International Transfers To Increase

Costs of research, scale of operations will result in greater international interdependence

DR. J. C. RAMAER*

The following paper served as the background document for talks recently organized by the Spanish-Netherlands Chamber of Commerce in Madrid and Barcelona on the international transfer of industrial know-how.

The international transfer of industrial know-how is playing an increasing and vital role in the industrialization process of the world. Yet it seems that, especially in intergovernmental organizations, many misunderstandings exist.

This article may help to clarify some of the essential elements. It has been written from the background of the electronics industry Philips. This company has been active in this field for over 50 years, supplying industrial know-how to its trading and manufacturing subsidiaries in more than 50 countries.

INTRODUCTION

Almost all European nations are small by the industrial standards of today's world. Holland has always been a small industrial nation. In the electronics industry, where the scale of operations is so important for survival under competitive conditions, Philips had to become international if it wanted to survive. Thus, Philips decided to internationalize at an earlier stage than many other European enterprises. Soon after 1920 the first factories were built in countries outside Holland. The concern now has factories in about 50 countries, half of which are developing countries.

Philips is often called an industrial world federation of enterprises in electronics. What lies at the basis of those enterprises and what are the ties between them that make them into such a federation? These questions will be answered below.

INDUSTRIAL ENTERPRISE: ITS FUNCTIONS AND FOUNDATIONS

An enterprise is an organization of human beings, serving human needs: it is an organization by the people and for the people.

The reason for this is the fact that an enterprise owes its existence to the fact that it makes products that serve human needs. This is true for a barber shop and for a worldwide electronics concern. They must bring products to the markets that customers find useful enough to spend their money on. If an enterprise succeeds in doing this, it can enable the people who work in and for it to earn a living. These are the two basic functions of an enterprise: produce and earn incomes for people. Therefore, business enterprise is something human, and not something purely rational.

But, what are the foundations — apart from the people themselves — without which an enterprise cannot continue to exist?

Especially, an industrial enterprise cannot exist for one day, or even for one year — it takes a long time to build it up. Consequently, it has to make sure that it continues to exist. The enterprise has to acquire its share of the market, it has to accumulate capital, e.g. buildings and machinery, in order to be able to produce.

However, capital as such is a dead thing. It can only produce something if there are human beings who know how to operate the machines, who know how to sell the products and who know to do all the other things that go with it.

Know-how of people is therefore a foundation without which an enterprise is unthinkable. In the case of Philips, that know-how is in the hands and heads of the 390,000 people working with companies all over the world. It is with know-how that this article will deal. And it will especially deal with the role of that know-how within an international group of companies such as Philips.

INDUSTRIAL KNOW-HOW — WHAT IT IS

The know-how of the people working in an industrial enterprise covers many aspects, such as:

1. Research
2. Development
3. Design
4. Manufacturing
5. Commerce
6. Finance
7. Social aspects and industrial relations
8. Service and repair
9. Logistics
10. Information, communications and analysis
11. Planning
12. Management and organization

This many-sided complex of industrial know-how has to be developed gradually and this takes time. It takes the time of thousands of people, who learn every day, who build up their knowledge and practical experience. But in-

**Deputy Director, N.V. Philips' Gloeilampenfabrieken, Eindhoven.*

dustrial know-how is also subject to continuous development and change, especially in a dynamic industry like electronics. The urge to innovate is the driving force behind it. There are always new products, new processes, new management methods. For instance, there is a big difference between the radio-receiver of today and that of 10 years ago, and the same is true for the manufacturing processes behind it.

Industrial know-how not only changes continually, it also has to be transferred, so it can be applied at the right *time* and the right *place*. Transfer takes place in two senses of the word:

-Between *stages* in the development of products and processes.

-Between people in different locations, e.g. between *countries*.

TRANSFER BETWEEN STAGES

An industrial enterprise only proves to be useful, once its products reach the customers. Before a new product reaches a customer, it has had a history. That history has a number of stages. The know-how necessary for the product, its manufacture, sale and service is developed during those stages, while it is being transferred from one stage to the next. The stages are:

1. Applied research.
2. Product and process development and engineering.
3. Manufacturing or reproduction.
4. Marketing, distribution and servicing.

