



Science Parks Innovation or Image?

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Smart Village Science Park, Cairo - Egypt

Preface



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In today's network and knowledge economy, science and technology parks can play a role as nodes in global networks, where knowledge workers can meet and exchange ideas. These parks offer a specific environment that is advantageous for the companies involved, as – just like them – the parks are strongly geared towards knowledge. These advantages arise from the opportunity for informal contacts, the opportunity to share facilities and the presence of a large number of knowledge workers (employment market, opportunities for exchanges with universities) and young graduates.

Because of the great proportion of highly educated people in the companies established in the science parks, extra attention needs to be paid to them. There is no doubt that, in the coming decades, highly educated personnel will become scarcer in the old, western economies as a result of demographic change. For knowledge-intensive companies, being able to attract and retain highly qualified employees will become vitally important. This results in the 'battle for brainpower' trend many people are now reporting. We now see that the working environment and location will play a major role in the struggle to attract talented employees. But it is also widely recognised

that a well-thought-out concept stimulates creativity, productivity and interaction.

At the international Royal Haskoning consultancy firm, the UrbanSolutions department develops the quality of that work environment, with particular focus on attractive architecture, optimal organisation of the buildings, social security, landscaping and, above all, a broad range of amenities, including recreational opportunities. Management and customer orientation is crucial (think about customer satisfaction surveys, proactive marketing, etc.).

This paper will provide you with an impression of our consultancy activities, the main focus, however, is on the presentation of the outcomes of an ongoing research project in co-operation with the University of Groningen. It shows that, in the case of science parks in The Netherlands, the parks vary in the way they function. The importance of a coherent admission strategy is emphasized.

Prof. dr. Jacques van Dinteren



Science Parks: innovation or image?

Prof. dr. Jacques van Dinteren

As a concept, science parks are still relatively young. In the Netherlands their development only began in the eighties. Governments consider science parks as important engines in regional economic development, above all because of the power for innovation that they are supposed to generate. Based on an exploratory study of businesses at six Dutch science parks, this article outlines the way these parks work. The necessary R&D is carried out, and services and facilities are an important part of the concept, but for a large number of the companies the image of a science park seems to be more important than the knowledge environment and the facilities provided.

Since the creation of science parks, some quite varying definitions have been given. The International Association of Science and Technology Parks (IASP; www.iasp.ws), for instance, places great emphasis on the science park as an organisation of professionals who focus on the exchange of information streams between companies and knowledge institutions, which promote innovation in companies and help with start-ups and spin-offs. Hansson (2004), on the other hand, looks more at their outward form and, based on a variety of definitions, establishes that there is almost always mention of the physical closeness

of a university and of a focus on knowledge and high-tech organisations, and that there is an organisation present that offers help to start-ups.

Based on an exploratory study at six Dutch science parks (see also Van Dinteren, 2009), this article presents an initial picture of the characteristics of the concept and attempts to evaluate its significance. The following parks are involved in the study: the Bio Science Park (Leiden), the High Tech Campus (Eindhoven), the Mercator Science Park (Nijmegen), the Zernike Science Park (Groningen), the Amsterdam Science Park and the Business and Science Park in Enschede. In total, we have received 134 usable questionnaires. The response varied by park from 20% to 43%. Weighted for the number of companies, that comes to an average of 27%. Not a particularly high percentage, but unfortunately characteristic of written questionnaires in companies nowadays. The level of significance maintained is 5%.

Image versus knowledge

Let us begin not with facts but with opinions. In the survey, the companies were presented with a number of propositions. With two of these, a striking contrast arose, almost a complete difference of opinion. We will first take a look at these two propositions. Of the companies, 47% (completely) agree with the statement, "Because of the presence of companies and knowledge institutions directly around our company, the knowledge productivity in our company is considerably higher than in another location." However, 65% of companies also (completely) agree with the following statement: "In practice, a science park does not really turn out to offer our company a great deal in terms of relations with knowledge institutions and other businesses. But it is definitely a good way of making our company known (marketing; image)."

