IASP International Association of Science Parks and Areas of Innovation

35th IASP World Conference
on Science Parks and Areas of Innovation 2018
Isfahan, Iran

The university as a catalyst in innovation district development

Plenary session 5:

Open Innovation and City Challenges

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Hosted by:

ISFAHAN SCIENCE & TECHNOLOGY TOWN (ISTT)

ISBN: 978-84-09-17612-0

The university as a catalyst in innovation district development

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Abstract

In this paper, we focus on the role of universities in innovation districts. Regarding the growing interest in innovation districts, the question arises if an innovation district can do without a university. Or, the other way round, can a university campus be a good starting point for an innovation district? Can an innovation district be successful without a university? In which way can a university function as a catalyst in innovation district development?

The outcomes of research and recent developments suggest that it is relevant to have a university or an annexe of a university in an innovation district, as distance does matter. However, there are yet no hard research outcomes that make it clear that the success of an innovation district is dependent upon a university. Apart from that, the four cases described here, in short, suggest that the establishment of a university or annexe can help the development of an innovation district by creating trust and contributing to a positive image of the development.

Introduction

Looking at different types of innovation areas[1] a distinction can be made in four crucial drivers:
- networks & community,
- entrepreneurial dynamism,
- infrastructure & facilities and
- a comprehensive business case (figure 1).

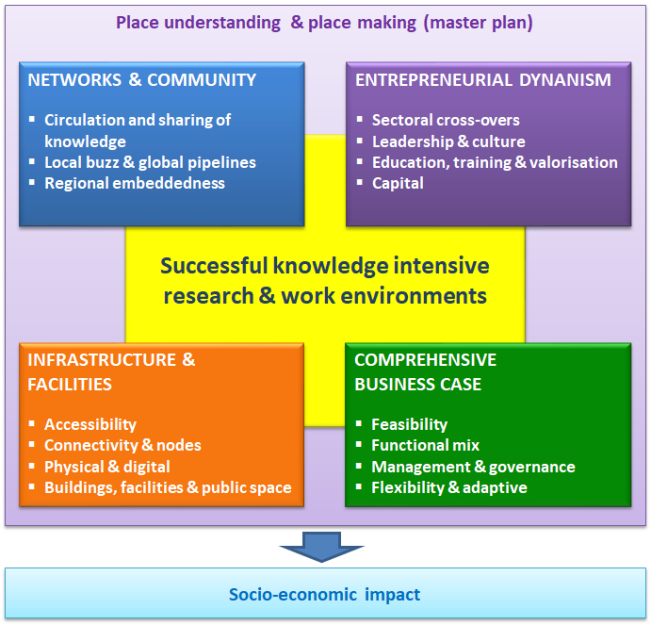
Until the 1990s there has been a strong focus on the physical aspects, mostly real estate, when developing innovative working environments. This focus was typical for the first decades of the, quite often mono-functional, science & technology park (STP) concept. Nowadays we understand that developing an STP or another type of innovation area is not (solely) a real estate operation. We – and others – like to stress the importance of the functional linkages between companies, institutions and universities enforced by strong management of these networks. The added value of an innovation area is in these networks, but also in the creation of a working environment that stimulates creativity. Altogether also known as the 'software'.

So, in today's innovation areas, the development of a knowledge network of companies and institutions is essential. The same goes for the creation of a community (which is more focused on personnel, organising activities and an excellent working environment). All together this forms the ecosystem. Although this doesn't alter the fact that ultimately businesses and institutions located in the innovation areas also need modern real estate, adaptive infrastructure and attractive public spaces. Given this, specific requirements can be placed on buildings, particularly respecting the needs for community building and networking. For instance, pedestrian flows, the creation of meeting points, the concentration of catering and restaurant facilities where pedestrian flows meet, creative work environments, etc. For the successful management of any area of innovation, it is crucial that the different layers in the social-spatial structure of a site or area are recognised and respected: the networks, the infrastructure and the buildings.
But first of all, the 'guests' in the estate (companies, institutions, others) are central. In many cases it can be observed that one guest is 'leading' or – better said – is considered to be the 'anchor' of the development. That is often a university in the case of an STP and – per definition – a large, innovative company in the case of an industrial innovation campus. But what about the

[1] In our opinion science & technology parks, innovation districts and industrial innovation campuses are different forms of innovation areas.

upcoming innovation district? The available literature points out that in general one has the opinion that a successful innovation district needs at least one anchor firm or institution. This can be a research university, another institution working in the field of research and innovation or a (large) company.

