

"ORGANIZING A TECHNOLOGY JUMP
OR
OVERCOMING THE TECHNOLOGICAL HURDLE"

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1. INTRODUCTION

The slowdown of industrial activity in the West, and the changes in industrial competition which occurred at the end of the seventies and the beginning of the eighties have increased our awareness of the fact that technology and technological innovation belong to the main, long term competitive issues to be monitored by a company. Obviously, technology should not be considered in isolation. If one wants to understand the dynamics of it, and the way it can be manipulated, a cogent way of thinking about the complex interrelationships between technology, manufacturing, markets and competition, organization design and innovation emphasis is needed.

An approach to this relationship originally grew out of marketing. The relationship between market characteristics (price, penetration, cash flow) and products were explained mainly through the concept of the product life-cycle. However, in a more recent approach, Utterback and Abernathy (1975) have extended this concept to include production processes as well. This much more encompassing model describes the relations between product performance characteristics, production processes, market structure, and organization design for what they consider to be the relevant unit of analysis, being a productive unit or segment. The model implies that such productive segments tend to evolve along a predictable profile, common to

different industries. Briefly, as a product evolves from a low-volume, unstandardized item to a well-defined, highly standardized mass-product, the related production processes will develop from an unstructured "job-shop"like highly flexible system towards an integrated, automated and elaborately structured process. The associated organization evolves from an entrepreneurial, flexible operation, with a lot of built-in slack, to a very efficient lean organization (almost Weberian bureaucracy).

As several authors have asserted, this "natural" evolution does not necessarily turn in a single direction. It can and should be reversed. The reason for this may be a strategic move of the production unit to new technologies or markets, or may be a disruptive change in the relation between product performance characteristics, technology and market preferences. Abernathy, Clark and Kantrow (1982) have called this the "logic of de-maturity". But as one easily understands, while the evolution from a flexible, inefficient operation to a highly structured one is fairly natural, and lines up with "normal" management practice, the reversal to a new technology and to a less efficient but more flexible organization type, is less evident even contrary to some of the accepted management wisdom.

This paper attempts to explore the way a productive unit can proceed to acquire and internalize the new technology required to be able to pursue this reversal, and which we will refer to as the "technology jump". Indeed, a productive unit going the reversed way is faced with a discontinuity in its concepts on technology and has to "jump" to say so from one set of technologies or technological strategies to another one. The problem challenging the productive unit is actually two-fold: the productive unit has not only to select a promising set of technologies (which is a problem of sound technological forecasting), but it should also create the proper organizational structure and culture to internalize and develop the alien

technology. Hence in this paper we will focus on this second aspect. Illustrated by a few case-studies, we will present a tentative model, which attempts to explain the organization design parameters which can be tuned to organize a technology jump.

2. SOME EXAMPLES

2.1. Case A

A small but affluent company produces additives and vitamins for cattle food. Its basic product technology dates from the fifties and sixties, and recently they have been increasingly automating and innovating the production process. The company is typically in the specific state according to the Utterback - Abernathy model (1975). In recent years the company became gradually aware of the evolution regarding bio-genetics, and the management got the feeling that this evolution might change the whole competitive environment in their industry. On the other hand it was conscious of the fact that the existing organization, which is mechanistic in Burns and Stalker's terms (1961), was not a suitable host for an emerging technology. Besides, though the company is active in the bio-industry, it had no internal know-how concerning bio-genetics and the engineering methods derived from it. Given this situation, they have chosen to incorporate, jointly with other (non-competitive) local and foreign companies active in the agro-business, a new R & D company, vested within the university, and built around high-level scientists. Their aim is to create a profitable R & D company, whose organization can act as an incubator for new technologies, and which can transfer its results to the (mechanistically organized) parent companies, which are preemptively adapted to the efficient production of the new products.

2.2. Case B

A well-known large manufacturer of sophisticated mechanical products and machinery and sports equipment decided to enter a new segment in the sports industry. It developed a new sports product whose assembly required the glueing together of aluminium parts. To the company it meant the internalization of several new product as well as production technologies. It had, for example, never been exposed either to the glueing of aluminium or to the assembly of large series.

Management decided to handle this new development in the same way it had always done with new products. This implied essentially the definition of the product specifications in the R & D department, and the transfer of these specifications to a production plant, i.e. a functional approach to product development.

This fairly mechanistic approach did not succeed. After one year of trials, and in a situation where the commercial department had already launched the product, it appeared that production was not able to manufacture a reliable product. Moreover, the relations between R & D and production were at an all-time low level.