There is a strong negative relationship between the scores for these two statements. Of the respondents who (completely) disagree with the proposition that setting up in a science park does not provide many advantages in the area of knowledge productivity but is good for the company's image, 80% (completely) agrees with the proposition that knowledge productivity is much higher



in a science park than outside (table 1). This relationship can also be found the other way round. Choosing a science park for reasons of image seldom goes together with choosing a science park because of the (expected) increased knowledge productivity. If we now divide the population into four subgroups, as indicated with the colours in table 1, a number of interesting differences come to light. We describe the four groups as knowledge seekers (positive about knowledge productivity; attach

no importance to image), image builders (the opposite view), the mixed group (find image important, but also experience a higher knowledge productivity) and the indifferent group (at least where these two aspects are concerned). The combination of attaching importance to knowledge production and to image does not occur that often: the mixed group has a small share of 9%. The largest group is that of the image builders (43%). The other two subgroups have practically the same share: 25% of respondents are counted among the knowledge seekers and 23% among the indifferent.

Aspects related to place of business

In the questionnaire, a distinction is made between reasons for choosing the location at a regional level and those for setting up in the science park itself. Looking at the reasons for choosing the region, the companies were given the opportunity to indicate the three most important factors. The closeness of the university and/or knowledge institutions scored highly (20%), followed by the more traditional factors such as geographical location (15%), easy accessibility (14%) and “historically developed like that” (13%). Only then comes a factor that can be related to knowledge and innovation: the availability of highly trained staff (8%).

Among the most important factors for their choice of location in terms of the actual science park, from the companies’ point of view, two specifically ‘science-park aspects’ score relatively highly. These are, in first place, the presence of other companies and/or knowledge institutions (21%) and the available networks of companies and knowledge institutions (12%). Here, too, the more traditional factors such as the location’s image (16%), the availability of a representative building (14%) and the rent and service costs (11%) feature high in the list. If we look at the different aspects concerning chosen

| | Proposition on image | | | | |
|---------------------------------------|----------------------|----------|-------|------------------|-------|
| Proposition on knowledge productivity | | | | | |
| | Completely disagree | Disagree | Agree | Completely agree | Total |
| Completely disagree | 0 | 11 | 12 | 35 | 15 |
| Disagree | 20 | 18 | 49 | 40 | 37 |
| Agree | 20 | 63 | 39 | 15 | 41 |
| Completely agree | 60 | 8 | 0 | 10 | 6 |
| Total | 100 | 100 | 100 | 100 | 100 |

Table 1: comparison of the statements concerning knowledge productivity and image



place of business for the four different subgroups, then significant differences can be observed for six factors (figure 1). Unsurprisingly, the closeness of a university is of above-average importance to the knowledge seekers. The presence of networks between companies and institutions is also considered to be important by this group. Conversely, for the image builders, the geographical location is important, as is the accessibility and, as might be expected, the location's image. The aspect 'representative building' though shows no significant difference. Accessibility counts as well for the 'indifferent' companies and this group also sees the location's image as (very) important. The mixture of factors we can identify for choosing a place of business turns out differently when we look at the four subpopulations of businesses. In that case it is above all the knowledge seekers who emphasise the aspects connected with a science park. The other groups attach more value to the more 'normal' factors.

