

A Note on Multinational Corporations and Technology Transfer Agreements

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Multinational corporations are responsible for much of the technology transfer that occurs between the developed and developing countries. Consequently, these corporations play an important role in economic development by supplying technical skills, managerial know-how and capital. However, this transfer of technology is not a costless process: these corporations remit money in the form of royalties, technical fees, and profits from the less developed countries. For undivided Pakistan, between 1965-1970 payments for royalties and technical fees averaged \$102 million per year [2, p.126]. If other costs, for example, profit repatriation and over-pricing of intermediate inputs, are included the figure would have been much higher.

Much of the technology that has been transferred to Pakistan has been on a contractual basis through the subsidiaries of multinational corporations or through joint ventures with domestic Pakistani-owned companies in the agricultural and industrial sectors of the economy. In an earlier study by Radhu [3, pp. 361-74] the characteristics of fifty contractual agreements involving technology transfer upto 1969 have been described and analysed. This note examines the contractual agreements from 1970 to 1976. In all, fifty four contracts are examined.¹ These agreements cover the manufacturing sector of the Pakistani economy.

THE ANATOMY OF TECHNOLOGY TRANSFER CONTRACTS

The transfer of technology contract may be divided into three sections. In the first section the nature of the agreement, the amount of royalty and

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technical fees to be paid and the grant of patents and trademarks are dealt with. In the second section the type of technological know-how that is to be transferred is specified and the possibility of either the physical transfer of machinery, or the transfer of a technical process in the manufacture of a particular commodity or the transfer of blueprints for the erection of installation and equipment and the like or a combination of these are dealt with. In other words, the extent of collaboration between the foreign technology supplier and the domestic purchaser of technology is discussed in this section. Also discussed in this section are the possibility of employing foreign staff or the training of local staff abroad. Specified in the third section are the restrictions, if any, in the technology transfer agreement.

The nature of the contractual agreement may be classified into five categories. These are for the provision of either technical collaboration, technical advisory, consultancy, trademark and manufacturing licence, or a combination of these. The majority of the agreements involved technical collaboration and the grant of manufacturing licences from the technology supplying firm to the domestic purchaser. It should be noted that in the contracts examined trademarks are an added-on item. Therefore, the possibility exists that these are not essential for technology transfer but are usually insisted upon by the supplier. However, the provision of technical advisory and consultancy services were relatively unimportant in the contracts examined. Table 1 presents the breakdown of the contracts by the nature of the agreement.

Table 1
*Breakdown by Nature of Agreement**

	Percentage	No. of contracts
Technical collaboration	62.96	34
Technical Advisory	11.11	6
Consultancy	7.4	4
Trademark	14.8	8
Manufacturing Licence	64.8	25

*These categories are not mutually exclusive as a contract can have more than one of these. Therefore, the percentage figures do not add up to 100 and the number of contracts exceeds 54.

Royalty Payments

Royalty payments are a fee for the use of patents, licences and trademarks which the domestic purchaser pays to the foreign supplier of technology. These are calculated as a percentage of either net sales proceeds of the firm, or on gross turnover, or on the f.o.b. value of the product, or on the ex-factory price or on net profit of the firm.² Minimum lumpsum amounts can also be specified in the agreement. An analysis of the contracts showed that royalty payments fall into eight categories each mutually exclusive. Table 2 lists these categories by payments.

²It should be noted that the rate of royalty payments on these categories ranges between 1 percent and 6-2/3 percent, without any pattern to the variation.

Table 2

Category-wise Classification of Royalty Payments

Category	Percentage*	No. of Contracts
Lumpsum amount	19.0	10
Minimum Lumpsum amonut	4.0	2
Net sales proceeds	11.0	6
Ex-factory price	22.0	12
Price of each product sold	15.0	8
Net profit	2.0	1
F.O.B. value	2.0	1
Contracts where no royalty is charged	30.0	14
Total:	100.0	54

*Percentages have been rounded off.