The appointment of a new head of the production division was the start of a new approach : a temporary project team was formed, informal relations between R & D and production were created, and perhaps most important of all, an entrepreneurial spirit was created in the production department. Universities and suppliers were offered contracts to solve some of the specific problems. Gradually the performance characteristics of the product were improved. The product is now considered to be one of the innovative successes of the company.

2.3. Case C

A medium-sized company, specialized in the installation of industrial electrical and mechanical equipment, and some engineering work for petrochemical plants was suddenly confronted with the market opportunities of computer-controlled automated gasoline stations, a market with which they had some contacts through their engineering activities. Though the technologies needed to develop such a system were readily available, the company itself had barely any experience with them. Moreover, the difficulties in developing such a system lay less in the technologies themselves, but were far more related to the complexity of the system in which these technologies had to be applied.

After some initial failures, the company developed in close harmony with its customers a concept which proved to be very flexible, and adaptable to a broad range of requirements.

They attribute their success amongst other things to their entrepreneurial approach. Within the company a new, highly unstructured department (or rather group of people) was created, which had to develop its own contacts with the users and had to internalize the required technology by itself. The group itself was created around what one would call a very creative product champion.

3. PRACTICAL APPROACHES

As illustrated in previous cases, the technology jump problem is far from new, and organizations have often developed creative solutions to overcome the problem. Without pretending to cover all the possibilities that have been created, we can see five broad categories of technology acquisition and internalization strategy for an existing productive unit.

a. In-house development, is a first category. It can itself be divided into four basic groups, the development in an existing R & D department with its available people and structure, the creation of either a temporary or permanent team or task force within the existing structures, and the creation of internal corporate ventures. By definition, in these four cases the involvement of outsiders is fairly low, and limited to exceptional consulting and advice. The organizational setting varies from merely bureaucratic, without requiring new flexible structures, to a highly entrepreneurial approach (internal ventureship) in the fourth group. The time span goes from a (very) short project for the first two possibilities to longer lasting settings for a project team or an internal venture. The degree of reliance on individuals increases generally from the development with existing structures to the internal venture teams.

b. Specific contract research, with either private or government-sponsored laboratories or research institutes, or universities is a second category. In this case the organizational setting is fairly simple: a contract is awarded to a "supplier" and the productive unit creates a gatekeeping structure to absorb the information provided by the supplier. The time horizon is seldom longer than two to three years, and the degree to which one relies on outside help is well defined (it is actually the object of the contract). In this kind of contracting research, the degree of reliance on individuals remains low since the contractor does not intend to lose its best people at the end of the contract and see them going to the contractor.

c. A third category consists of various forms of inter-company cooperation, excluding joint ventures. They can go from a discussion group sponsored by the government or an industrial sectorial organization, participation in a

(government sponsored) research program, participation in a development program shared by several sub contractors for a big customer, to technology-exchange contracts. The nature of this category of inter-company cooperation is often characterized by a well-established structure (to fix individual responsibilities), a long term commitment, a minimal degree of reliance on individual know-how, and by definition reliance on outside help. The long term cooperation between companies and preferenced academic teams, without clearly defined goals also belongs to this category.

d. The creation of joint ventures with equal partners to create a new organizational unit is a fourth category. These joint ventures can be of a highly different nature. They can range from the venturing of an R & D company with a limited task to a new integrated enterprise. Usually these constructions are intended to be long term, rely heavily on individual commitments, have a loose entrepreneurial structure, and are of course created to provide outside help.

e. A fifth category can be called the aquisitions category. Here again several possibilities exist. One can conceive a full aquisition or a simple participation in an existing company either as a junior or senior partner. When we limit ourselves to those aquisitions which are initiated to realize a technology jump, the majority of the aquisitions provide a kind of window on technology. A particular form of aquisition is the hiring of new experienced employees. In this case you do not aquire another company, but part of its technological knowhow in the form of personnel. The way technology is aquired here is usually formal, but heavily based on the transfer of individual knowledge. The time span of this category can be long, but his is not a strict requirement.

We do not pretend to cover all possibilities, and we certainly are not implying that these categories are mutually exclusive (often in-house development is necessary to make contract research successful for instance),

but they can however cover quite a broad range of possible actions to internalize alien technologies. The question remains in which circumstances is a certain approach preferable?

4. ORGANIZATIONAL APPROACH TO TECHNOLOGY JUMP

Similar problems, the internalization of alien technology, possibly coupled with a new market, but having different organizational solutions. Does this imply that if a productive unit intends to "jump" towards a new technology that anything goes? One suspects that some underlying model exists in these cases which could explain why in each of these cases a particular approach has been chosen.