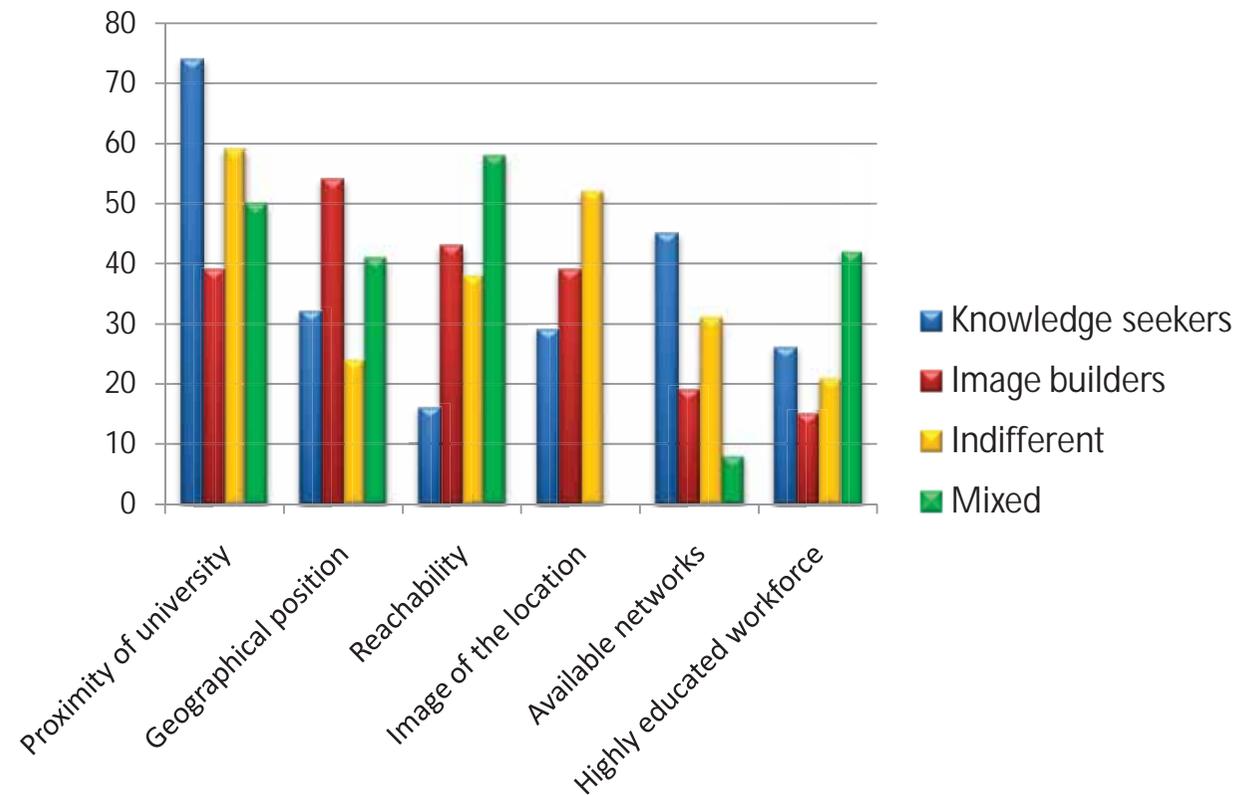


Figure 1: differences in the evaluation of factors in choosing a place of business (percentage that find the aspect in question important or very important)



The Surrey Research Park, Guildford, England

Significance of the university for the companies

A science park is generally associated with the presence of a university. In the cases studied here, the universities – with the exception of Eindhoven – can be found in or next to the park. The fact that the university is so close is definitely not a rule, since for science parks worldwide the university is located on or in the direct vicinity of the science park in only about 40% of cases.

Of the companies in the study population, a third works together with the neighbouring university in the area of R&D. The differences between the company groupings highlighted here are substantial. Unsurprisingly, the proportion is highest among the knowledge seekers (55%), followed by the 'indifferent' with 38%. In the small group that chose both knowledge productivity and image, the proportion is 25%. Only 18% of the image builders collaborate in any way with the university in the field of R&D. The partnerships are usually strong, and are generally of a formal nature.

The study asks about the opportunities that a university can offer the company operating in a science park. For many of the elements given, the companies indicate that these are not relevant for them. Depending on the

different possibilities, around 30 to 50% indicate that they are irrelevant for them (figure 2). That applies particularly to contract research and teaching at the university. For many companies it is also not very important that all sorts of research activities take place in the nearby universities or that their own employees may be offered academic programmes.

