Science Parks: a mechanism for technology transfer

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Introduction

The transfer of technology is not new. It has existed since at least the beginning of mankind. Technology in the ancient world even gave rise to the designations of periods of history, such as the bronze age, iron age etc. The transfer of those technologies from one group of peoples to another was a slow one and the term used to describe that process, diffusion, characterized this perfectly.

That which makes this same intrinsic process seem new today is the inescapable recognition of the speed of the transfer function; the acceptance that industry now is more knowledge than raw materials or power based; and the belief that the process can be managed. The prominence of these activities in modern industrial life has demanded the coining of a convenient descriptive phrase and thus we have "technology transfer". It is a term which is deceptively difficult to define satisfactorily, and is often used too loosely and inaccurately. Nevertheless the majority of people instinctively understand the essential meaning of the phrase.

Over the last two or three decades there has been a slow but ever increasing recognition that science parks are potentially most useful mechanisms to facilitate the process of technology transfer. Indeed, it can be said that science parks are but a special case of the general activity of technology transfer. The specificity is derived from the fact that a particularly favourable location is developed for the siting of innovative companies close to a centre of research and dissemination of relevant knowledge, in which the transfer process is actively managed, and in which the tenant companies have need of "continuous technology transfer".

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In order to expand upon these themes it is convenient to take the general and the particular cases of technology transfer separately.

Technology Transfer

It may be helpful to start by making some simplifying assumptions. "Technology" may be thought of as that body of knowledge which is required in the design of a new product or process. In this context, it is probably worth adding the qualification that "new" means new to the receiving party as opposed to a fundamentally fresh discovery. "Transfer" is the movement of the necessary "know how" from its source to where it is needed.

It is also assumed that Technology Transfer (T.T.) involves the whole range of activities from product or process concept through design, development, prototyping, specifications, detailed design drawings, component lists, production engineering, jigs and fixtures, control information (if automated manufacture is involved), sub-contract manufacture, assembly, and test.

In some relatively very few cases, the task of transferring the technology is abbreviated because the recipient, having been shown or given a description of the basic principles of a new development, is both able (in the sense of knowledge) and capable (in the sense of available effort) to develop the product or process "in-house". This may be conveniently described as "ideas transfer", and it is usually confined to the largest companies for obvious reasons.

More often, and especially with small and medium sized enterprises (SMEs), the task of transferring the "know how" involves most if not all of the activities listed above. Clearly this task involves much more effort, perhaps several orders of magnitude more effort to accomplish than "ideas transfer" and the degree of assistance needed by the recipient will be in inverse proportion to the in-house capacity of the receiver.

The most efficient way of transferring technology is to move the person with the "know how" to where it is needed, a process familiarly known as "recruitment". Universities, polytechnics, technical high schools, and research centres are particularly fertile sources of supply of such expert personnel, either on a long term basis (employment) or short term basis (secondment).

An extension of this practice takes us to the "spin off" company formed by one or more members of staff of a university or research

centre who wish to take the results of their work and expertise through to its full commercial exploitation. It can be argued that science parks associated with universities and research centres have been particularly successful in stimulating this aspect of business creation by making it easier, both psychologically and logistically, for such entreprenurial members of staff to make the transition from one type of activity to the other, whilst providing the most effective means for retaining contacts and access to former colleagues and their research work as an important resource both for the present and the future.

Training is another long established method of acquiring "know how" especially when the emphasis is upon the need to know "how" in order to undertake the relevant tasks inside the company. It is worth noting, however, that training has been undergoing a quiet revolution in the past decade or so and has developed a wide range of new mechanisms which provide both flexibility and relevance to the user. In addition to audio and video tapes and other forms of distance learning, the possibilities opened up by computer based learning and the use of multi-media forms of presentation of the information has greatly improved the case of learning at a time, pace, and depth appropriate to each "pupil". The value of these new methods to industry will be great, and once again those companies sited within a science park focused upon a University, for example, will be able to share in what is known at Heriot-Watt University as the "intensively supported learning environment" (ISLE), through use of a personal computer terminal linked to a campus local area network.