It is our opinion that indeed the second hypothesis holds, and that in the three cases described, the successful approach is closely related to the characteristics of the situation. However, this raises the question "which set of characteristics is important in this setting?" In the three cases technological innovation and a lack of familiarity with the new technology is at the core. Consequently, rather than looking for some external factors explaining the approach to the technology jump, one should look first at the characteristics of the technology itself. The model we present here precisely hypothesises that the attributes of the technology are the main determinants of the ways in which a productive unit can organize a technology jump.

4.1. Characterizing the Technology

Regarding the attributes of technology determining organizational variables the most instrumental approach is the one presented by Perrow (1970), who uses two characteristics to describe technology. The first one is the degree to which search procedures used with respect to the particular technology

are analysable (i.e. analysability). The degree of analysability reflects the extent to which the procedures and tools available to study and develop the particular technology are formalized and widely available. Though there might be some association between maturity and analysability, analysability definitely reflects another dimension than mere maturity. Micro-electronics, for example, are to a great extent analysable : the physical laws lying behind the design of electronic devices are well understood for the main bulk of applications. The mixing of perfumes on the other hand often uses very old technology, but still relied for the greater part until today on rules of thumb and craftsmanship. It is probably too much of a generalization, but one could say that the analysability reflects the extent to which rules of thumb have been replaced by science-based laws and procedures.

The second dimension described by Perrow concerns the variety of problems which may ignite the search behaviour, or the number of exceptions encountered by the technologist, and which may briefly referred to as the stability of the technology. The more exceptions one encounters working with a technology, the less stable the technology becomes.

Apart from these two dimensions, we propose a third one which is a consequence of the "parochial" structure of technology. In contrast to science, which is usually universal and equally available to each interested professional, technology is much more a local phenomenon, (Allen, 1977) only fully understood and available to the organizational unit which has developed it. Technological knowledge, in contrast to scientific knowledge is not usually widely published, but rather embedded in products and processes, and often protected by trade secrets. The publishing ambition of scientists will guarantee the diffusion of scientific knowledge, but in a

technological environment one will try to hide one's knowledge as long as possible to ensure a favourable competitive position. The acquisition of technological knowledge is a much less straightforward exercise than one is used to in scientific institutions. Consequently an important attribute of a technology is the degree of exposure of the productive unit to the new technology. This degree of exposure provides an indication of the experience the productive unit has accumulated with the particular technology, and thus the productive unit's ability to understand new know-how about this technology.

To summarize, a technology can be characterized by three attributes: the analysability, the stability and the exposure. The first two are inherent to the technology, the third describes the relation between the technology and the relevant productive unit. A short example may clarify the concept. Genetic engineering may be quite analysable, but is highly unstable. The degree of exposure will be high to a group of doctoral students working in the biology department of one of the top universities in the field, who incorporates a company, but is low to a planter in Central America, who works daily, albeit unwittingly, with biological processes.

4.2 Developing the Framework

Now that the attributes of technology have been described, one can try to link these attributes to the general characteristics of ways open for acquiring technology. The model presented here is based on four simple rules:

1. The first rule concerns the stability of the technology. The degree of complexity will determine the nature of the organizational structure which will have to be created to absorb the new technology. If one conceives a scale of organizational flexibility, ranging from a purely mechanistic organization up to a highly entrepreneurial structure, one can identify with

this scale a second scale varying from low to high complexity. The higher the stability of the technology, the more bureaucratic in a Weberian sense, the organization will become. The lower the stability, the more one will have to rely on flexibility and some kind of entrepreneurship.

2. To formulate the second rule, one has to realize that the more a technology is analysable, or the more a technology can be described in terms of formulae, laws and rules, the easier it will be to transfer the technology in a formal way. A highly analysable technology can be taught. For a technology which is characterized by low analysability, one has to rely totally on talent and apprenticeship. Consequently the analysability of the technology will determine the intensity with which one will have to rely on persons and their experience, (later referred to as "the degree of reliance on individuals") instead of formally encoded information. The higher the analysability, the less individual experience will be needed to jump onto a new technology.

3. Since we focus in our model on productive units facing the need for "de-maturing", we can readily accept that the productive unit starts with a high degree of exposure to the presently used technology, and that only the set of technologies which it tries to internalize vary in degree of exposure. As a third rule we assert that the lower the degree of exposure to the pursued technology is, the more one will have to rely on outside help. Indeed, given the parochial nature of technology, one will either need outside consultants in some form, or be obliged to create joint projects, or hire new employees to be able to internalize the knowledge.

