A fair exchange?

Philip Hanson assesses the balance in the East–West transfer of technology

THE technological relations between the West and the Soviet bloc are curious. The United States and the Soviet Union spend huge sums on military R&D, primarily to maintain their abilities to blow one another to pieces. Yet at the same time Western businessmen are eagerly selling know-how and high-technology products to the USSR and Eastern Europe; and there is also a certain commercial flow of technology—of more modest dimensions—from East to West.

These transactions, of course, are in principle restricted by strategic embargoes to non-military purposes; yet the technologies transferred quite often originate from military R&D. In any case the civilian–military distinction is somewhat artificial: in the long run any new technology that makes the civilian economy more productive makes it easier to enlarge the resources allocated to the military. And even if there were no military considerations, economic competition between communist and capitalist countries is part of their general competition for power and influence, and so much technical assistance among competitors—even at a price—is at first sight rather odd. Altogether it is not surprising that East–West technology transfer is politically controversial.

The recent growth of Soviet–US trade, in particular, has prompted economists to look more closely than before at East–West technological relations. They have focused, naturally enough on commercial transactions. Obviously there are many ways in which knowledge about new products and processes travels from West to East without any commercial exchange, but these are not discussed much because most of them are not amenable to control by governments. The screening of Western technical literature by Soviet specialists, for example, and the gleaning of information from visits and conferences are beyond the influence of all but the most provocative action by governments.

East–West trade, however, provides a number of channels of technology transfer: notably, the sale of products embodying new technology; turnkey projects; licencing; know-how sales; and technical assistance and training. Some of these transactions simply provide cost-saving machinery and other products (for example wide-diameter pipe for gas pipelines) with-

out transmitting the know-how to make the product in question. Other transactions, however, such as licence deals with technical assistance, or joint design work, may transfer such capabilities.

An interesting example is the Pullman-Swindell contribution to the huge foundry complex at the Soviet Kama River lorry works. Over a period of three years a total of more than 150 Soviet engineers worked with Pullman-Swindell on the detailed design and equipment ordering. The knowledge they acquired must have been considerable. How far it would enable the Russians to repeat the exercise for themselves probably depends on the extent to which these particular engineers can be kept together as a design team.

Most Western governments subsidise export credit as they compete against one another to promote exports and they thus ease the terms on which technology is transferred. Is this really in the interests of the West as a whole? Would it be wiser not to encourage such transfers, or even to restrict them? What is or is not wise in this context is largely a matter of political judgment: in other words, nobody really knows. The economics of East–West technology transfer, however, are more susceptible to measurement, and a good deal of measurement has accordingly been going on. The aim is to quantify the economic costs and benefits to Western and Soviet-bloc countries of transactions by which technology is transferred.

The starting point is the well established fact that in most fields Soviet and East European civilian production lags technically well behind that of the West even though these countries maintain large R&D establishments and are strong in many areas of basic research. Heavy military priorities, semi-isolation from Western technology and the lack of competitive pressures and incentives, however, have resulted in a generally poor performance in the creation and diffusion of new technologies. They therefore stand to gain a good deal from the acquisition of Western know-how.

Clearly Western firms also gain from selling this know-how. A recent survey of 168 US firms selling to the USSR found—in contrast to what some economists had predicted—that about three-quarters of them considered their activities to be profitable. The position

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of West European firms, who have had more experience of dealing with the Russians, is probably more favourable.

The transfer that is going on, whether by means of product or of know-how sales, is predominantly of proven technology. In electronics, for example, Western firms quite often sell their latest products or the know-how to manufacture their less advanced products, but they seldom transfer the know-how to manufacture their latest products—let alone those currently under development. There is also, in the case of the Soviet Union, evidence that absorption and utilisation of imported technology is slow by Western standards. As a result, there is so far no very obvious narrowing of East–West technology gaps as a result of transfer.

Western firms, in other words, have not gone into Eastern markets in order to establish Eastern competitors for themselves. It is rather odd that anyone should ever have expected them to. Since they could not set up wholly- or majority-owned subsidiaries in any Comecon country, they have mostly been careful to hand over technology in measured doses: in products, in licence deals subject to market restrictions, and so on. More than a hundred companies, mostly big multinationals, have signed technological cooperation agreements with the Soviet State Committee for Science and Technology, but exchanges of information under many of these agreements have been minimal.