If we examine the companies for which certain aspects are relevant (figure 2), then the most important are the availability of graduate students, the access to libraries and data systems, and the access to laboratories and clean rooms. Only after that come the aspects more directly associated with research such as the opportunities for joint research between the company and the university and the presence of relevant research activities.

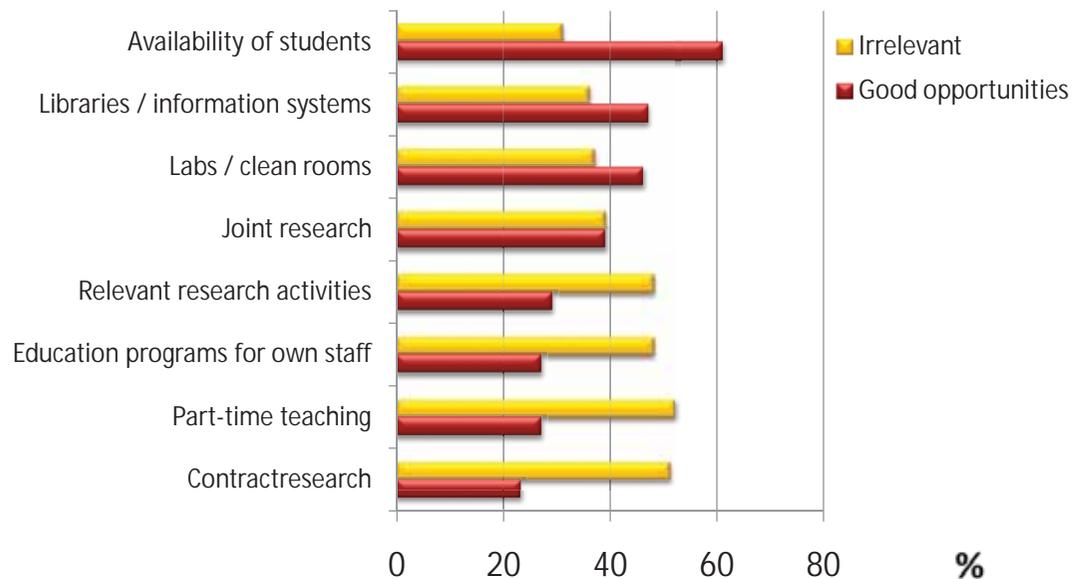


Figure 2: assessment of the opportunities from the neighbouring university



Welding technology (photo by Fronius)

Given the idea of what a science park is (or ought to be), one could assume that the latter aspects, such as contract research, would achieve much higher scores. Here, too, the picture becomes clearer when we examine the four subgroups. If we look at the knowledge seekers, these show above-average scores with regard to the appreciation of research activities (relevant to the company) present in the university (96% against 74% overall), of being able to carry out joint research (89% against 73%) and of the available laboratories / clean rooms (72% against 51% of the total population). The 'indifferent' group is also clearly interested in the university. Being able to collaborate on research scores highly with this group (90% against 73% overall). The other two significantly higher scoring items concern the 'training side' in particular: the possibility of academic programmes for employees (88% against 57%) and the opportunity as a company to provide classes in the university (74% against 47%). As this is the group that is indifferent to the idea of 'knowledge production' (and also of image), you would not really expect this. One might suspect that start-up companies are involved here, but there was no significant connection to be found.