Finally, a less familiar but most effective method is that which might conveniently be called "co-operative assistance". Here, the technical and scientific resources of a University or centre of research contribute personnel to a company's project team in order to develop a product or process, whilst at the same time expanding the company's staff expertise through the provision of thorough explanations of the new knowledge being supplied. This may be thought of as a method of "on site tutorials" and this philosophy may be developed into the establishment of full-time, dedicated technology transfer institutes, in which each such T.T.I. concentrates upon a particular area of technology. The objectives of such T.T.I.s are to be aware of new technology in their field wherever it is being developed; to assess the significance of these new developments for industry; to identify specific applications of this new technology; and then to work with interested industrial companies to develop new products or processes

using this technology. The benefits to recipient companies of such an approach have been amply demonstrated and are well worth considering as a means of not only creating a new product but also raising the capability of a company and its capacity to undertake development work.

There are other aspects of the technology transfer process which we shall return to later. At this point it can be appreciated that potentially there are tangible benefits to be obtained by companies, particularly SMEs, in making use of one or a combination of the opportunities for technology transfer from Universities or centres of research. It is also very important to make the distinction that in the case of the latter institutions the underlying assumption is that the relationship with industry is founded not only upon the provision of service but also knowledge. In developing this background to T.T., no explicit assumption has been made as to the distance separating the two partners in university/industry collaboration. If the co-operation is occasional, this question is less sensitive but, as a general rule, it is true to say that the scale of co-operation tends to be proportional to the separation distance if such work is to be economically justified. Conversely, there will be cases in which the need for frequent and on-going contact between the two parties is such that only a location for the company in the immediate proximity of the University or research centre will really be satisfactory. Thus we come to the concept of a science park as a special case of technology transfer in which companies with a need for continuous access to the sources of knowledge are accommodated in a suitable location as close as possible to the focal University or research centre.

Science Parks

The term "science park" has come to be used widely to describe property based initiatives designed to foster the development of technology based industry. The UK Science Park Association definition is as follows:

«The term Science Park is used to describe a property based initiative which

- has formal and operational links with a University or other higher Educational Institution or major centre of research
- is designed to encourage the formation and growth of knowledge based businesses and other organisations normally

resident on site
- has a management function which is actively engaged in the transfer of technology and business skills to the organisations on site

The term Science Park may include initiatives called by other names, e.g. Research Park, Innovation Centre, High Technology Development, etc., where they meet the essential criteria set out above».

Thus, the purpose of a science park is to provide a location which, by its close proximity to a centre of teaching and research, is especially favourable to the creation and growth of knowledge based businesses.

The above definition may be considered to be quite tightly drawn and there are many variations upon the theme to be observed in practice. This should not occasion any surprise, nor invite comparisons, since there is no doubt that each project needs to be suited to the needs of its situation. Thus the precise objectives of the project, the resources available to it (including finance, scientific and technical co-operation, location, etc.) will shape the size, character, and mode of operation of each Park.

Stanford University in California is rightly given credit for being the first to give expression to the concept of the modern science park with its development in Palo Alto. This is a large park by any standards, some 260 Ha, and now forms but a part of a huge, predominantly high technology based manufacturing industrial area spreading all the way down the west side of southern San Francisco Bay from Menlo Park through Cupertino to the south side of San Jose. Much of this development has no direct connection with the Stanford Park, of course, but undoubtedly the latter set an example and gave impulse to what has proved to be an area of quite phenomenal economic growth. Notwithstanding its location in the heart of this burgeoning science based industry, and the fact that it is a large Park, nevertheless it took a period of 30 years for Stanford to completely fill the Park area. This illustrates one of the fundamental lessons from science park developments, namely that these must be seen as long term projects. The special nature of the interactions expected of the tenants with the focal University or research centre determine that rates of development will be steady rather than dramatic.

