not to export at all, but this sort of approach would avoid the essence of the problem. The point is that, analysing the issue in a longer-term perspective, it is advisable to take into account not only current, short-run direct advantages (exports earning, owner's of the invention revenues etc.) but also potential losses that will appear in other fields indirectly connected with licensing policy. Apart from the fact that exports of disembodied technology may mean a loss of potential revenues resulting from hypothetical exports of productive inputs accompanying the sale of a licence, a special emphasis should be put on the impact of this kind of licence export on the competitive position of a country in foreign markets as well as on the eventuality of creating additional pressure on the balance of payments.

Conscious (or not wholly conscious) eschewing of potential advantages resulting from productive utilization of an invention which is an absolute novelty on a world scale, and its export without previous exploitation leads to the transfer of a substantial part of these advantages to the importer. As a result, the exporter of the invention may face in the future the necessity of importing goods produced by the licensee. Expenses on these imports may considerably exceed the original revenues for exporting the licence. In the light of the above remarks one conclusion may be drawn. Every decision concerning sales of licences should be based on a macroeconomic, complex calculus, a sort of cost-benefit analysis. The answer to the above question may be sometimes positive, i.e. there are cases when it is really more advisable to refrain from exporting (particularly not fully tested innovations) than to undertake it at a cost several times exceeding the gains from it.

To sum up, without entering into detailed analysis, it is worth pointing out the main reasons for the unsatisfactory state of licensing exports in Poland. The fundamental determinant conditioning to a great extent all the other factors is the limited innovative capacity of the Polish economy or — to put it another way — the lack of mechanisms enabling the transformation of inventions into innovations in the production sphere. The other, derived reasons are the following:

— the deformations in the structure of investment and production;
— the deficiencies of the export strategy;
— the limited stock of knowledge, experience and contacts related to skills indispensable for promoting technology exports;
— weak correlation between patenting Polish inventions abroad and their subsequent exports;
— inefficient transmission of international markets' signals on current trends in world demand for inventions and innovations into practical responses of the productive sphere;[14]
— the excessively small motivating power of stimuli pushing foreign trade enterprises and economic organizations to export licences.



(*Manuscript received September 1981*)

[14]For example, the most recent trends in world demand are related to technical solutions and inventions in the field of solar energy exploitation and environmental protection (Paris, April 1979). In Poland, instead, these research directions (regardless of their practical utilization) are at the margin of the mainstream of innovative activities.