Innovation in the companies in science parks

It may well be that a part of the population finds image more important than knowledge productivity, but that does not alter the fact that the information obtained shows that in the science parks concerned the necessary activities take place in the field of R&D and innovation. Of the companies in the study population, 26% spends nothing on R&D, but for most of the companies R&D expenditure is

greater than the norm for an average company. The average comes out at 29%, the median at 13%. If we again separate the results out into the four subgroups of companies, we see that in the knowledge seekers almost three quarters of the companies spend 11% or more of their gross revenue on R&D. The mixed group is the weakest in this aspect (table 2).

| | Knowledge seekers | Image builders | Indifferent | Mixed | Total |
|----------|-------------------|----------------|-------------|-------|-------|
| 0-3% | 7 | 26 | 17 | 33 | 20 |
| 3- 10% | 19 | 33 | 48 | 42 | 34 |
| 11 - 40% | 35 | 24 | 24 | 0 | 25 |
| > 40% | 39 | 17 | 10 | 25 | 21 |
| Total | 100 | 100 | 100 | 100 | 100 |

Table 2: the percentage of gross revenue spent on Research & Development



Activity in the field of R&D must lead to innovations: new products, services or processes. Patent applications (and, further, obtaining patents) are one of the consequences of this. Table 3 gives an outline of these aspects. Particularly here the knowledge seekers prove to score remarkably highly with respect to the rest of the population. What is also striking is that, after we have already seen earlier that

the ‘indifferent’ attach greater than average importance to being able to carry out joint research with the universities, they now also have an above-average score regarding collaboration with other companies. The mixed group also scores well in this regard. It is – unsurprisingly – the image builders who score differently in a negative sense.

Intrinsic differences between the science parks

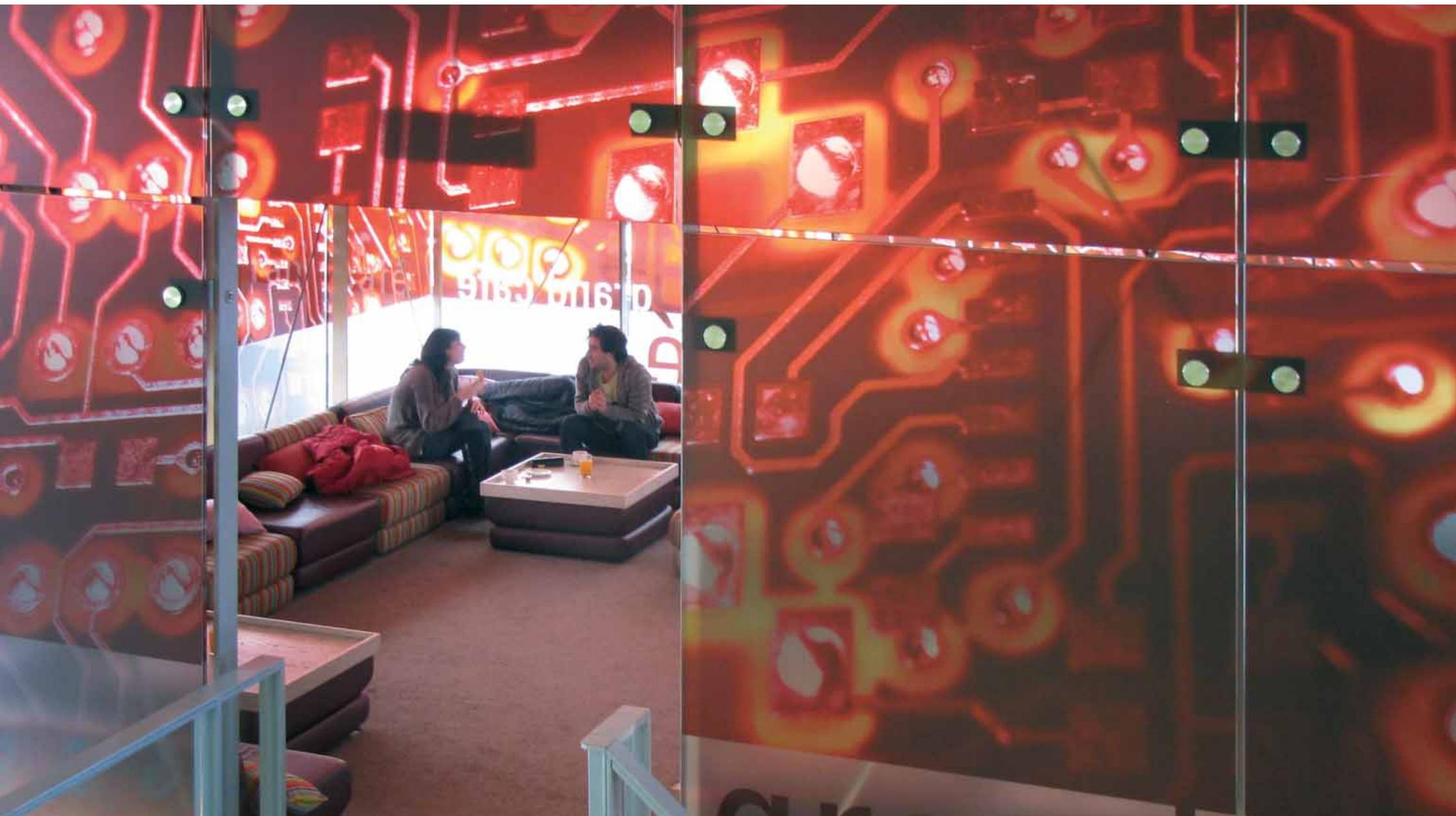
Inevitably the question arises as to what the situation is in the different science parks. Before looking at that, it must be noted that the differences described below are statistically significant (as far as this section is concerned, at a level of 10%), but that does not mean that the results for the different parks are representative. Given the size of the population in the different science parks, the results should be considered as indicative.