Figure 1: IADP-model to create a successful R&D work environments (www.iadp.co)



The leading question for this paper
Given the great importance of innovation and the exchange of information between stakeholders involved, (research) universities and leading, innovative firms probably plays a crucial role in the development of innovation districts. "Probably" because, as far as we know, there are not yet research outcomes available that make clear what exactly that impact can be. Until now it is more about expectations.

In this paper, we particularly focus on the role of universities in innovation districts. These districts are characterised by their embeddedness in the city, innovation, a dynamic mix of functions and good public transport. It seems that for a growing number of firms and institutions, active in the fields of science and innovation, the innovation district is the working environment of the future. Such an environment might also (or maybe specifically) attract the millennials in the war for talent. Given the link of STPs with universities, this raises the question if an innovation district can be successful without a university in the district? Or, in case of an already established university or university institution: can such a university be the starting point for an innovation district?

The latter question is posed by the University of Amsterdam, The Netherlands. This university is very well established in the city with three of their four sites located in the city. An 'interconnected concentration' of specialised clusters, which together constitute a network of knowledge and individually function as catalysts for their immediate surroundings. One of these clusters is situated in the inner city, and the university intends to create an innovation quarter ('University Quarter') here, consisting of university buildings and the surrounding area. It is the opinion of this university that a modern university is no longer an 'ivory tower'. It stands in the middle of society and in front of that society. A university is a crucial member of a modern, knowledge-oriented society. Against this background, the question arises how the University Quarter can be turned into a success. The aim is to create added value to the university, the environment and the city and what role the University Quarter plays in this respect. Also, the surrounding area is important to the university: the space between the different buildings, but also between the clusters, needs to stimulate the interaction between inhabitants, students, companies and knowledge institutions. At the sub local

level (University Quarter), that space must also provide a pleasant working environment that stimulates creativity and innovation. The key question is: how can we shape this area into a successful whole, involving all stakeholders and stimulating innovation?

In this paper, we will focus on the question of which way a university can function as a catalyst in innovation district development. To get a preliminary answer to this question we have used the available literature and news items. This will be followed by interviews with representatives of universities in existing innovation districts. At the time of delivering this paper for the conference, the results of these interviews were not yet available but will be presented at the IASP conference in September 2018.

Relevant trends

Many different developments have been recognised that, positively or negatively, elucidate the growing interest in and success of innovation districts. At IADP we think that the following main trends are relevant.

A response to the trend of deconcentration - In Europe in the sixties of the 20th century, apart from some centuries old universities (Cambridge for example), many universities tended to concentrate their activities in areas at the edge of the city where sufficient space was available. The upcoming phenomena of STPs at that time and the link these parks sought with the university also led to favouring isolated areas at the edge of the city. For both developments, STPs and universities, there is growing criticism about this spatial pattern and the way it functions. Too mono-functional, too much focussed on car accessibility, too far away from the inner city, not well connected with or embedded in the city, and so on. Some STPs try to find solutions for the problem (if it is perceived as a problem) by developing living quarters on the park, which also helps to ease the threshold for facilities and services in the park itself.

Companies are looking for 'density' - It seems that the aforementioned developments of STPs have stimulated the rise of innovation districts. The changing functions of inner cities and the mass re-allocation of traditional industries from the inner cities and surrounding old quarters give room for new developments such as innovation districts. Innovation economies reward urban density because of the agglomeration effects. Open innovation stresses the importance of working in close proximity, being able to share ideas rather than invent in isolation.

Companies are revaluing vibrancy and authenticity in (inner) cities – This trend is an extension of the former one. It is well-known that artists, people working in creative industries and researchers value a sense of place, including coffee shops, art galleries, and so on. A work environment that encourages creativity and innovation, and offers a balance between life, work and play. This is more important for millennials, which is an important target group for innovative companies and research universities in their competition to get the best talent.

Cross-overs instead of specialisation – In the worlds of innovation and areas of innovation the clustering of companies and institutions working in the same field was the adage for a long time and still is. On some STPs, we see a shift in the concept from specialisation towards crossovers. We have the impression that it is expected that especially the innovation district can offer the right environment for a functional mix of innovative companies and institutions and hence an environment or a seedbed very well suited for crossovers.