Undoubtedly, for many, Stanford epitomises the concept of Science Parks, and in the course of the last three decades there has been a flow

of new projects around the world based to a greater or lesser extent upon this model. In the beginning, this flow was nothing more than a trickle and it was not until the early eighties that there was a substantial surge in the number of science park projects, often referred to as the "second wave". This probably reflected the fact that, by that time, enough evidence was accumulating from the early parks, over a reasonable period of operation, to show that a sustained success could be achieved. By the mid eighties, the concept was more widely understood and this, coupled with the rising number of operational projects, triggered a world wide interest in and enthusiasm for these developments. One of the contributions of the "second wave" parks, which were now multiplying the number of examples in each country, was to show that these initiatives had a very strong regional influence. As tangible and relatively high profile developments, these park projects acted as catalysts in helping to change the prospects of a particular region. This proved to be of particular importance in areas of declining traditional industries by assisting the change to new activities and, most significant of all, by helping to change the perceptions of the locality held by residents as well as potential external investors. Thus, on the map of industrial geography, whereas the early parks were typically initiatives taken by Universities and supply driven, the second wave parks showed a markedly higher involvement by regional or city authorities or development agencies in projects aimed at changing the industrial infra-structure of a locality.

In the late eighties, a third and more diffuse wave of park projects emerged to exemplify yet further developments of this philosophy. Prominent in this group were projects in developing countries and in the "less favoured regions" of developed countries. In both cases, the mechanism of a science park was seen as a means of assisting the national strategy of moving the country or region towards an industrialised economy based upon modern products and processes, by bringing together the necessary knowledge and the commercial entrepreneurs. Part of the impulse to achieve this arises from the desire on the part of a primary producer, for example, to carry out more of the down stream processing of raw materials in his own country thus significantly raising the value of the output. Another expectation is that new, additional and (hopefully) innovative products based upon the natural resources of the country can be developed and exploited internationally for the benefit of the national economy. In some cases, the science park project may be seen essentially as a mechanism for

introducing an enhanced element of applied research and development into a region which is predominantly rural, for example. Beguiling as the prospects for such projects may seem, the practical realisation of these benefits can often be a difficult process. Both sides of this partnership need to respond. The industrialist and the entrepreneur has to recognise the contribution which additional expertise from outside the company can make to the development of competitive products and thus wealth creation. The researchers and academics with relevant knowledge need to be motivated, encouraged, and rewarded by some appropriate share of the wealth so created. If the mechanisms do not already exist to permit this, then the problem needs to be addressed at national level in order to liberate these resources. Administrative changes can be legislated by Governments even if the process is a lengthy one. Sometimes, the necessary changes are more in the nature of habits of thought and the business environment. Conservatism in the means by which knowledge is transferred can be most inhibiting, for example. A regional or national bias towards trading as opposed to manufacture can suppress the ability to recognise the opportunity for a new product to fulfil a market need. In both cases, the ability to address the opportunity, assess the technical and investment risk, and to organise and carry the development through to a successful outcome is much reduced. At best, the prospect of import substitution is lost (because sooner or later someone else will provide the product). At worst, the opportunity to gain some share of an international market is never realised. It would be idle to pretend, of course, that these radical changes can be effected easily or quickly, and even more untenable to suggest that science parks are the sole means of making these changes. The contribution which these parks can make, and which has been one of the more obvious characteristics of many of the «third wave» projects, is the potential to capture the imagination of the more enterprising members of both research centres and industry and by their example to show the way forward for these in less well developed economies.

Parks can also be a magnet for inward investment companies. In this instance, of course, the focus will always be upon those areas of research in the University or centre of research which are currently of world class standard. In short, it can be said that the quality of the focal research must be proportional to the distance between the Park and the origins of the prospective tenant. Such considerations will mean, therefore, that in international terms, any one park will mirror

those relatively few areas of research in which that university/park excels.

This specialisation may already be implicit in the case of a focal centre of research which is devoted to one particular area of science e.g. medicine, agriculture, etc. Thus a sub-set of park projects is represented by those which have a tightly defined base of scientific support. The relative advantages and disadvantages of such specialisation may be argued, and the position at present is that an insufficient number exists, and the total operational experience of such is too short, to enable any value judgements to be made.

Finally, before drawing the threads of science parks together, it is interesting to note that one example exists (Belasis Hall Technology Park, Teeside, UK) of a science park focused not upon a University but upon the Research Department of a major industrial company (ICI). Clearly, in such a situation, there is a potential for conflict of interest between a tenant and the source of scientific support, and this source will obviously be alert to the possibility of a leakage of proprietary information to a prospective tenant when applications to be located at the park are being considered. In this respect, however, the greatest safeguard is probably the disparity in size between a focal company (such as ICI) and any of the tenant companies, since the market which each respectively needs to address will be vastly different in scale. The success of Belasis Park does show however that such projects need not be centred only upon academic institutions.