From Table 2 it can be seen that most of the payments fall into four major categories. The first major category is the ex-factory price of the product for which 22 percent of the contracts specified royalty payments. The second major category specified is the payment of lumpsum amounts to the technology supplier which is 19 percent of the sample. In the third category, 15 percent of the cases assessed royalty payments as a percentage of the price of each product sold. In the fourth major category, consisting of 11 percent of the sample, royalties were calculated on the net sales proceeds of the firm. In Radhu's [3, study pp.361-74], the majority of the contracts set royalties as a percentage of total sales. However, it is noted that 4 percent of the sample had fixed minimum rates of royalty to be paid in a lumpsum amount. Interestingly enough, Radhu [3, pp. 361-74] in his sample also reported the same finding for contracts that specified minimum lumpsum amounts. Only one contract specified the calculation of royalty on the net profit rule criterion. It is possible, therefore, that the supplier of technology knows that the project is not profitable.

Technical Service Fees

This fee is charged by the foreign technology supplier from the domestic purchaser of the technology for the sale of technical know-how. The fee is usually paid in lumpsum amounts although it could be assessed as a percentage of gross turnover, or ex-factory price or price of each product sold, less taxes. The rates vary between 1 and 5 percent. Table 3 gives the distribution of the technical service fee by their different categories; each category being mutually exclusive. Almost 52 percent of the contracts did not specify a technical service fee.

Table 3

Category-wise Distribution of Technical Service Fees

Category	Percentage*	No. of Contracts
Lumpsum amounts	30.0	16
Gross Turnover	4.0	2
Ex-factory price	9.0	5
Price of each product sold	5.0	3
Contracts for which no technical fee charged	52.0	28
Total:	100	54

*Percentage figures have been rounded off.

However, it should be noted that contracts for which no technical fees are charged usually have some stipulation regarding the payment of a royalty. Similarly, contracts for which no royalty is charged usually have some provision for technical fee payments. The two categories, *i.e.*, the payment of royalty and the technical service fee cannot be said to be mutually exclusive.

To conclude the discussion on royalties and technical service fees, a brief comparison with Radhu's [3, pp.361-74] results shows that in his study, the rate of royalty payments varied between one and five percent with the majority of the contracts having royalties set between 2 and 4 percent. In the present study, the rates vary between 1 and 6-2/3 percent with the majority of the agreements having royalties set between 2 and 5 percent. This marginal increase in royalty fees in the period 1970-1976 may be due to a rise in the rate of inflation or the dissemination of newer technology or both.

Table 4 below presents the combined payments for royalties and technical and managerial fees for the years 1971-1976.

Table 4

Royalty and Technical Fee Payments 1971-1976

Years	Amount
1971 - 1972*	\$ 30 million
1972 - 1973	Rs. 117 million
1973 - 1974	Rs. 333 million
1974 - 1975	Rs. 549 million
1975 - 1976	Rs. 443 million

Source: State Bank of Pakistan.

*Because of complications arising from devaluation in May 1972 payments for 1971-1972 are given in dollars.

The second section of the transfer of technology agreement describes the degree of collaboration between the technology supplier and the purchaser. This collaboration can take various forms. The supplier can provide blueprints dealing with plant layout and installations, secret information regarding technical processes, specification of raw materials, management expertise etc. However, it should be noted that these categories are not mutually exclusive, a contract can have more than one of these features regarding collaboration with a foreign supplier. The most common form of collaboration involved the manufacturing process, followed by layout and design and the like, (Table 5). The thirteenth item relates to any new development in technology that has resulted from the research and development by the multinational corporations. In 54 percent of the contracts, the results of this research and development are automatically transferred to the domestic purchaser of the technology.

Table 5

Special Features Regarding Collaboration

Type of Feature	Percentage*	No. of Contracts
(i) Manufacturing process	89.0	48
(ii) Layout and design	61.0	33
(iii) Erection/Installation	28.0	15
(iv) Source of supply of plant machinery	24.0	13
(v) Specification of building	9.0	5
(vi) Specification of raw materials	35.0	19
(vii) Material handling	6.0	3
(viii) Flow and storage of components	9.0	5
(ix) Sales and distribution	19.0	10
(x) Selection of personnel	6.0	3
(xi) Factory administration	11.0	6
(xii) Packaging and advertisement	20.0	11
(xiii) Any development of new research	54.0	29

*Percentage figures have been rounded off.