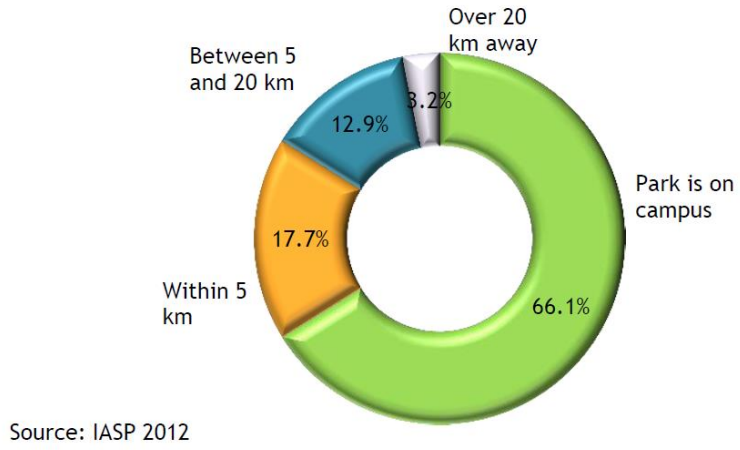
When looking at the possible (anchor) role of a university in an innovation district the following two trends might be relevant:

The 'opening up' of the university – According to Goddard & Valance (2013) universities have to become civic universities, meaning that they have to turn into an urban 'anchor' institution, being of significant importance to the economy and the wider community life of the cities in which they are based. Or, as Goddard & Valance put it, institutions that are of the city not just in the city. Universities try to do this in different ways by appointing innovation officers (linked to the industry), setting up incubator centres, organising specific education programs for the city population, and so on. The 'opening up' is sometimes also stimulated by taking the initiative to settle between the population in an innovation district or by starting an innovation district by itself.

From triple to quadruple helix - It is not surprising that this interweaving of the university with the city led to a shift of the triple helix concept towards the quadruple helix. It is the cooperation of university, (local) government, firms and inhabitants. This might have to do less with innovation, as far as the local population is involved, and points at – among others – education, continuous learning, living labs and other forms of co-production with citizens. Several authors state that universities should go to or settle next to deprived areas to encourage developments there.

Although these trends can explain the upcoming phenomena of innovation districts, we do not suggest that this is the end of STPs. STPs will continue to exist, but the concept has to be adjusted to new standards. The innovation district is just another concept in the realm of innovation areas. Moreover, it is important to consider STPs, innovation districts and innovation campuses as focus points within an innovative region. It would be a serious mistake to think that such a cluster or set of clusters will in itself determine the innovation power of a city or region. Also, because too many relevant, innovative firms and institutions are established outside these innovation areas.

Figure 2: distance of European STPs to their closest university (EC, 2014)



Source: IASP 2012

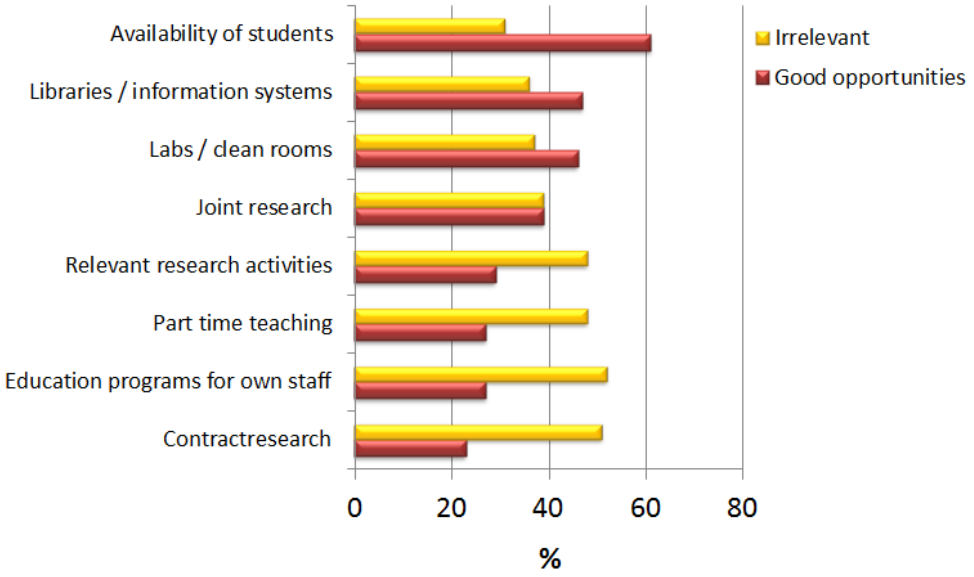
The university, the networks and the ecosystem