Taking all of the above factors into account, it can be recognised that science park tenants may be categorised by source as follows.

1. Spin-off companies from the focal University or centre of research
2. Local start-up companies
3. Divisions of existing companies

In the discussion so far the assumption has been that the companies are the recipients of the transfer of technology. Whilst true, it may equally be valid to observe that some if not all of these companies can be the source of technology transfer in their turn.

Licensing of Technology

The vast majority of tenants on science parks are small or medium sized enterprises (SMEs), and they have particular problems to overcome in their operations. One of these is the difficulty of justifying

the retention in-house of a wide range of skills, and one answer to this need is a location on a science park. Another and equally severe problem is that of securing a position in the market place. Large companies, with a reasonably secure, perhaps even a dominating position in the market place, tend to be evolutionary rather than revolutionary in their product developments. This maximises their previous investments in research and development; it utilises the (high) fixed investment already made in manufacturing plant and facilities; their established names and reputation for that range of product; their sales skills and contacts; and their service support organisations. All of these factors are usually deployed on an international basis by large companies. The SME generally finds it extremely difficult to break into such well established markets for all the obvious reasons. The small, new company therefore has to develop a novel product which will avoid a direct competition with the large companies on their own ground. Thus the SME may find that it has no option, quite irrespective of its desires, than to be innovative. In so doing, it will have to bear a quite disproportionately high development cost, and risk, and must also accept the need to educate the market place to need (or at least to desire) this innovative product. Such tasks make heavy demands on any company's resources in terms of finance, capability, and available management capacity. Formidable though these difficulties are to a SME, a further challenge needs to be addressed also. The rate of change of the basic technology, together with that of many of the components utilised in the design of innovative products, is extremely high. As a consequence, the "window of opportunity" during which a product can be built and sold is becoming very short, in some cases (involving micro-electronics, for example) perhaps four years or less. At the same time, the proportional time needed to develop a new product is lengthening as compared with its market life. Thus the traditional ratios of these two periods is changing radically and whereas it may have been typically of the order to 1:7 for traditional engineering products, the modern "high tech" product's ratio may now be 1.5:1. Clearly this poses a major problem to SME's. Not only is the proportion of effort and cost much higher for these developments tasks, but it also requires that the development of the next product starts well before the completion of development of the preceding one. Quite apart from the question of providing the necessary resources of all kinds to service such a profile of operation, the pressure to produce new ideas for products which can

be made within the same manufacturing facilities is relentless.

One answer to this dilemma is for the company to eschew the manufacturing aspect altogether and to concentrate upon the development activity with the aim of licensing its designs to others for a fee, and a royalty on production. These companies which do retain the manufacturing element, and which can sustain this demanding development/production profile, can show remarkable evidence of the speed of obsolescence of modern, science-based products. It is not uncommon to find a company which, after five years of operation, no longer has in production a single one of the products with which it started. These problems bring into sharp focus the need for technology transfer; the adequacy of the mechanisms for T.T; and the advantages of one special form of T.T., namely cross-licensing.

Cross-licensing offers a form of technology transfer that is still relatively under utilised but which is rapidly gaining favour amongst SMEs, particularly in Europe. The comparatively high cost of developing "high tech" products must be recovered during the short market window characteristic of these items. Furthermore, it is unlikely that a sufficiently large market will exist for such "niche" products within the company's own domestic market. The need to export is obvious, therefore, although the SME will find this very difficult due to lack of finance and available management effort. Problems of language, different regulations, and export/import administration will also be factors of significance in such initiatives. One mechanism to overcome these problems is the use of an agent, but another (and, it can be argued, more attractive possibility) is to make a technology licensing agreement with a similar size and type of company in another country whereby the latter manufactures, sells, and supports the product locally and remits the agreed fee for each item sold. This is only one half of the equation, of course, and if the licensee company is similar in size and capability (as is highly likely) then there is every possibility that one or mote of their products can be licensed inwards in turn, thus effectively inserting products into the manufacturing and sales process of the «home» company without the development effort and risk.

