

## Creating a vibrant innovation ecosystem : the High Tech Campus Eindhoven case

***Citation for published version (APA):***

Romme, A. G. L. (2017). *Creating a vibrant innovation ecosystem : the High Tech Campus Eindhoven case*. Technische Universiteit Eindhoven.

***Document status and date:***

Published: 15/05/2017

***Document Version:***

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

***Please check the document version of this publication:***

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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# Creating a vibrant innovation ecosystem: The *High Tech Campus Eindhoven* case

White paper (May 2017)<sup>1</sup>

The High Tech Campus Eindhoven is a campus-based ecosystem for hightech R&D, located in the city of Eindhoven (Netherlands). It is currently home to more than 140 companies and institutions, involving more than 10,000 product developers, researchers, entrepreneurs, and service providers. The *Financial Times*, *Fortune*, *Forbes* and many others have praised the High Tech Campus Eindhoven (HTCE) as one of the best locations in the world for hightech venture development and startup activity. The *OECD* has observed that the HTCE is the most inventive “square kilometer” on the planet, in terms of patent density. *Henry Chesbrough*, a leading scholar in the field of “open innovation”, has followed the HTCE since its inception:

"I have visited the campus numerous times, and can attest to the energy, vitality and diversity of the more than 10,000 scientists and engineers located there. HTCE is truly an exemplary example of open innovation, with the wonderful physical layout, the many different companies and technologies housed there, and the savvy to help newcomers plug into this vibrant open innovation ecosystem."

This white paper depicts and illustrates the key characteristics of HTCE’s capability as an innovation ecosystem. First, HTCE’s history and current offerings are outlined. Subsequently, I explore what has been fueling its success.

## History

Philips was the original force behind the HTCE. Until the late 1990s, Philips operated all its R&D activities in its NatLab, the breeding ground for many successful *Philips* products as well as a large number of hightech startups, some of which became leading OEMs themselves—such as *ASML* and *NXP*. To reinforce the interaction between researchers and product developers with different technical backgrounds, Philips decided to open up its main NatLab facility to other companies in 2003, renaming it the *High Tech Campus Eindhoven*. The result was a substantial growth in the number of high-tech companies and other residents – both large and small. In 2012 the HTCE was sold by Philips to *Ramphastos Investments*, a consortium of investors. Philips remained on the Campus as a tenant, but its status changed from owner/manager to resident.

Since 2012, the HTCE has continued to attract new companies and research institutes engaging in R&D in the area of high tech systems, nanotechnology, smart

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<sup>1</sup> This white paper is largely based on: Romme, A.G.L., "Toward the blueprint of campus-based ecosystems for innovation", *Engineering Management Research*, 6 (2017): 84-89 (<http://www.ccsenet.org/journal/index.php/emr/article/view/67708>). This paper was commissioned by the HTCE management team. E-mail address of the author: a.g.l.romme@tue.nl

pharma, embedded systems, life sciences, and security and encryption. HTCE researchers submit 4 patents a day (on average), which is **more than 50 percent** of all patent applications in the Netherlands. In *The Smartest Places on Earth*, Van Agtmael and Bakker observe that the HTCE

“has enjoyed astonishing success so far. More than one hundred organizations – including global players Intel, IBM, ABB, ASML and Philips – have now located at least part of their research activities to the campus, and more than 8,000 R&D engineers from sixty countries are employed there.”

## What the HTCE offers

One key goal of the HTCE is to foster cooperation between companies in hightech systems, nanotechnology, smart pharma, life sciences, embedded systems, encryption, and related areas. The high density of researchers and entrepreneurs at HTCE makes it into a so-called **innovation district**, but we'll use the term *R&D ecosystem* here. The high density and proximity of people at HTCE promotes trust, which in turn encourages a faster exchange of ideas when two or more persons (from different companies) meet to talk about mutual interests.



Source: HTCE

The HTCE provides basic services such as office facilities and parking space. But HTCE's key offering in the area of high tech systems, nanotechnology, smart pharma, embedded systems, life sciences, and security and encryption is to **facilitate R&D and product development** by

- providing *access to innovation services* – in the area of, for example, materials analysis, high-end laser job shop prototyping, production facilities for electronics and mechanical products, product certification, electronic instrumentation and photonic equipment; and
- creating and sustaining an *innovation community* that enhances informal networking and knowledge sharing between (R&D engineers of) the companies and institutes at the campus; as such, the HTCE hosts about 500 events every year.