Given the trends above, a university might choose to move (partly) into an innovation district which seems to be more open to the city than a campus at the edge of a city. Will that make it easier for a university to become a part of that ecosystem? Let us first have a look at the relationship between a university and an STP. It is often stated that universities play a crucial role in the development and success of the networks and the ecosystem on an STP. Proximity to a university is generally believed to be helpful (if not crucial) to establishing and maintaining a working relationship. Figure 2 shows that 84% of STPs are within 5 km of their closest university and 66% are either on or adjacent to the university campus (EC, 2014). This suggests that proximity of a university is crucial to the development of an STP. With regard to the new concept of innovation districts, the question arises whether an innovation district can do without a university. Or, the other way round, can a university campus be a good starting point for an innovation district?

A study of six STPs in The Netherlands (Van Dinteren, 2012) revealed that such a relationship with a university can cover a lot of activities and is not solely limited to knowledge linkages. It even appeared that other aspects/facilities were generally seen as more important by the entrepreneurs established on the STP (figure 3). 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. These percentages are influenced by the fact that, in these STPs, firms are established that do not directly belong to the target group. Admission policy on STPs is often rather weak in The Netherlands. If we focus on firms and institutions that belong to the target group, these show

above-average scores with regard to the appreciation of research activities (relevant to the company) present in the university (96% versus 74% overall), of being able to carry out joint research (89% in comparison to 73%) and of the availability of laboratories/clean rooms (72% versus 51% of the total population).

Figure 3: assessment of the opportunities from the neighbouring university (Van Dinteren, 2012)



Proximity, mass and density

The need for a university in some type of innovation area can be related to the desire of firms and other institutions to be able to consult researchers at the university quickly and informally. On the other hand, how relevant is proximity given globalisation, the internet and other possibilities for rapid exchange of knowledge? Recent studies seem to indicate that proximity still plays a role. Linkages between firms and research institutions function both on the local *and* global level. Sometimes a university is even criticised for too much global interest. For example, Meric Gertler, president of the University of Toronto agrees with the criticism that his university focuses too much on global relationships, reputation and rankings than on its community partners (www.universityaffairs.ca/news/news-article/big-city-universities-examine-their-relationship-to-the-cities-in-which-they-reside/).

A study about research outcomes by Dutch CPB (2017) shows that the chance that a company builds on the knowledge produced at a university decreases the further it is from the university. This suggests that knowledge spill-overs are localised. The size of the effect also depends on the sector and the size of the university. The study is, however, focused on the regional level and is not clear about the impact of small(er) distances.

Andes (2017) states that over the last century hundreds of studies have proved the benefits of density and proximity for innovation and that these findings suggest that knowledge sharing among universities, research labs, and firms exists at the neighbourhood level. Andes does not elaborate on what proximity exactly means, but he shows that size of the city (mass) and density of the urban environment play a role, as universities established in that type of environment flourish. He analyses downtown universities in metropolitan areas (the reasoning here is based on numerous economic studies which show that large metropolitan areas experience much stronger positive effects of proximity than smaller cities). In his study, Andes compares the commercial outcomes of research universities located within employment-dense neighbourhoods (e.g. downtowns) in the 100 largest cities to the average research university. He finds that compared to their peers located in smaller towns, suburbs or rural areas on a per-student basis, 'downtown' universities:

- produce 80% more licensing deals;

- disclose 123% more inventions;
- receive 222% more income from licensing agreements;
- create 71% more start-ups.

These outcomes suggest that universities located in dense employment centres of cities achieve greater commercial impact for their research. Clustering of economic activities does matter and inner cities, where most of the innovation districts can be found or are located nearby, provide the right conditions for such a clustering.