In summary, by the export licence of one's own technology, markets can be tapped which otherwise might be out of reach and an income stream generated to contribute towards meeting the original development costs. By the complimentary import licence of someone else's technology, a further product can be made and sold, and more time is

gained in which to develop the next of one's own products. Unlike large companies which by the international nature of their operations are likely to be direct competitors in all relevant markets geographically, SMEs can co-operate in cross-licensing for the very reason that their weakness in international marketing means that none is likely to be able to push another out of its own domestic market. Thus, profitable mutual interests can be accommodated.

Science Parks as Nodes in a T.T. Network

The concentration in science parks of SMEs of the type described above and the concern of science park managements with technology transfer both to and on behalf of their tenant companies, has given parks a natural role in encouraging and helping to facilitate the transfer of technologies between companies, most frequently on a trans-national basis. This has been greatly assisted in recent years by the growing number of parks and their more even geographic distribution. This, together with the increasing communication between the managements of science parks to confer on matters of mutual interest such as technology transfer, has created networks of personal contacts between science park managers. These contacts can then be used to assist tenant companies to find suitable partners for cross-licensing arrangements. Undoubtedly, the essence of these technology broking support services to tenant companies is the personal contact as described above but, increasingly, informed opinion is moving to a recognition that science parks can serve a vital role as nodes on more formal international technology transfer networks. This philosophy is likely to be strengthened in future as more parks are able to link through electronic communication networks thus making the detailed exchange of information relating to each opportunity more efficient. If the transfer of technology by SMEs through the mechanism of product licensing continues to develop strongly then it may be foreseen that access by tenant companies to these external technology support networks will become as important a reason for an innovative company to locate in a science park as access to the internal network of scientific and technical expertise.

In this context, two European initiatives are of relevance. The first is directly targeted at technology transfer and trans-national licensing, and is an international association called the European Association for the Transfer of Technologies, Innovation and Industrial Information

(TII). The Association is a network of technology transfer professionals, a sub-set of which are science parks. The majority of members are commercial technology brokers and represent essentially a new profession. When it is considered that membership of TII now exceeds 500 in some fifteen countries in Europe then some measure may be gained of the scale of this activity which, in its turn, is a good indicator of the volume of technology transfer business within Europe at the present time. Moreover, all the indications are that the trend is a strongly rising one. In network terms, the involvement of science parks within the membership of TII means that the range of contacts available to parks is amplified by the other, more numerous members of the "club". Thus there is a high ratio gearing available which, whilst providing a mutual benefit, is decidedly to the advantage of the parks and their tenant companies.

The second initiative is that of DG XIII of the EC in recognising the growing importance of science parks as nodes on technology transfer networks, and programmes aimed at supporting and reinforcing existing individual efforts to strengthen and further improve the practical operation of these networks are being discussed and formulated. In particular, there is a desire to infuse a trans-European dimension into national demonstrator projects, utilising the potential of modern telecommunications technology. This would complement, for example, the UKSPA-NET protocol developed by the UK Science Park Association for the exchange of license opportunities on behalf of members' tenant companies. At the present time UKSPA has a membership of 33 operational science parks containing over 1,000 tenant companies. With this critical mass for interaction on a national scale (and the same potential in France, Scandinavia, etc.) these group protocols would be able to act as national hubs for linkage into a pan-European network.

The possibilities are great but it is necessary to sound a cautionary note. The available telecommunications technology far exceeds the requirements of the network in putely technical terms. The essential questions are the cost effectiveness of such systems and, even more critical, the intelligent management of the information circulating in the network. Hence the emphasis upon protocols. There must be adequate filters in terms of relevance, substance, and obsolescence to ensure that the network conveys to each of its participants timely information (as opposed to mere data) which is suited to their declared interests. The next few years will show whether this promise can be

realised in practical terms, and utilised to help the further growth of innovative companies.

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Τα Επιστημονικά Πάρκα: ένας μηχανισμός μεταφοράς τεχνολογίας.