This combined offering appeals to hightech companies of all sizes. It attracts large corporates such as ABB, ASML, IBM, Intel, and NXP, but also many small companies. The med-tech startup **G-Therapeutics**, for example, recently acquired €36 million in funding and made a conscious choice to locate its product development activities on the HTCE, says the CEO of this **Swiss-Dutch startup**:

“The High Tech Campus is a great place to be for international tech talent. It’s great to have such a large community with various skills. The physical proximity of big corporates is also a plus. When needed I can easily connect to people there.”

Another example is LifeSense, a fast-growing startup in the area of sensor technology that develops protective and re-usable **underwear**. For Valer Pop, the CEO of LifeSense, the HTCE is not only the birth place of his company but also fuels its growth:

“For me and my company, the High Tech Campus Eindhoven is the number one location in the world. LifeSense is based here, but almost all our revenue is generated outside the Netherlands. And having the HTCE on my business card greatly helps in closing deals in the US, Japan or anywhere elsewhere in the world. It’s like an endorsement: people simply trust me when I say that LifeSense is based at this campus, that has a global reputation ever since Philips created many of its successful products here. My ambition, thus, is to create a new Philips at the HTCE.”

## **Distinctiveness**

HTCE’s value proposition, as depicted above, may in itself not be unique. Other location-based ecosystems, such as many **science parks**, are offering a similar proposition. However, the HTCE appears to be distinctive in how it systematically practices and implements its key offering, drawing on a deep understanding of what makes it tick as an R&D ecosystem. This ‘software’ of the HTCE can be summarized in the following principles.

### ***Minimizing distances to facilitate direct interaction***

The physical distances between buildings and offices at the HTCE are minimal, which provides for easy access to technological facilities as well as other people at the campus. At the heart of the campus is **The Strip**, hosting a variety of facilities such as restaurants, grand cafés, conference rooms, a food market, and a wellness/fitness center. This central area of the HTCE has been deliberately designed to connect people and stimulate knowledge sharing and collaboration. A key implication of this design is that all other buildings at the campus do *not* have any canteens or restaurants, which provides an extra motivation for many people to frequently walk to the facilities at The Strip.

Elsewhere on the campus, a large variety of outdoor sports facilities is available, including tennis courts, soccer pitches, volleyball and basketball courts, and running and workout circuits. There is also a (former) farm house at the HTCE, for a variety of social events. Overall, the short distances at the HTCE appear to facilitate direct interaction and collaboration between people.



Source: Philips Innovation Services

### ***Informal networks and knowledge sharing***

Short distances to others at the campus are, obviously, not enough to make people interact with each other. A key assumption therefore is that “**networks cannot be copied nor can they be easily established.**” The HTCE therefore deliberately hosts a large number of events, to facilitate informal networking and knowledge sharing. This is done by a variety of thematic workshops and seminars, meet and match events, quiz nights, open lectures, drinks and demo sessions, sports and recreational events, and many other informal events.

A large number of campus events are initiated and organized by members of the HTCE community, and others are organized by the campus management team. As a result, the HTCE hosts about 500 events every year. A substantial number of events focus on the social dimension—such as sport tournaments, quiz nights, and other recreational events. But most events are set up as network meetings or thematic sessions, to connect people with a shared interest—for example in a particular emerging technology.

### ***Managing the ecosystem’s diversity and reputation***

The HTCE manages the diversity of its ecosystem in two complementary ways. For one, it grows and sustains the *diversity* of the population of residents, within the scope of HTCE’s profile. Second, HTCE’s management team deliberately seeks to build and maintain its *reputation*, by selecting new residents that fit and reinforce its profile as well as motivating residents that do not (or no longer) contribute to its ecosystem to leave.

This balancing act, between growing the ecosystem’s diversity and sustaining its profile and reputation, implies the HTCE must facilitate the exit of residents that no longer fit its value proposition. The case of **Liquavista**, a spinoff from Philips that was later acquired by Samsung and Amazon, illustrates why it is important to have these **exit routes**. Liquavista initially decided to locate on the HTCE, but at some point discovered it no longer needed the state-of-the-art cleanrooms available at the campus, and therefore decided to move elsewhere. