

# When to Assign an Innovation

*What is the optimal point to assign or sell to a manufacturer; this requires close study*

BY JAN HJORTH\*

The question is: At what stage of development would the possible license income have its maximum? Even more to the point, when does the possible license net income after deduction of research and development cost, as well as license marketing cost, have its maximum?

It is not always the case that the license value will increase steadily or even keep increasing with the development spent and therefore have a higher value the later in the development it is offered for sale. It is my thinking that much too often this is overlooked. A tendency exists to spend more development cost than is justified just to make sure that the invention or the technology is proven. When trying to sell a license or to persuade a branch or division internally to start manufacturing or investing on a new venture, the receiver or the buyer advocates this strongly. This may sometimes be correct, but always makes the decision easier for him, without necessarily being motivated.

However, in most cases the life of new technology today is only five to seven years. To fully prove the technology may take too much of this time, and additionally one must calculate two years for marketing and negotiation, and further years before manufacturing is started. Therefore the buyer should be prepared to take a risk on less proven technology to try to get a share of the larger market potential, while the technology still has an edge on competition.

I argue that the potential net income and the time when it is most appropriate to sell or assign to a manufacturer should be studied more closely. It should be possible to distinguish the main types of innovation and situations which should be considered for a more early exploitation. According to my thinking and experience there are three such cases.

I will pinpoint the main factors to consider. The reasoning is accrued from the marketing of more than 30 important license agreements covering various fields of new technologies. In the majority of cases, marketing started before industrial references were obtained, and agreements were often concluded without having even had half-scale industrial experience. The main part of the license arrangements were made for the Axel Johnson Institute for Industrial Research.

The Institute belongs to the Axel Johnson Group, a major Swedish heavy industrial group with a turnover of

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more than \$2 billion and with 24,000 employees. It develops new industrial equipment and processes to manufacture new tools for the Group, and also to be marketed internationally as license.

These licenses are marketed with the help of the trading house of the Axel Johnson Group, A. Johnson & Co., and

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with the help of its local offices in 24 countries. This function, Technology Marketing, my responsibility, is then also in the position to price the technology going to the Group companies, which also must sign license contracts.

The points in time which could be most clearly defined — and also are the points where there is likely to be a change in license value — have been chosen as reference points:

- a. At start as innovation idea, usually as patent.
- b. After pilot test is made, as nonproven but working technology.
- c. After industrial reference is gained as proven technology i.e. semi-industrial-scale plant under operation.

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The first relation to study and the most well known is the cost-time relation for an industrial development. The very low cost at the idea stage will be followed by quickly increasing costs when pilot tests start, and as soon as the industrial realization is to be developed the cost increases to another scale. (Fig. 1).

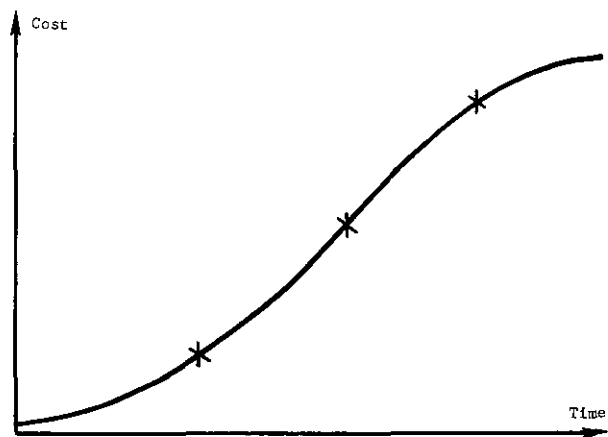


Fig. 1 COST/TIME RELATION FOR R&D

This curve is in principle always the same, even if availability of test equipment or test in one's own plant could make it less exponential.

The next relation of interest is obviously the income or the value of the potential revenue. To assess this one has to study:

- a. technical value, degree of innovation, technical

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terest. Are there patents? If so, in what countries? If there are none, can any be filed? What is their scope? Are there trademarks. Are they well recognized in the market place? Are they registered abroad? What about know-how? Is it secret? Can it be kept secret and licensed as such? To what extent do the values of patents depend on confidential know-how.

### Nine Details

Further details relate to product design and manufacture. Are manufacturing techniques fully developed? Are they subject to change? Must they be improved in order to expand the market or meet competition? What equipment is required? Is it standard or special? What special facilities are required? Are there manufacturing hazards? What materials are required? Are they standard or special? Are they available in markets in which licensees are to be sought? Does the product conform to required industrial standards? Are there any special conversion or design requirements to make the product suitable for other markets?