In each stage more know-how is added to the complex of know-how needed to develop, produce and market the product. Once the product is being sold to the market, all the aspects of industrial know-how mentioned above are playing a role. In each of the stages one finds different people with different capacities. The researcher is a man who is satisfied if he finds that the probability of successfully implementing his new idea is, say, more than 50%. He may even produce one prototype. However, the development engineer who takes over from the researcher has to guarantee reproducibility, otherwise there can be no manufacturing. Moreover, he has to take into account the requirements of customers as far as price, design and servicability are concerned. After the development engineer comes the manufacturer whose discipline is to think in terms of people, cost, quality, delivery times and machines. After the manufacturer comes the commercial man who has to be in continuous touch with the market and the customers and who has to feed back his experience to the men in the previous stages. Especially manufacturers and commercial men have to cooperate with many other people; for instance, those in finance, industrial relations, logistics, information and planning.

It will be clear from the above that these four types of people have not only different responsibilities, but different mentalities. It is a management task to link these people and to see to it that know-how is transferred between the stages and that mental boundaries are crossed. Moreover, the transfer has to take place fast. An enterprise bringing an innovation fast onto the market is mostly rewarded in terms of a competitive advantage. That enterprise has the best chance not only to recover the costs involved in research, development, manufacturing, and marketing, but also to make a profit. An enterprise that is too late will loose out on a competitive market. The sporting element is to be ahead of the others — in time, and also in quality.

A fast transfer between stages has certain risks. The final product may prove not to be up to standard, because certain imperfections have not yet been eliminated. It is therefore of vital importance for an enterprise to have an efficient transfer of know-how between the stages. Between "too late" and "too fast," the management of an enterprise has to strike a balance. It will also be clear that an industry in which one innovation follows another fast also is more risky than one where products, processes and management methods do not change for many years. However, such industries are also less challenging.

The task of management also becomes more difficult, if apart from the above-mentioned transfer of know-how between stages, *international* transfers of know-how are necessary. This leads us to the second type of transfer.

TRANSFER BETWEEN COUNTRIES — SOME CONDITIONS

Already when a sales and servicing organization has to be set up in another country, know-how has to be transferred across borders. Moreover, that know-how has to be *adapted* to local circumstances. For instance, one cannot apply the marketing methods of Spain in Holland. The problems of transfer become more complicated and the risk of mistakes increases when, in addition to a marketing organization, manufacturing has to be set up. Such complications even multiply if in addition to manufacturing, know-how concerning research and development has to be transferred, especially when this is done before the time is ripe, for instance under government pressure.

It is therefore important to ask the question what *conditions* have to be fulfilled in order to make an international transfer of industrial know-how successful.

In the first place, transfer should have to do with an exactly defined activity or something equally concrete, such as the manufacture and sale of a certain product.

In the second place, all the elements of know-how have to be transferred *simultaneously* and in a *mutually consistent* form. To take an example: a factory will not work if only the technical know-how is transferred while the know-how on logistics is forgotten. Only too many factories built in the world have stood idle because this rule was not observed.

Third, those transferring know-how not only have to know their subject, but they should also understand how to transfer, i.e. how to make things clear. This is an art in itself, and it becomes more difficult to master if language and other differences have to be overcome. People who understand the art of transfer are scarce. Probably the lack of such people is one of the biggest obstacles to fast industrialization in many parts of the world.

Fourth, the elements of know-how must be presented in such a manner that the persons acquiring them can absorb and apply them. Generally speaking, someone who has already accumulated know-how can absorb additional know-how relatively more easily. Here lies one basic reason for the fact that it is so difficult to transfer sophisticated know-how to countries where industrial development is beginning.

Experience proves that the conditions for a proper

transfer of industrial know-how can best be met when there is a relationship between parent company and subsidiary. In such cases, years of cooperation between people on both sides, common training, standard procedures, and also many informal factors facilitate the communications without which a proper transfer and adaptation to local circumstances cannot take place. Just like all other aspects of enterprise, industrial know-how and its transfer is a matter of people, and people have to know and understand each other before they can work together on something complicated like an industry.