4. A fourth rule concerns the length of time during which one will have to rely on special settings and structures to transfer the knowledge. This time span is dependant on exposure and analysability. The lower the exposure and analysability, the longer the period of special measures will have to be.

The effects of the three dimensions of the technology are not however independent. Interaction effects do exist. A lack of exposure to the technology combined with a low analysability, will mutually enforce the individual effects. For example, the intensity with which one will have to rely on outside help, and the sophistication of this outside help will grow more than one would expect if both effects were independent. A similar remark can be made for the interaction between stability and analysability.

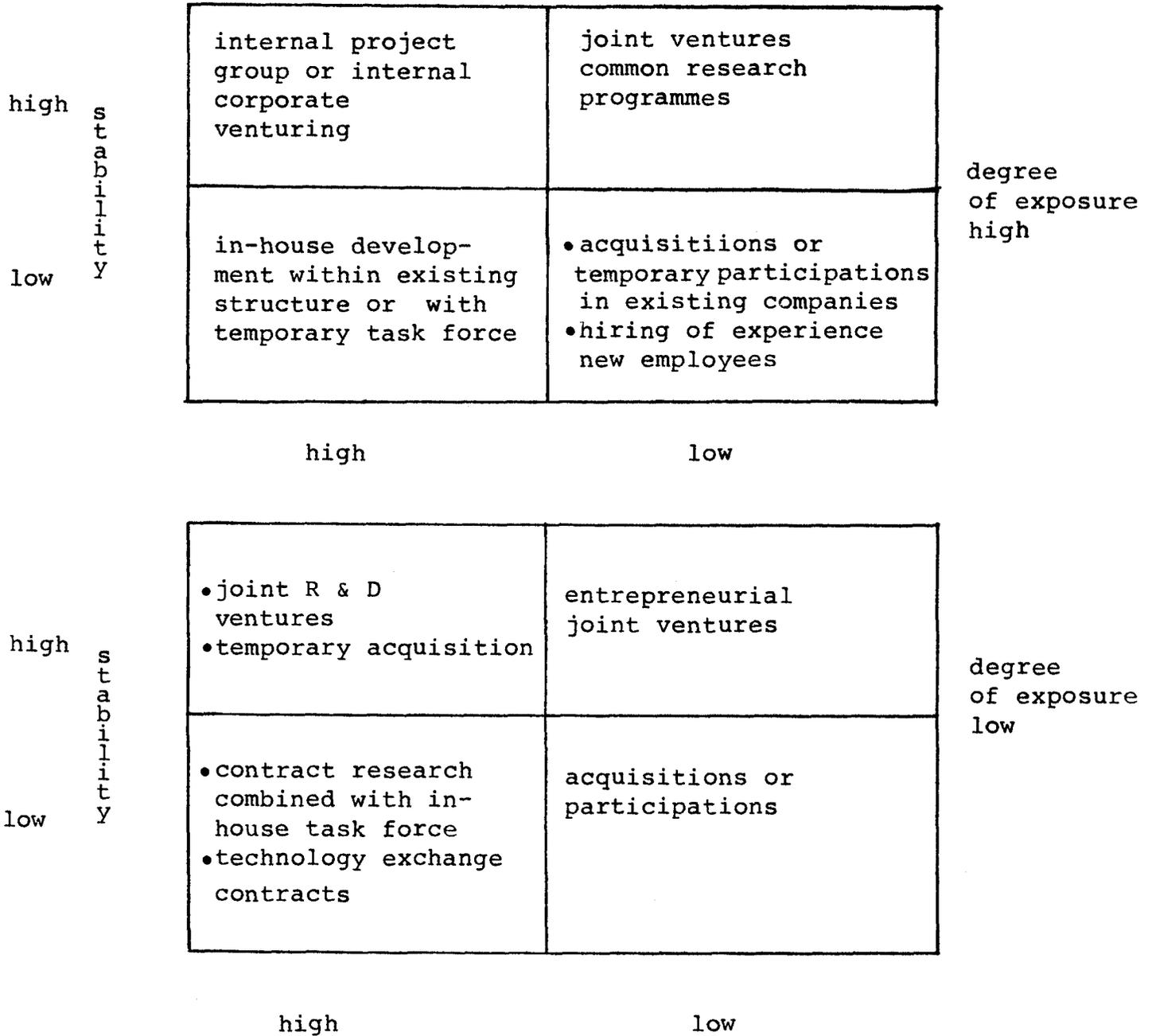
5. THE MODEL IN PRACTICE

The aim of the model is to provide some indication about the organizational settings for acquiring and internalizing a new set of technologies, when considering a productive unit actively concerned with a given set of technologies.