Foreign Training

Much of the technology that is transferred is complex and requires the services of skilled technicians to train the domestic workforce in its handling. A majority of the agreements (32 contracts or 59 percent of the total number of

agreements examined) had provisions for training local staff within the country or abroad, Table 6(a). This finding conforms with the results obtained in Radhu's study [3, pp. 361-74]. However, the total cost of this training is usually borne by the domestic purchaser of the technology, *i.e.*, the licensee. Consequently, out of the 32 agreements that had provisions for foreign training, 19 agreements specified that the cost of such training be met by the purchaser of the technology. In 22 agreements (41 percent of the sample) no provisions were included for the foreign training of local staff, Table 6(a).

In 40 agreements, (74 percent of the contracts) foreign staff were employed, Table 6(b). Again in the large majority of the cases the cost of employing this staff was met by the licensee. In only 14 contracts (26 percent of the cases) no provisions existed for the employment of foreign staff, Table 6(b).

Table 6 (a)

Provisions for Foreign Training of Local Staff

	Percentage	No. of Contracts
(a) Yes	59.0	32
(b) No foreign training, did not specify any form of training	41.0	22
Total:	100	54

Table 6(b)

Provisions for Employment of Foreign Staff

(a) Yes	74.0	40
(b) No provisions for foreign staff	26.0	14
Total:	100	54

The third section of the technology transfer agreement deals with the restrictive clauses in the contract. There are five major types of restrictions namely, restrictions on the territorial movement of goods, for example: exports; restrictions on spare parts; and intermediate products; restrictions on the pattern of production; limitations effecting the economy and restrictions that affect the validity of patents etc. Table 7 presents in summary form the restrictions in the contracts.

These restrictions are meant to protect the parent company from competition from their subsidiaries, and also to keep the latter dependent on the former through clauses restricting the supply of raw materials, spare parts, overpricing of intermediate products and preventing the subsidiaries from purchasing competing technologies which may be cheaper from other sources. Other restrictions can also effect the economy of the country, for example, the prohibition of exports or only permitting them to certain countries. In Radhu's [3, pp.361- 74] sample 32 percent of the contracts had export prohibitive clauses.

However, in this study, only 6 percent of the contracts had such clauses (Table 7). Also 31 percent of the contracts in the present study had a clause requiring the prior approval of the licensor for the export of goods. In Radhu's [3, pp. 361-74] sample this was true in 8 percent of the cases.

Other restrictions include clauses that require the technology purchasing company to employ staff desired by the licensor, (in 7 percent of the cases, Table 7), or to limit the research capability of the licensee (in 7 percent of the cases see Table 7).

Finally, there are restrictions that are legal in nature. For example, in 24 percent of the cases, the validity of patents cannot be tested. Again, in 33 percent of the cases, should any dispute arise between the licensee and the licensor, it can be settled under foreign jurisdiction.

Table 7
Restrictive Clauses in Technology Transfer Contracts

	Percentage*	No. of Contracts
<i>Territorial Restrictions</i>		
(a) Total ban on exports	6.0	3
(b) Prior approval of licensor	31.0	17
(c) Prohibition of exports to certain countries.	4	2
(d) Export to certain countries	13	7
(e) Export through licensor's agent	4	2
<i>Restriction on Source of Supply</i>		
(a) Raw materials	28	15
(b) Spare Parts	17	9
(c) Intermediate products	26	14
(d) Capital goods	26	14
(e) Competing technologies	15	8
<i>Restriction on Pattern of Production</i>		
(a) Production	19	10
(b) Sales and distribution	15	8
<i>Limitations Affecting the Economy</i>		
(a) Limitation on field of use	7	4
(b) Use staff desired by licensor	7	4
(c) Restriction on research and technological development of licensee	7	4
(d) Grant back provision	43	23
<i>Other Restrictions</i>		
(a) Not to contest validity of patents	24	13
(b) Foreign jurisdiction in settlement of disputes	33	18

Note: As each contract can have more than one restriction, the number of contracts do not add to 54 and percentages to 100.

*Percentage figures have been rounded off.