Below, special attention will be given to differences between countries and problems of international transfer.

TRANSFER BETWEEN COUNTRIES: WHICH COUNTRIES, WHAT SORT OF PROBLEMS?

On the basis of the experience of Philips, one could divide the world roughly into five groups of countries, according to an increasing degree of difficulty and risk in the transfer process.

The *first group* is that of the Benelux countries where the concern center is located. Therefore, it is in Benelux and the nearby areas that all required know-how exists; all elements in all stages from research to marketing. There are practically no language problems, and distances are small. It is therefore not surprising that in this area most basic research is done, together with a considerable part of applied research. Moreover, many manufacturing processes, involving special difficulties and risks, are organized here.

The *second group* consists of the industrialized countries of Western Europe, where the concern has grown-up national organizations with a great deal of experience. There may be some language problems, but the additional problems are small compared to Benelux.

The *third group* consists of industrialized countries outside Europe. In this category of countries the industrial climate is comparable with that of Europe, but distances make the transfer of know-how time-consuming and more expensive. Moreover, these countries often lie within the sphere of influence of large industrial countries with different industrial technologies. (Example: American and European picture tubes are not interchangeable, and Canada applies United States' technologies and standards.) Consequently, in these countries, some adaptation to local circumstances in the technological field is necessary.

The *fourth group* is comprised of countries, classified as developing countries by the United Nations, that have a manufacturing industry of considerable size. In these countries, some of which have a sizable home market, an infrastructure and ancillary industries have grown up. Moreover, there are skilled people. Nevertheless, the transfer of know-how faces a number of special complications:

-Nationalist tendencies lead to autarchic ambitions. So, national production of parts and materials is often pushed farther than is justified from the point of view of cost and efficiency.

-The know-how from outside needed for this purpose is often only partly paid for, if at all. Governments tend to make it difficult to obtain licenses for know-how contracts or to transfer payments for know-how. This is especially awkward for an electronics industry that has to finance expensive research and development. In the case of Philips the cost of research and development is equivalent to some 7% of turnover. In addition to that, costs are incurred for international transfers of know-how.

-The government's directives, and the way in which they are handled, often inhibit a smooth conduct of affairs and the development of industrial enterprises (both local and foreign).

The *fifth group* are the developing countries with a very limited or almost nonexistent industrial base. These countries have all the problems of the fourth group, and the handicap of a small home market in addition to that. Any company set up here can only produce small series and will consequently have to struggle against high unit costs. As a general rule, the infrastructure and subcontractors are little developed, so that no parts can be purchased locally, except when the firm takes the time and trouble and spends the cost to help in setting up subcontractors — and this does happen. On top of this, there is a great shortage of people with the right training and industrial experience.

The transfer of know-how to industries in these countries consequently demands special attention and effort. The watchword for those transferring know-how to these countries is *simplification* and *scaling down*.

A few examples may elucidate this last point. The machinery and test equipment required for the manufacture of a product must be designed in such a way that, already in the initial stage of production, a continued production can take place. Care must be taken to ensure that the equipment used is not too complicated, from the point of view of the operating personnel, or with regard to repair and maintenance. Finally, efficient management makes it necessary, where production series are small, to achieve a reduction of the capital invested, in order to keep the costs of depreciation and interest per unit of product at an acceptable level.

Although the technical side is often thought to be the most important, the other functions in the company merit just as much attention. The storage of components and semi-finished goods, and their administration, demand particular care. This is especially the case in those countries that often have long supply lines for imported components, etc. Failure to order a single part at the right time can cause stagnation in the production process for months. In view of the lower level of training of the personnel, simplification of administration procedures is imperative. A large gap has to be bridged in this field, because, in industrialized countries, the flow of goods through companies is often controlled with the help of computers. However, this is impossible in these countries. Therefore, computer programs and procedures have to be "translated" into simpler and more understandable terms for manually operated procedures.

The way in which the product and its manufacture are laid down in manuals has also attained a certain degree of sophistication in industrially developed countries. This is another field in which simplification is imperative. A more visual approach is necessary, e.g. the description of how to drill, assemble or solder with the help of normal pictures instead of technical designs.