The description of the five categories in section 3 (which given the subdivisions, lead to a non-exhaustive list of more than fifteen possibilities) suggest a relation between these categories and the characteristics of the technology. This relation is summarized in figure 1.

To simplify the model we limited the description of this technology jump model to a matrix with three dichotomous dimensions. Obviously the world is not dichotomous and this simplified matrix is not a perfect reflection of the conceivable possibilities. It is merely an illustration of how one can use the rules we developed in the previous section to start a thinking process about the way a technology jump can be organized. For instance, in the case where we have high stability combined with high analysability and

Figure 1.



high degree of exposure, in-house development, externally enriched by some consulting, should be sufficient. However, in the case of high stability, a high degree of exposure, and a low degree of analysability, one will rely more heavily on individually embedded knowledge, without however increasing the need for more ventureship or increase heavily the outside help. Consequently one will have to consider the hiring of new employees, or (temporary) participation in a company active in this field.

If one considers the other extreme of low stability, low exposure, and low analysability, the most evident approach is probably to start an entrepreneurial joint venture, with people who know the field. Often the role of your company or productive unit will be redefined as that of the venture capitalist, providing the start-up money, while the technological knowhow comes entirely from different sources.

In between these extremes other possibilities are conceivable. In the case of low stability and high analysability, some form of venturing will create a favourable situation. The decision whether either an internal venture or a joint venture with an external partner, or an acquisition will be preferred, will be determined by the degree of exposure to the technology.

In the case of high stability, and a low degree of exposure, the technology will have to be sought outside the organization, and the degree of analysability will determine whether one can jump to the new technology either by contracts with research institutions or other companies, or by acquisition of the organization who has the relevant knowhow.

5. BACK TO THE CASES

Do the three short examples described at the beginning fit our model? Is

their successful action in harmony with the solutions suggested by our model?

The first company, confronted with evolution in the bio-genetic field is challenged by a yet unstable but analysable technology to which it has barely been exposed. One would expect them to opt for a joint R & D venture or a temporary association, which is exactly what they have decided. The second company had first approached their technology problem with plain in-house development, which proved to be unsatisfactory. Given the fact that the technologies they were trying to internalize were analysable, had a medium to high stability, and that they had not been exposed to it before, one would expect them to pursue contract research with the in-house task forces. This is exactly the avenue which was followed after the arrival of the new manager.

The third company was already exposed to the market and its technologies, had no experience with some of the technologies (which were however readily available), but was challenged in particular by the complexity of the system that had to be developed. The creation of an internal venture is precisely what one would expect them to have done.

We do admit that three cases can never be more than an illustration of the model. We are however encouraged by the results and it is our opinion that this model creates some interesting paths for further research.

CONCLUSION

In this paper we have tried to develop a framework for the way a company focusing on a maturing technology can acquire new (possibly threatening) technologies. Companies have conceived creative solutions to overcome this

hurdle, to make this technology jump in many different ways. One wonders whether there is some framework which will explain why particular business units or particular companies will move in a given direction. As demonstrated in this paper, we postulate that the organizational solution which has been chosen to overcome this technological hurdle is contingent with the characteristics of the technology. These characteristics are defined as analysability, stability, and degree of exposure. Depending on the status of these three parameters, one will favour a particular organizational approach to internalize the new technology.

Though we readily admit that the relations that are described are still tentative, we are convinced that they constitute an interesting basis for further exploration and empirical testing.

Abernathy, W. (1978) *The Productivity Dilemma: Roadblock to Innovation in the Automobile Industry*, J. Hopkins University Press, Baltimore.

Abernathy, W.J., Clark, K.B., Kantraw A.M. (1982) *Industrial Renaissance, producing a Competitive Future for America*, Basic Books, New York.

Allen, T.J., (1977) *Managing the Flow of Technology*, M.I.T. Press, Cambridge M.A.

Burns, T. and Stalker G.M., (1961), *The Management of Innovation*, Tanstock Publications.

Perrow, C. (1970) *Organizational Analysis : a Sociological View*, Brooks/Cole Publishing Co.

Utterback, J.M. and Abernathy W.J, (1975), *A Dynamic Model of Process and Product Innovation*, Omega, vol. 3, no.6 pp.639-656

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