If we first of all look at the factors that determined the choice of region, it is only in the case of the characteristic ‘innovative region’ that a striking difference can be observed. Eindhoven scores extremely highly here in comparison to the others. In addition to this there are a few differences in a number of comparatively rather less important factors. Thus Amsterdam stands out with regard to the favourable geographical location, Leiden has an above-average score for the presence of businesses in the same branch (in which the focus on life sciences undoubtedly plays a part, together with the admission policy) and Enschede and Groningen achieve an above-average score with regard to the living environment. As for the relevant factors that concern the science

| | Knowledge seekers | Image builders | Indifferent | Mixed | Total |
|---|-------------------|----------------|-------------|-------|---------|
| Works together with other companies in the science park | 55 | 24 | 45 | 42 | 38 |
| Brought out a new product in the past five years | 71 | 33 | 30 | 14 | 39 |
| Brought out a new service in the past five years | 59 | 41 | 55 | 43 | 48 (NS) |
| Brought out a new process in the past five years | 12 | 13 | 5 | 0 | 10 (NS) |
| One or more patents applied for in the past five years | 32 | 14 | 18 | 20 | 20 |
| One or more patents granted in the past five years | 29 | 11 | 18 | 20 | 22 |

NS: not significant

Table 3: the percentage of gross revenue spent on Research & Development



park, there are significant differences with regard to the image aspects, among other things. The image of the location scores highly with the companies in the science parks in Amsterdam and Eindhoven. In contrast, the buildings in the two parks are less appreciated. It is different in Enschede, Groningen and Nijmegen, where the representativeness of the buildings receive an above-average score. The High Tech Campus in Eindhoven also distinguishes itself through the available networks and the presence of other companies and knowledge institutions. On that last point, the Leiden Bio Science Park also has an above-average score.

Eindhoven's positive image is continued when we look at the opportunities that the university can offer. The fact that in Eindhoven the university actually lies somewhat further away does not seem to present much of a problem here. The companies of Eindhoven are more than averagely positive about the access to laboratories and clean rooms and about the opportunities for joint research between companies and the university. The Mercator Science Park in Nijmegen also has above-average scores on both points, and Leiden has an above-average score on the aspect of opportunities for joint research activities.