What are the costs? What investment is required? How large a market is required to justify a minimum investment? What does it take to get into the business?

This is a good sampling — but by no means a complete list of the questions and details that we consider useful in order to estimate licensing possibilities of a product. It is not intended as a check list. The fact is that, while check lists are useful as guides, when you have been in the licensing game long enough, the right questions, questions that hit the essential elements of a particular project occur almost as a reflex. And finally, when you have asked all pertinent questions and received the answers — including the “maybes” and “I don’t knows” — it is not a matter of drawing up a score or a passing grade. The answers, or absence of them, must lead your thinking and sharpen your intuitions. Intensive structured analysis has its value, but I tend to place great value on intuitive experience or experienced intuition. Given the right answer to one or two key questions, many other questions or problems become irrelevant or unimportant. Show me a strong patent on a product that Mercedes specifies as an OEM component and I won’t worry if it has a DIN specification or is available only in metric dimensions. Show me that your secret manufacturing method can produce a standard product at lower cost than conventional techniques and why worry if there are patents or sales literature!

For almost 15 years, some of the largest companies in the industry have been paying REFAC royalties for the right to use secret methods which we licensed on a proprietary basis, for manufacturing molded rubber products — and 90% of standard check list questions never came up. One interesting sidelight of this — the small American manufacturer, from whom we acquired the licensing rights, told me at the time we would be wasting our effort — that his methods were not the sort of thing that could be licensed, that manufacturers would rather steal than pay for know-how, and that he might better keep his knowledge to himself. I did not accept this commentary because I knew how most other manufacturers were doing the job, and I had confidence in licensing. Today, as for the last 10 years, my skeptical friend makes more money from overseas royalties than he does from his own production.

In assembling details of a prospective licensing project — to decide whether it is the sort of thing we would undertake — we are at the same time putting together our licensing package. This package is the product on which we must be sold and which we, in turn, if we are satisfied with it, will expect to sell others. The package consists of modules of facts, figures, and fantasy, all selected, qualified, combined, and shaped to suit the “what’s in it for me” yardsticks of the various markets we intend to approach. To steal Marshall McLuhan’s phrase, the licensing package is both the message and the medium.

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competitiveness etc.

- b. the *market*, its total value, distribution geographically and the possible share.
- c. the degree of *risk* involved, or to what extent the technical value and market could be appraised.

This appraisal is then to be compared with earlier similar license arrangements to establish the license condition and potential resulting activities under the license. As a result the license value could be calculated as the present value using a suitable rate of interest.

The *life length of the innovation* and the *time it takes to market and negotiate* a license agreement makes it necessary to start marketing and to assign to a manufacturer through a license at an earlier stage than should be advisable from other points of view. As mentioned, most modern advanced technology has a life length shorter than five to seven years, and the marketing and conclusion of a license takes two to three years.

It is more important to remember this relation as the real market should be worldwide. For this reason, there is too often only time for exploitation in the home market.

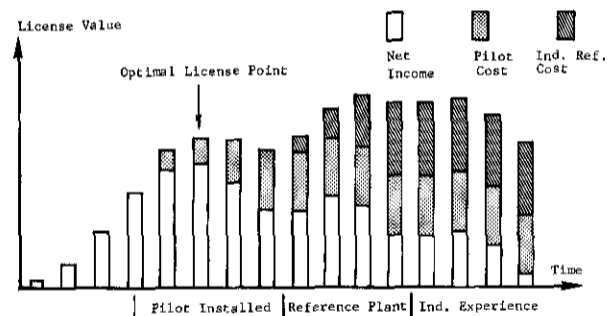


Fig. 2 IDEA (PATENT LICENSE)

Finally, let us study the *cost-revenue relation* for a license arrangement to decide when to assign the invention to the manufacturer.

The main factors are:

- a. *External factors*: possible financial aid in form of governmental subsidies, etc.; change of legal and other conditions, etc.
- b. *Internal resources*: given priorities, product program, size of home market or market available, etc.
- c. *Product parameters*: patentability, nature of invention, degree of innovation, etc.

Using these factors and applying them to the net license

value, you will arrive at three different typical cases, each having its maximum on different points in time with regard to potential net license value.

Fig. 2 is the typical curve for a patent license when the exploitation is made on the idea without further testing or development. Typically, this is the stage a license is bought from an individual private inventor or more often as a result of a university research team. Internal resources are lacking and the innovation is outside the inventor's program, and further the product parameters are weak.