The university and the innovation district: two models

There are two simple models when we look at the possible relationship between a university and an innovation district. In the first case, an innovation district is under development and looks for a university or annexes of a university to complete the picture, as it might be clear that a strong institution or company can be an important anchor in such a development. It helps to create an image, but it is also an important node in the local innovation network.

The second option is a university taking the initiative to develop an innovation district next to its premises, or maybe even mixed with its own buildings. The motivation, as described above, is to become a part of the city and not just being located in it.

Model 1 - Katz & Wagner (2014) state "universities are particularly helpful drivers for growing districts; for this reason, many districts that did not originally include universities (…) have convinced universities to build satellite campuses". Initiators of the *I.D.E.A. District in San Diego* were worried about this development because a few years ago the migration of technology companies to the downtown area had started to take hold. In 2013, 25% of the new downtown leases, many of them tech companies, were executed by companies coming from outside of downtown. To speed up and assure development a corporate leader was needed "who can accelerate the transformation". In December 2016, UC San Diego, a major research university, announced a 6,100 m^2 downtown outpost. It is now expected that satellite businesses will surely follow. "As soon as UCSD or one of the other big academic institutions puts a beachhead downtown, then we'll know downtown has arrived", potential users told Carlson, a CBRE commercial broker active in downtown office leasing (www.ideadistrictsd.com).
In the early days of the well-known *Boston Innovation District,* its position was strengthened when a satellite campus of Babson College was established. In 2011 this campus was expected to serve "as the academic anchor to help fuel further growth in the Innovation District". "Nobody creates jobs like entrepreneurs, and nobody creates entrepreneurs like Babson," said Mayor Menino. "The inclusion of a top-tier academic institution here in the Innovation District is a key part of the supportive infrastructure we are building and providing to the people and businesses in this neighbourhood. Babson's expertise and partnership undoubtedly will help us fuel even more connectivity and growth across this district." (www.babson.edu/news-events/babson-news/Pages/11915Innovation-District-Welcomes-Babson.aspx.)
In the case of the 22@Barcelona innovation district, companies seem to have been the anchors in the early stage, but nowadays universities seem to have taken over this role. Being a publicly financed university, the Universitat Pompeu Fabra, for example, felt it was obliged to move a part of its activities, especially in the broad fields of communication, to the Barcelona innovation district.

Model 2 - or 'the other way around': the university that wants to become an innovation district. The reasons for this can differ. Offering a nice environment to work and study in is one possible reason, but creating stronger links with companies (the entrepreneurial university) is certainly another one. An example is *Seattle's University District*. This district extends beyond the physical boundaries of the university which makes the development much more difficult because of the existing neighbourhoods. This raises a conflict between the envisaged development and liveability. The city takes care of good planning, assuring that there will be sufficient affordable housing, instead of gentrification. A light-rail station in the district will help to discourage motor vehicle traffic (www.washington.edu/innovation/).
In the case of *Melbourne (Australia)* the development of an urban innovation district (MID) is an initiative of the City of Melbourne, RMIT University and the University of Melbourne. Home to 21% of all knowledge sector jobs in Melbourne, the urban innovation district features the central campuses

of RMIT and the University of Melbourne, State Library Victoria, Queen Victoria Market, Royal Exhibition Building, Trades Hall and the Melbourne Museum. "Through community events and improved public spaces, MID will provide more opportunities for Melbourne's knowledge workers, researchers, students, business and community organisations to connect and collaborate, creating innovative ideas essential for the city to continue to thrive and prosper. Planning considerations for the area will help innovation flourish and will include upgrades to streets, parks and other public spaces, while at the same time protecting the district's suburban character" (www.rmit.edu.au/news/all-news/2017/aug/melbourne-innovation-districts-launched).

The added value of a university for an innovation district

If in an innovation district it is felt that a university is needed as an anchor it is assumed that such an institution will be crucial in stimulating innovation, and in creating a scientific, innovative ecosystem. The development of the Boston Innovation District mentioned above shows that such an anchor helps to strengthen the image of the development and stimulates entrepreneurs to choose to settle in the district. But the added value of a university is not limited to companies and other institutions. From the idea of a civic university, a university well embedded in society, there are also (high) expectations about the ability of the university to stimulate social and economic development in deprived areas, as it often stated that many innovation districts are located near such neighbourhoods. Special (education) programs might help young people (with parents that have no university education) living in these neighbourhoods, offering better opportunities to visit a university. Students at the university can also play a role in these deprived areas as volunteers, supporting people, local schools and organisations. For the people living in these quarters, but also for others living in the surrounding areas, the university can provide access to facilities, such as gyms, meeting rooms, restaurants, library and the like. The university can also organise exhibitions and lectures and can actively participate in local projects, helping to find solutions for specific problems (see also box).