Actual collaboration with other companies in the science

park occurs most frequently in Eindhoven (in 65% of the companies), Leiden (61%) and Nijmegen (42%).

With regard to the percentage of gross revenue that is spent on R&D, the companies on the High Tech Campus in Eindhoven are the absolute leaders (figure 3). The

Zernike Science Park shows the worst score. This science park has never really taken off properly and in fact has developed into more of an (as yet small-scale) business park. Initiatives have now been undertaken to breathe new life into the concept.

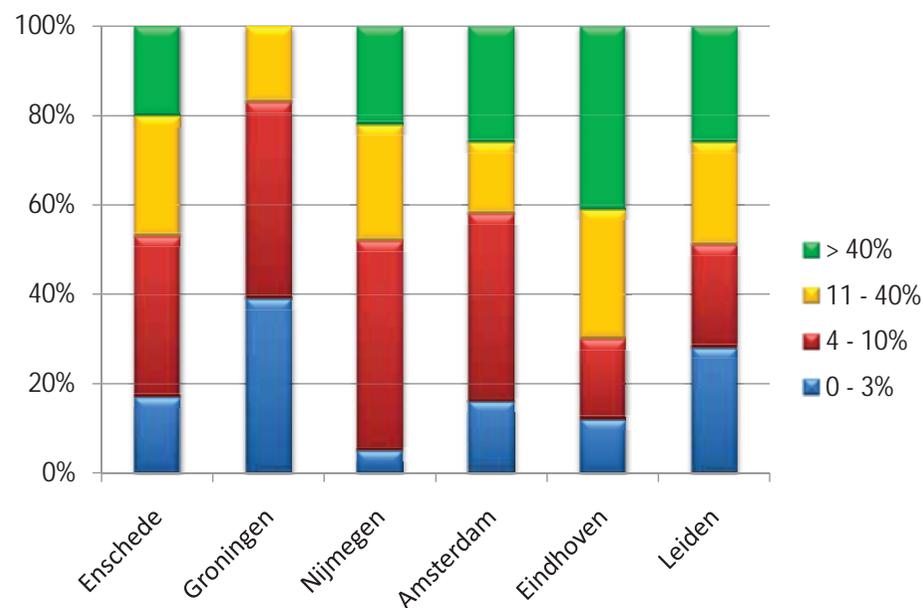


Figure 3: the percentage of gross revenue spent on Research & Development



The presence of a young student population is of importance

If there is one single science park that emerges extremely strongly on the points considered here, it is the High Tech Campus in Eindhoven. Here, too, we find a comparatively large number of knowledge seekers together with an overrepresentation of the 'indifferent' companies (figure 4). Nijmegen and Leiden also come out looking good. Nevertheless, they are completely different science parks. The Mercator Science Park in Nijmegen consists of a few collective buildings and half the companies have five employees or fewer. The Bio Science Park in Leiden, on the other hand, covers a considerable area and has proportionally larger companies. Nijmegen has an overrepresentation of 'indifferent' companies; Leiden of the mixed group, but in absolute figures the image builders dominate. Groningen, Enschede and Amsterdam come out less well on the aspects surveyed here. For the Zernike Science Park the reasons for this have already been given. For Enschede it may have to do with the mix of activities. The name says it all, in fact: the Business and Science Park. From the beginning, here, the choice was made to have a mix of business service providers and knowledge-oriented companies.

Looking at the four groupings highlighted here and the above-mentioned points it is in any case clear that the

High Tech Campus in Eindhoven, which scored highly on the most variables in this, also has a large number of knowledge seekers (figure 4). The picture presented by the Science Park Amsterdam is the complete opposite: this park seems to be home to a large number of image builders.

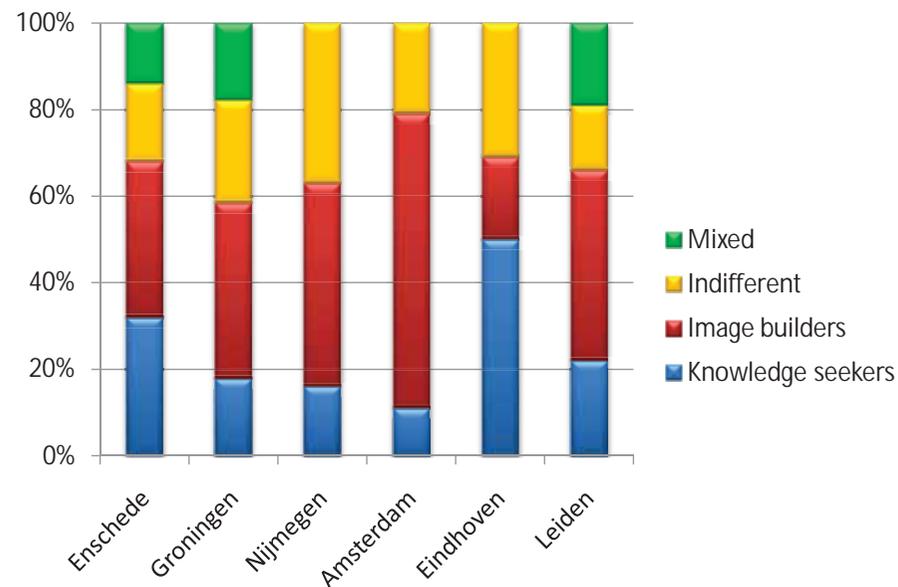


Figure 4: the percentage distribution across the four types of companies, by science park



Conclusion

Science parks are intended to create an environment for businesses and knowledge institutions in which they can function well by making use of each other's facilities, and where they can meet each other informally and exchange knowledge. The fact that they can also be seen as an attractive work environment is a plus point for the critical knowledge worker, just as the presence of a young student population can be attractive to businesses. That is the concept. Strategic partnerships and the exchange of (strategic) knowledge are no part of that. Such things are so important that people are ready to travel across the whole world for them; it is not something that happens somewhere within the confines of a science park (Van Dinteren, 2007, 2009).

If we take a look at the results of this analysis it seems possible to establish, on the basis of the answers from the companies, that in the Dutch science parks the above points are met. There is above-average investment in R&D and there are collaborations between companies and the university and among the companies – even if this only applies to a third of the cases. So by and large the opportunities are there, but it is only a limited number of the businesses that make use of them. Undoubtedly this has to do with the fact that a large group of companies can

be found (almost half) in the science parks that first and foremost attach importance to the allure of the science park and above all to its effect on their image.

The general conclusion appears to be that science parks in the Netherlands are set up in such a way that they can fulfil the concept of a 'science park', but the admission strategy evidently lacks cohesion. There is no critical consideration of the companies that put themselves forward. Given that most science parks are limited in size, the danger exists that the power of the concept is undermined through this. To conclude, we invite you to consider the following quote from David Adamson (director of Estate Management, Cambridge University): 'If someone rang and said, "I want to put up a 10,000 sq m building," I would ask which professors they are working with. If they couldn't answer the question I'd tell them to go to one of the colleges. It's not an open season science park. You have to demonstrate links with the university to be here' (Van Dinteren, 2007).

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- Vnukovo Business & Science Park, Moscow, Russia (market research, concept development, urban design)
- Automotive Campus, Helmond / Eindhoven, The Netherlands (market research, concept development, urban design)
- Zernike Science Campus, Groningen, The Netherlands (market research, concept development, investor research, process management)
- ENCI Building and Construction Campus, Maastricht, The Netherlands (market research, concept development, general urban design)
- Business and Science Park Schieveen, Rotterdam, The Netherlands (process management)
- GreenPark, science park for agro-industry, Venlo, The Netherlands (business plan)



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