All these activities could not have been managed by

Philips without the help of a special Pilot Plant created for that purpose. It is located far enough from the Concern Center at Eindhoven to make it possible to simulate the conditions in the developing countries in a factory that has to stand on its own. Yet, the pilot plant can fall back on the wealth of know-how in the Center when necessary. The plant not only has the necessary research facilities to simplify and adapt industrial know-how, it also manufactures. In fact, manufacturing units to be installed overseas are set up here to function, so that all the initial troubles can be eliminated before the machinery is sent overseas. This makes it possible also to train the managerial personnel to run the factory while the machinery is set up and when it is in production.

What were the conditions that had to be fulfilled in order to make this pilot plant possible? They could be summed up as follows:

In the first place, Philips happened to have a man with an idea and the initiative to create such a plant. He could convince the management of its necessity, at a time when Philips was being pushed by governments to create the beginnings of an electronics industry in many developing countries that had become independent states at the time.

Second, this particular plant could be created because its activities could be related to certain concrete products and their components. In other words, the management of the pilot plant knew from the outset what to aim for.

Third, the plant could fall back on experienced specialists.

Fourth, the pilot plant could profit from a continuous exchange of experience with existing overseas commercial and industrial organizations. It could therefore continually check its ideas with existing reality.

Fifth, the plant had a series of concrete jobs to do: setting up and follow-up support of factories in certain countries X-Y-Z that had to turn out certain numbers of certain products A-B-C (i.e. radio-receivers, television sets, gramophones and certain components).

Sixth, the plant's management had a considerable degree of autonomy and a location to assure such autonomy.

Last, but not least, the operation has a sufficient scale, and in two respects. The scale of the Philips Group allowed for the setting up of a pilot plant, which is an expensive operation. Second, the expenses of the operation were warranted by the fact that some 20 factories had to be set up and required follow-up support. The follow-up support is an important activity in this particular industry, as it has been (and still is) going through a number of radical changes in products, components and processes.

The rather large number of conditions that has to be fulfilled may explain why there are not many pilot plants in the world, dedicated to the adaptation of technology and other elements of industrial know-how to developing countries. This pilot plant is a rare but interesting application of the principle: "Small is beautiful."

It is interesting to note that experience showed that in a few cases where the pilot plant had to set up factories for third parties (e.g. governments), the process proved to be more difficult, time-consuming and therefore costly. The most important reason for this was that communications with the third party appeared more difficult than between the pilot plant and subsidiaries of Philips. Such "communications gaps" had to be bridged by more extensive training and many other special efforts that made such operations more time-consuming and expensive.

TECHNICAL EVOLUTION — A COMPLICATION AND A STIMULUS TO INTERNATIONAL TRANSFERS

The urge to improve quality and to lower cost continually leads to the use of new materials, techniques, work processes and products, and everything else associated with them.

It is an illusion to think that any country can isolate itself from these changes. Modern communications rule such isolation out. The consumers all over the world want the latest and the best — and they are entitled to it.

In countries where the final product can be imported, advantage can immediately be taken of such developments. In countries where the government is not prepared to allow for the importation of the final product of latest design, industry will have to acquire the know-how in order to be able to manufacture the product. This puts a special burden on such international companies as Philips. However, it inevitably costs time too, and for such delays the customers of industry in countries with import restrictions in fact pay the "price."

In view of the high investments involved, many modern electronic products can only be manufactured economically in very large quantities. This evolution is in direct conflict with the aspiration of many countries to have an independent electronics industry of their own that produces all components also. Only those with a large to very large home market stand a chance of realizing that ambition.

However, even these countries — like the largest international companies — will also have to acquire know-how continuously from others, if they are to ensure their growth and development. The purchase of know-how, it will be appreciated, is often less costly and less time-consuming than developing it in one's own house. No company, no country, however large, can afford to develop everything on its own. This really means that autarchy is an illusion in the world of today.

Thus, international transfers of know-how are becoming more necessary every year. How should their contractual aspects be dealt with, and how should their costs be shared? These questions will be dealt with below.