Table 8 presents the breakdown of the 54 contracts by countries. It can be seen from this table that more than 50 percent of the agreements are with three major countries, namely, the United Kingdom, the United States of America and the Federal Republic of Germany. This concentration can be explained by the fact that these countries are the major trading partners of Pakistan. In the case of the United Kingdom, economic collaboration is due to previous colonial ties. However, there are some countries included in Table 8 that were not on Radhu's list [3, pp.361-74] and *vice versa*. Sweden, Yugoslavia and Bermuda are not included on his list, whereas Belgium is not mentioned here.

Table 8

Distribution of Agreements by Country

Country	Percentage	No. of contracts
Holland	9	5
Britain	24	13
Japan	6	3
U.S.A.	24	13
Bermuda	2	1
Germany	19	10
Yugoslavia	2	1
Switzerland	9	5
Sweden	4	2
France	2	1
Total:	100	54

Table 9 presents the distribution of contracts by their duration. A majority of the contracts are short term, 3-5 years, followed by medium term, 6-10 years and the long term. No comparison can be made with Radhu's [3, pp.361-74] sample as he did not report the duration of the contracts.

Table 9

Distribution of Contracts by Duration of Contract

Years	Percentage	No. of contracts
3-5	43	23
6-10	33	18
11+	9	5
Did not specify any time period	15	8
Total:	100	54

Table 10 presents the percentage distribution of contracts by industry. The chemical and pharmaceutical industry alongwith engineering have the majority of the agreements involving technology transfer. The electrical and textile industries come next.

Table 10

Distribution of Contracts by Industry

Industry	Percentage	No. of contracts
Textiles	13	7
Motor Vehicles	4	2
Electric Industry	15	8
Chemicals and Pharmaceuticals	35	19
Light and heavy Engineering	31	17
Miscellaneous	2	1
Total:	100	54

CONCLUSIONS

An analysis of the data show that several issues of policy relevance can be raised. First, there is a shortage of skilled manpower in the developing countries. To rectify this situation, the multinational corporation can assist in providing to local personnel training in management and other technical skills. However, 41 percent of the contracts did not specify any form of training. This lack of training facilities is liable to make the domestic purchaser of technology dependent on the foreign supplier and also to retard the pace of development activity.³ It is, therefore, imperative that provisions for the foreign training of local personnel be included as a part of any future transfer of technology agreement.

Second, as can be seen from Table 8 the contracts are unevenly distributed among the various technology supplying countries; more than half the contracts are with the companies of three countries, namely, the UK, USA and Germany. It would be advantageous for Pakistani companies to diversify in making contracts with the suppliers of technology. Japan, Holland and France would be good example of alternative sources of foreign technology.

Third, the domestic institutional framework requires strengthening. This is necessary to improve the flow of information on new products and process to Pakistani manufacturers so that they can adopt those which suit local factor requirements and which are also most profitable. At present there are several autonomous bodies, for example, the Pakistan Council for Scientific and Industrial Research and the Pakistan Industrial Technology Assistance Centre to name a couple, but there is little, or no coordination between them. It is, therefore, necessary, that an autonomous organization should be established and given power to regulate the transfer of technology. The purpose of such an organization, would be to evaluate the technology to

³For a detailed theoretical exposition see [1, pp.154-70].

be transferred, that is, whether it is appropriate to Pakistan or not: appropriate technology can be identified as one that is suitable to Pakistani factor endowments. In other words, technology that is more labour intensive in its use.

The fourth policy recommendation deals with the development of indigenous technology and know-how the basis for this already exists in the engineering industry, for example, in the manufacture of water pumps, electric motors and machine tools, where the transfer of technology has been successful. What is important is the development of indigenous design capabilities. This is necessary for the diversification of the product mix in the engineering industry and also to improve the quality of the goods produced

Fifthly, as can be seen from Table 7, almost all contracts have some form of restriction on the technology transferred. These restrictions range from the prohibition of exports to the foreign jurisdiction in the settlement of disputes. Legislation should be introduced in the country to nullify these restrictions as the inclusion of such clauses in the transfer of technology agreement hampers the economic development of the country. Although this is an extreme recommendation, India adopted such a policy towards the multinational corporations. Consequently, some left the country. Therefore, it is important to assess the sensitivity of suppliers to leave by estimating their supply elasticities to a reduction in the price of technology, a question that is difficult to answer.

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