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Η μεταφορά τεχνολογίας δεν είναι νέα. Σήμερα, αυτό που κάνει τη διαδικασία αυτή να φαίνεται νέα, είναι η ταχύτητα μεταφοράς της τεχνολογίας. Η αποδοχή ότι σήμερα η βιομηχανία βασίζεται περισσότερο στη γνώση παρά στις πρώτες ύλες και την ενέργεια; και η βεβαιότητα ότι η διαδιακσία αυτή μπορεί να διευθυνθεί.

Κατά τις τελευταίες δύο ή τρεις δεκαετίες, αργά αλλά σταθερά αναγνωρίζεται το γεγονός ότι τα Επιστημονικά Πάρκα είναι δυναμικά οι πιο κατάλληλοι μηχανισμοί για τη μεταφορά τεχνολογίας. Πράγματι, μπορεί να λεχθεί ότι τα Επιστημονικά Πάρκα δεν είναι παρά μια ειδική περίπτωση της γενικότερης δραστηριότητας της μεταφοράς τεχνολογίας. Η ιδιαιτερότητα βγαίνει από το γεγονός ότι αναπτύσσεται μια ιδαίτερα ευνοική περιοχή για την εγκατάσταση καινοτόμων επιχειρήσεων, κοντά σε ένα κέντρο έρευνας και "διάχυσης" της σχετικής γνώσης, στην οποία (περιοχή) η διαδικασία της μεταφοράς (γνώσης) διευθύνεται ενεργά, και στην οποία οι εγκατεστημένες επιχειρήσεις έχουν ανάγκη μιας "συνεχούς μεταφοράς τεχνολογίας".

Μπορεί κανείς να σκεφθεί την τεχνολογία σαν ένα σώμα γνώσης που απαιτείται για το σχεδιασμό ενός νέου προιόντος ή διαδικασίας. Η "μεταφορά" είναι η κίνηση της απαραίτητης "τεχνογνωσίας" από την πηγή της προς όπου απαιτείται.

Είναι επίσης δεκτό, ότι η μεταφορά τεχνολογίας (ΜΤ) αφορά σε όλο το φάσμα των δραστηριοτήτων, από την "αρχή" του προιόντος ή της διαδικασίας, μέχρι το σχεδιασμό, την ανάπτυξη, τη δημιουργία προτύπων, τις προδιαγραφές, τα σχέδια λεπτομερειών, τους καταλόγους εξαρτημάτων, το μηχανισμό παραγωγής, τις πληροφορίες ελέγχου (εάν υπεισέρχεται

αυτοματοποιημένη παραγωγή), την παραγωγή των υπεργολάβων, τη συναρμολόγηση και τον έλεγχο.

Ο πιο αποτελεσματικός τρόπος μεταφοράς τεχνολογίας είναι να μετεφερθεί το άτομο με την "τεχνογνωσία" εκεί όπου χρειάζεται, μια διαδικασία που οικειότερα ονομάζεται "στρατολόγηση". Πανεπιστήμια, Πολυτεχνεία, Ανώτερες Τεχνικές Σχολές και Ερευνητικά Κέντρα αποτελούν ιδιαίτερα γόνιμες πηγές προσφοράς τέτοιου εξειδικευμένου προσωπικού είτε σε μακρόχρονη βάση (απασχόληση) είτε σε βραχύχρονη (συνεπικουρία).

Μια επέκταση αυτής της τακτικής, μας οδηγεί στη νεοσύστατη εταιρεία που ιδρύεται από ένα ή περισσότερα μέλη του προσωπικού ενός Πανεπιστημίου ή Ερευνητικού Κέντρου, τα οποία επιδιώκουν να άγουν τα αποτελέσματα της εργασίας και εξειδίκευσής τους μέχρι την πλήρη εμπορική τους εκμετάλευση. Μπορεί να υποστηριχθεί, ότι τα Επιστημονικά Πάρκα, που έχουν σχέση με Πανεπιστήμια και Ερευνητικά Κέντρα, έχουν σημειώσει σημαντική επιτυχία στην "στήριξη" αυτής της πλευράς της γέννησης της επιχειρηματικότητας, διευκολύνοντας ψυχολογικά και διαδικαστικά τέτοια επιχειρηματικά μέλη του προσωπικού να κατορθώσουν τη μετάβαση από τον ένα τύπο δραστηριότητας στον άλλο, ενώ παράλληλα τους παρείχαν τα πιο αποτελεσματικά μέσα για τη διατήρηση των επαφών και της πρόσβασης προς τους πρώην συναδέλφους και την έρευνά τους, ως ένα σημαντικό πόρο για το παρόν και το μέλλον.