CONTRACTUAL ASPECTS

It will be clear that the transfer of know-how almost always has to be "made to measure" for each customer. This generally makes it impossible to draw up standard agreements governing the desired contractual relations, a suggestion sometimes made by international organizations.

It is only possible to give a systematic list of questions that have to be considered during negotiations. The appendix contains such a list, which has been drawn up by the World Intellectual Property Organization (WIPO). The publication's title is: "Legal Aspects of License Agreements in the field of patents, trademarks and know-how."

One source of industrial know-how is research and development.

It has been calculated in the United States how many

scientists and engineers were involved in research and development per 1,000 employees and how much was spent as a percentage of net sales.*

For obvious reasons aircraft and missiles came out on top, whereas electrical equipment and communication appeared to have about 4% of their personnel in research.

Experience shows that the European scene is not very different from the United States. Philips has had about 5% of its total personnel involved in research and development, whereas it consistently spent some 7% of its turnover figure on research and development.

Research and development costs do not include all the costs that have to be made for the development and transfer of know-how.

The calculation of these costs in an exact way is not possible, because such costs are made during working hours spent on different activities. Therefore it is impossible to mention an exact percentage of sales or labor force employed. Moreover, such percentages would have to be different for different products and also for transfers of know-how to different sorts of countries.

The most practical approach therefore seems to be a calculation in terms of a global percentage of sales or of production realized, based on estimates of research, development and other costs.

How could costs thus determined be shared between companies in different countries belonging to the same group? This involves similar problems as those in determining overall costs of know-how: cost allocation.

A considerable part of the know-how needed to run the operations of such international groups of companies is created and accumulated in central facilities established in one or only a few countries. The rationale of such centralization mostly lies in manageability and in economic size. Thus, many companies have only one or very few research laboratories as the concentration of research makes it better manageable and cheaper per unit of "output." The same is true for other specialized and managerial functions. Consequently, centralization of certain functions reduces the costs for all the companies of the group. It is logical that such costs are shared between those members of the group.

Not only international companies have central facilities. International cooperation between governments shows comparable features. For instance, the United Nations Secretariat is established in one city, and so are the headquarters of the OECD and the European Community. The costs of such central facilities are shared between the member governments.

Even many companies who are independent from each other, enter into arrangements whereby costs are shared of services which are to their joint benefit. Such an arrangement could equally well apply between a parent and a subsidiary.

If central facilities are used by a number of companies in different countries — whether they are independent from each other or whether they belong to one concern — it is reasonable that the costs of such facilities are shared between those companies. One formula is called cost sharing. Another possibility is the contract for individual products or activities. Below follow some remarks on the principle of cost sharing.

In the case of international enterprises the costs of central facilities are often called concern costs. It is a condition for a proper functioning of this form of international cooperation that such concern costs can be fully covered in the center where they are made. To this effect such costs must be allocated to the cost price of the various products, and the proceeds should be allowed to flow freely from the various points of sale to the center: i.e. from group companies to the parent company.

The question is what key to use in order to determine the share of each company in the total costs to be shared. Keys can be based on different figures: turnover, cost of production, or value added. In principle it should not make much difference which key is applied as long as it is consistently applied by all companies of the group. In the case of international organizations of governments, population, national product or international trade can be the basis of a key for cost sharing.

In principle a cost-sharing arrangement implies that the contributing companies are entitled to utilize all services that are readily available within the concern. They have free access to all available know-how without payment of any additional remuneration.

Therefore, the scope of a cost-sharing arrangement is much wider than that of a patent, royalty or technical assistance agreement, which is only limited to the use of patents and technical know-how.

Generally speaking, a cost-sharing arrangement does not cover any specific services that can be allocated directly, and that are not readily available within the concern. Those should be supplied separately.

The essence of a cost-sharing arrangement is that payment is made for the availability of the services and therefore specific use does not have to be proved. In other words, each party's share is assumed to be the counter value of the services received.

As long as the fiscal authorities are satisfied that the method of allocation of the concern costs shared is consistent, and in accordance with sound accounting principles, the allocated share of costs should be allowed as a tax-deductible expense.