Production benefit

There is a good deal more, however, to the economics of East–West technology transfer than the question of its commercial profitability. Much of the debate in the West concerns the im-

fact of imported Western technology on Soviet production, and this raises some quite different questions. To begin with, there is the question whether imports of Western technology are really of more than marginal importance to the Soviet economy. The USSR has traditionally been highly self-sufficient. Only a very small percentage of its consumption and investment needs are met by imports. Less than half of these imports, moreover, have been from the West, and of this, capital goods—the main vehicle of international technology transfer—have generally comprised about a third. This means that in 1976, for example, imported Western machinery was almost certainly not more than 6% by value of total machinery installed. (The large differences between Soviet domestic prices and the prices of imports make precise comparison impossible.)

At first sight, this suggests that imported Western technology cannot have more than a very minor effect on Soviet output. If the growth of production depends on the growth of the labour force, the growth of the capital stock and technical change, then the technical change embodied in a very tiny part of the increment in the capital stock must surely make only a tiny contribution to that growth.

This need not follow, however, if the technology embodied in the imported machinery has significant indirect, as well as direct, effects. The direct effect of the imported technology is the extra output attributable to it, over and above what would have been produced with the same resources of capital and labour with the technologies already in use inside the country. But this same technology will also have in-

direct effects insofar as it is successfully diffused (for example by building Soviet machinery to the same design) and insofar as it enables improved producer goods (such as compound fertilisers) to be made which themselves raise productivity in other lines of production.

Soviet machinery and know-how imports have been strongly concentrated in certain fields: the main recipients have been the chemical industry, the motor industry, computerisation, shipping, and oil and gas pipeline transport. The planners have identified areas where there was a considerable technology lag: in other words, areas where the direct and indirect impact of technology would be considerable. The production of fertilisers and pesticides is an example: the backwardness of both the Soviet chemical industry and Soviet agriculture promised high returns to hard-currency spending on imported technology.

Some recent estimates suggest that the returns have indeed been high. One tentative estimate for the mineral fertiliser industry is that by 1975 the technology embodied in about \$2,000 million worth of installed Western equipment was yielding, directly and indirectly, some \$4,000 million worth of extra agricultural output per annum, over and above what the same resources would have produced in the absence of the imported technology. Part of the gain came from the diffusion of Western phosphoric acid and compound fertiliser technology to Soviet built plants.

A global estimate has been derived from an econometric model of the Soviet economy. The conclusion in this case was that, of an overall increase in Soviet industrial output of 32.1% between 1968 and 1973, 2.5% could be attributed to an acceleration of the import of Western machinery over that period. The acceleration was such that the stock of installed Western machinery was about a fifth higher in 1973 than it would have been if the rate of growth of imports had remained unchanged. Like the estimate for the mineral fertiliser industry, this entails a very high rate of return.

On the other side of the scale, the contribution of East-West technology transfer to Western GNP is very small indeed. The Soviet Union has probably made slightly over 200 licence sales to Western firms in recent years, mostly unaccompanied by machinery, and often requiring development and adaptation in the West. And the employment associated with Western capital-goods sales to the Soviet bloc is probably less than 0.5% of total em-

ployment in most OECD countries.

According to the conventional wisdom, Western governments should not worry unduly about all this because the Soviet economic system is relatively poor at using and diffusing new technology, and this fundamental lack of technological dynamism will keep the level of Soviet civilian technology generally below that of the West, even if the import of Western technology and know-how continues to grow strongly.

One way street

This may well be so. But if the two estimates just described are anywhere near correct they put this conventional wisdom in a somewhat changed perspective. They suggest that, while the Soviet economic system may be slower than Western economies in using and diffusing new technologies, it nonetheless does get a fair mileage out of imported technology. Where there is a particularly large backlog to be exploited, the impact on production can be dramatic.

This means that those who see East-West technology transfer as a 'one-way street', in which the benefits go mainly from West to East, have a serious case. It may be true that imported Western technology is not enabling the USSR to catch up and overtake the West in areas of advanced technology, but it is probably making a significant contribution to Soviet productivity levels, and thus reducing the pressure on Soviet policymakers to divert resources from military to civilian purposes.

Similarly, the firms selling the technology are no doubt doing so on commercially acceptable terms. On the other hand they are generally competing with one another to extract extra revenue from products and processes whose development costs have already been written off; they are therefore unlikely to charge prices that would come close to reflecting either the cost to the Soviet-bloc purchaser of replicating the development work for himself or his gains in output from using the technology.

The balance of economic advantage, then, in East-West trade in machinery and know-how seems to be strongly in the Soviet bloc's favour. From a conventional Western point of view this is not a welcome conclusion. Further evidence might possibly alter it, or it might be made more palatable by clear indications that the growth of East-West trade was linked with political advantage for the West. If not, a rather awkward question arises: is there anything much that Western governments can do about it? □

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