Η κατάρτιση είναι μια άλλη παλαιά μέθοδος για την απόκτηση "τεχνογνωσίας", ιδιαίτερα όταν η έμφαση πέφτει στην ανάγκη της γνώσης των τρόπων για την ανάληψη των σημαντικών σχετικών εργασιών μέσα σε μια εταιρεία.

Τέλος, μια λιγώτερο συνήθης, αλλά εξαιρετικά αποτελεσματική μέθοδος, είναι αυτή που θα μπορούσαμε βολικά να αποκαλέσουμε "συνεργατική βοήθεια". Αυτή θα μπορούσε να εκληφθεί ως μέθοδος "επί τόπου μαθημάτων". Αυτή η φιλοσοφία μπορεί να αναπτυχθεί με τη δημιουργία "εξειδικευμένων" ινστιτούτων μεταφοράς τεχνολογίας (ΙΜΤ) όπου το κάθε ΙΜΤ εστιάζει σε κάποιο συγκεκριμένο πεδίο της τεχνολογίας. Θα υπάρξουν περιπτώσεις όπου η ανάγκη για συχνή και συνεχή επαφή ανάμεσα στα δύο μέρη θα είναι τέτοια, που μόνο η εγκατάσταση της εταιρείας σε άμεση γειτνίαση με το Πανεπιστήμιο ή το Ερευνητικό Κέντρο μπορεί πραγματικά να αποφέρει ικανοποιητικά αποτελέσματα. Έτσι, φτάνουμε στην έννοια ενός Επιστημονικού Πάρκου, ως μιας ειδικής περίπτωσης μεταφοράς τεχνολογίας κατά την οποία εταιρείες έχουσες την ανάγκη συνεχούς πρόσβασης στις πηγές της γνώσης, εγκαθίστανται σε κάποια κατάλληλη θέση όσο το δυνατόν πλησιέστερα στο εν λόγω Πανεπιστήμιο ή Ερευνητικό κέντρο.

Επιστημονικά Πάρκα

Ο προορισμός του Επιστημονικού Πάρκου είναι να παρέχει μια γεωγραφική θέση η οποία με τη στενή γειτνίασή της με ένα κέντρο διδασκαλίας και έρευνας αποβαίνει ιδιαίτερα ευνοική για τη δημιουργία και ανάπτυξη επιχειρήσεων που βασίζονται στη γνώση.

Η υπόθεση είναι ότι οι εταιρείες είναι οι αποδέκτες της μεταφοράς της τεχνολογίας. Αν και αυτό είναι αληθές, θα ήταν εξ' ίσου εύστοχη η παρατήρηση ότι κάποιες, άν όχι όλες από αυτές τις εταιρείες μπορεί να αποτελέσουν και αυτές με τη σειρά τους την πηγή της μεταφοράς τεχνολογίας.