CONCLUDING REMARKS

An essential foundation of an industrial enterprise is the know-how of the people working in it. That know-how necessarily is many-sided, yet it forms an integrated body. If such know-how has to be transferred internationally, it must also take place in an integrated way. In addition, adaptation to local circumstances has to take place, especially in countries where industrial development is in its beginnings.

International transfers of industrial know-how will increase further. The scale of industrial operations and the costs of research are making it impossible, even for the biggest countries and the biggest companies, to be independent from know-how developed by others.

Therefore, autarchy and nationalism are on the way out, with international interdependence on the increase, and the people in international enterprises leading the way.

*Source: "Research and Development in Industry 1971," National Science Foundation, NSF 73-305, pages 7 and 15.

APPENDIX

QUESTIONS TO BE CONSIDERED

The following list contains questions for consideration during negotiations. In some cases, the result of this consideration will be a decision to the effect that a particular point need not be covered in the agreement. In other cases, additional points may be raised by the licensor or the licensee. The list, therefore, is merely a practical aide-memoire; it may also assist in determining the structure of the agreement. Explanatory notes are given on points requiring special explanation.

I. Questions Common to all License Agreements

A. Legal Framework

1. Who are the parties?
2. What are the consequences of a change in the status, ownership, etc., of a party?
3. Which law is applicable to the agreement? Must some other national laws also be taken into account?
4. In what language will the authentic text be established?
5. Is an arbitration clause desired?
6. In case of controversy, which courts will have jurisdiction?

B. Fundamental Aspects

7. Degree of exclusivity, if any.
8. Will the licensee have the right to grant sub-licenses?
9. Royalties, method of payment, minimum payments, currency control, safeguards against devaluation and revaluation, government guarantees for payment of royalties, taxation aspects, inspection of books.
10. Duration, possible extensions.

C. Additional Provisions

11. Most-favored licensee clause.
12. Possible obligation of the licensor to sell materials, etc., to the licensee, possible obligation of the licensor to buy products from the licensee, and possible regulation of prices for such materials or products.
13. Possible obligation of the licensee to sell a part of his production to the licensor, possible obligation of the licensee to buy materials, etc., from the licensor, and possible regulation of prices for this purpose.
14. Possible right or obligation of the licensee to indicate on his products that they have been manufactured under the license.
15. Rights or obligations to take action against third parties who infringe rights covered by the license agreement.
16. Infringement by the licensee of third-party patents or trademarks.
17. Communication and use of, and rights in, improvements effected by the licensor or the licensee.
18. Remedies for fundamental or minor breaches.
19. Early termination of the agreement.
20. Situation at the expiry or early termination of the agreement.
21. Approval of competent authorities, if prescribed by national law.

II. Special Questions Relating to Patent Licenses

22. Identification of the patents to be licensed.
23. Extent of the rights granted to the licensee; which acts covered by the patent may he perform, in which technical fields, and in which country where a patent is held by the licensor?
24. Maintenance in force of the patents.
25. Consequences in case the patent is refused or annulled.
26. Possible obligation of the licensee to use the patented invention.

III. Special Questions Relating to Know-How Agreements

27. Specification of the know-how to be transferred.
28. Conditions of the agreement which may restrict the use of the know-how (field of technology, territory, duration, etc.), or the sale or use of products manufactured under the license.
29. Specification of means of the transfer of the know-how, such as:
    (a) written information, models and samples;
    (b) visits by and training of the licensee's staff, including training in the licensor's premises;
    (c) advice by the licensor's staff, including visits to the licensee's premises.
30. Period of transfer of the know-how.
31. Obligation of the licensee and the licensee's staff to treat the know-how as confidential.
32. Consequences of loss of secrecy.
33. Will use by the licensee of the know-how require a license under patents, existing or future, held by the licensor?

IV. Special Questions Relating to Trademark Licenses

34. Form of the trademark and extent of use.
35. Quality control.
36. Obligation to use.
37. Obligation to refer to the licensor.

Face Lift

You may not have recognized us when we arrived on your busy desk, for we have a new face beginning with this issue. We have the familiar les Nouvelles *nameplate and blue color, but our table of contents now appears conveniently on the front cover.*

The new cover is another in a number of changes being made to improve the magazine and make it more meaningful and useful to the licensing profession. The Editors.