It is our impression that, in the literature, particular attention is paid to the relationship of the university with surrounding districts, while in practice it is a relationship with the city, and perhaps the region too. This doesn't exclude that a certain accent can be placed on deprived neighbourhoods.

The University of Sheffield

The university has a programme of open days, lectures, seminars, exhibitions and family events running throughout the year. It offers a range of courses to members of the public, some of which are free. For example, Discover is a free award winning short course, designed to inspire adults who haven't been to university. The course is delivered one morning each week, and focuses on themes that link into the subjects offered by the Department for Lifelong Learning.

Sheffield Volunteering supports students and staff to get involved in activities in the city. Its aim is to increase awareness of local community issues amongst students as well as an understanding of how they can make a positive impact through volunteering. In 2014 2,213 students and staff took part in 2,922 volunteering opportunities within the local community and across Sheffield. The university's sports facilities are open to the public, with many of the facilities available on a 'pay and play' basis such as the swimming pool, fitness classes, squash and badminton.

Source: Goddard & Kempton (2016)

The added value of an innovation district for the university

Although a university might be important as an anchor in an innovation district, the innovation district can also be of importance for the university itself as Bruce c.s. (2015) have described. Being established or having satellites in an innovation district helps research and innovation in universities. The authors sum up many examples (in the United States of America) of educational and research institutions that have moved key facilities and departments as a means of generating greater innovation output to retain or achieve competitive advantage in their respective clusters and fields. By seeking the best places within their region (or even within other regions), universities want to retain or strengthen their competitive power.

Of less significance is maybe the fact that the settlement of a university (or an annexe) might be perceived by students as an attractive location because of the dynamic environment "where people unexpectedly bump into each other again and again in their daily routines". An environment formed by cafeterias, convenience stores, theatres, restaurants, and so on. As many innovation districts can be found in the central parts of a city, good public transport is guaranteed.

Preliminary conclusion

In an innovation economy, networks are essential. Large innovative companies and universities can build the webs connecting these networks. Although we have all the opportunities to establish worldwide networks, research suggests that proximity is still important. But what is proximity? Is that on the neighbourhood, the city or the regional level? What about smaller cities and larger ones? 66% of all STPs are established on the campus of a university. That seems to suggest that short distances are relevant. And, as we have seen, that it is not just because of networks, but also about facilities and the like, we could state that proximity also helps to create that dynamic environment that students, innovators and companies are looking for. In that respect, it is also interesting to notice that universities in dense areas flourish.

Given these outcomes, one could suggest that it is relevant to have a university or an annexe of a university in an innovation district, as distance does matter. However, there are as yet no hard research outcomes that make it clear that the success of an innovation district is dependent upon a university. Apart from that, the four cases described here suggest, in short, that the establishment of a university or annexe can help the development of an innovation district by creating trust and contributing to a positive image of the development.
It is also interesting to note that universities themselves believe in the concept. Innovation districts can try to attract a university, but we have seen that there is also another model in which the university wants to develop an innovation district on its premises or adjacent to it.

Although it is all based on circumstantial evidence, this secondary research seems to suggest that the establishment of a university (annexe) can be a real anchor in the development of an innovation area.

Although we do realise that the outcomes of these interviews will not deliver hard evidence, we will continue this research by having interviews with managers of universities that are settled in an innovation district to try to find more details. We will focus on:

- the model (university establishing in an innovation district or a university creating an innovation district);
- expectations and locational factors;
- specialisation or cross-overs;
- special demands by the university;
- success factors.

The outcomes of this follow-up will be presented at the IASP world conference 2018.

At the same time, we like to invite our fellow researchers to gather more hard information on the linkages between a university and its innovation district. What does proximity mean in terms of (kilo)meters? Keep in mind that proximity not only refers to exchanging information but is also relevant with regard to other aspects such as availability of students, facilities and the like.

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