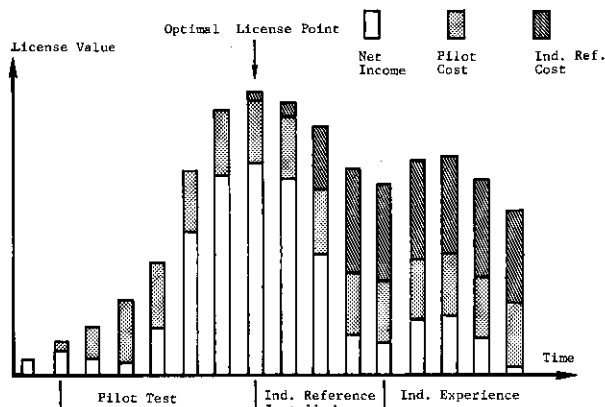


Fig. 3 LIMITED LIFE SPAN

Fig. 3 is the typical situation for a development which is not suited for inhouse use or manufacturing. Therefore, the costs for testing and development beyond the pilot scale would be very high if done in one's own laboratory or a unit was built for use in only one case. Further steps would also require experience and engineering knowledge in the field. But the product parameters are strong, and external factors, such as government subsidies, own or related plant for testing etc., make pilot tests less expensive.

Fig. 4 is the common case for an industrial process. Even if cost at the pilot stage could be kept low, the half-industrial or full-industrial plant has to be made to make

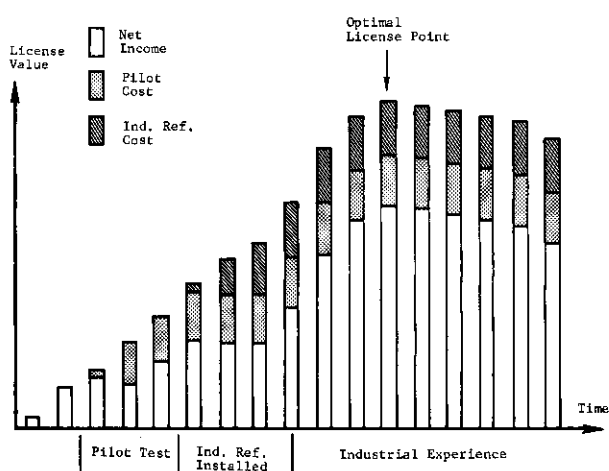


Fig. 4 INDUSTRIAL PROCESS

necessary unexpected child sicknesses come out and be solved and to prove the overall process economy. Hence, the value of the license will remain low until the technology is proven and the high risk for a major investment minimized.

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expiration of the agreement and licensee's secrecy obligation.

### 6. Environmental Factors

In recent years, consideration of the impact of the industrial activities on the environment has become very important. In some cases, it is a paramount factor. A process may be totally unpracticable due to its ecological impact. The law may prohibit the manufacture and sale of certain products, or require the use of antipollution devices which call for substantial investment, and thus deteriorates economic feasibility of the process.

It is advisable to collect the data and information, if available, on toxicity or any hazardous effect of the material to human being, cattle, poultry, crops, air, and water.

The factors to be considered in this category may be as follows:

- (1) Possibility of pollution by the product and its waste and possible countermeasures.
- (2) Possibility of pollution by by-products and plant effluents and its countermeasures. Property and amount of such effluent as exhaust gas, waste water, and waste liquid should be scrutinized. Method of treatment and possible investment cost for the treating facilities should be studied.
- (3) Possibility of public nuisance caused by the plant, such as noise, odor, smoke, dust, etc. should be studied, along with the method and cost of prevention of such nuisance.
- (4) Possibility of pollution caused by various effluents in case of emergency start-up and stopping of the plant should be studied together with the method and cost of prevention.
- (5) Particularly, careful examination is recommended on the following items when they are discharged from the plant. Mercury, arsenic or compounds containing such toxic elements; BOD, COD; dust; suspended solids; SO<sub>2</sub>, NO<sub>x</sub>

### 7. Safety

Safety assurance should be taken into account for smooth operation of a plant to minimize the hazard.

- (1) Safety in plant operation. The following information must be obtained to assure the safety in plant operation.
  - a. Chemical and physical properties of the material.
    - flammability, corrosiveness, etc.
    - acute and sub-acute toxicity to those who may be contaminated by the material in the working area.
  - b. Operation condition and equipment durability.
    - high-pressure or temperature to be experienced in normal or abnormal operation.
    - durability of equipment against pressure or corrosion.