'Αδειες για χρησιμοποίηση τεχνολογίας

Η τεράστια πλειοψηφία των "ενοίκων" των Επιστημονικών Πάρκων είναι μικρές και μεσαίες επιχειρήσεις (ΜΜΕ), και έχουν να υπερπηδήσουν συγκεκριμένα προβλήματα στη λειτουργία τους. Ενα από αυτά είναι ότι οι ΜΜΕ βρίσκουν γενικά δυσκολία να εισέλθουν σε γερά διαμορφωμένες αγορές, για όλους τους προφανείς λόγους. Ετσι, η μικρή, νέα εταιρεία έχει να αναπτύξει ένα νέο προιόν το οποίο θα αποφύγει τον άμεσο ανταγωνισμό με τις μεγάλες επιχειρήσεις στο δικό τους έδαφος. Ο ρυθμός αλλαγών της βασικής τεχνολογίας, μαζί με αυτόν πολλών από τα εξαρτήματα που χρησιμοποιούνται στο σχεδιασμό καινοτομικών προιόντων, είναι εξαιρετικά υψηλός. Ως αποτέλεσμα, το "περιθώριο της ευκαιρίας" κατά το οποίο μπορεί να κατασκευαστεί και να πουληθεί ένα προιόν γίνεται πολύ μικρό, και σε μερικές περιπτώσεις (για παράδειγμα όταν υπάρχει και η μικροηλεκτρονική) μειώνεται και σε λιγώτερο από τέσσερα χρόνια. Την ίδια στιγμή, ο ανάλογος χρόνος που χρειάζεται για να αναπτυχθεί ένα νέο προιόν μεγαλώνει συγκρινόμενος με τη ζωή του προιόντος στην αγορά. Ετσι, οι παραδοσιακές αναλογίες αυτών των δύο περιόδων αλλάζουν ριζικά. Εκεί που τυπικά ο λόγος θα ήταν της τάξεως του 1:7 για τα παραδοσιακά μηχανολογικά προιόντα, ο λόγος για τα σύγχρονα προιόντα υψηλής τεχνολογίας μπορεί να φτάσει τώρα το 1,5:1. Τα προβλήματα αυτά εστιάζουν με οξύτητα στην ανάγκη για μεταφορά τεχνολογίας; στην επάρκεια των μηχανισμών για μεταφορά τεχνολογίας; και στα πλεονεκτήματα ενός ειδικού τύπου μεταφοράς τεχνολογίας, συγκεκριμένα στο cross-licencing.

Εν συντομία, με την άδεια εξαγωγής της τεχνολογίας, μπορούν να προσεγγισθούν αγορές που αλλιώς θα ήταν εκτός "βελήνεκούς" και μπορεί να δημιουργηθεί ένα εισοδηματικό ρεύμα που θα συνεισφέρει

στην κάλυψη των αρχικών εξόδων ανάπτυξης. Με την συμπληρωματική άδεια εισαγωγής της τεχνολογίας κάποιου άλλου, μπορεί να φτιαχτεί και να πουληθεί ένα διαφορετικό προϊόν, και έτσι να κερδηθεί περισσότερος χρόνος, κατά τον οποίο η επιχείρηση να αναπτύξει το επόμενο από τα δικά της προϊόντα.

Τα Επιστημονικά Πάρκα ως κόμβοι σε ένα δίκτυο μεταφοράς τεχνολογίας

Η συγκέντρωση ΜΜΕ, του τύπου που περιγράφηκε παραπάνω, σε Επιστημονικά Πάρκα, και το ενδιαφέρον των διευθύνσεων των Επιστημονικών Πάρκων για τη μεταφορά τεχνολογίας προς και για λογαριασμό των εγκατεστημένων επιχειρήσεων, έχει δώσει στα Πάρκα ένα φυσικό ρόλο στο να ενθαρρύνουν και να βοηθούν την διευκόλυνση της μεταφοράς τεχνολογίας ανάμεσα σε επιχειρήσεις, συχνότατα σε διεθνή βάση. Αναμφίβολα, η ουσία αυτών των υπηρεσιών υποστήριξης της τεχνολογικής μεσιτείας προς τις εγκατεστημένες επιχειρήσεις είναι οι προσωπικές επαφές όπως περιγράφηκαν παραπάνω, αλλά, όλο και περισσότερο, η θεμελιωμένη άποψη ότι τα Επιστημονικά Πάρκα μπορούν να υπηρετήσουν ένα ζωτικό ρόλο ως κόμβοι πιο επίσημων διεθνών δικτύων μεταφοράς τεχνολογίας. Μπορεί να προβλεφθεί ότι η πρόσβαση των εγκατεστημένων επιχειρήσεων σε αυτά τα εξωτερικά δίκτυα τεχνολογικής υποστήριξης θα αποβεί εξ'ίσου σημαντικός λόγος για να εγκατασταθεί μια επιχείρηση σε ένα Επιστημονικό Πάρκο, με την πρόσβαση στο εσωτερικό δίκτυο της επιστημονικής και τεχνικής εξειδίκευσης.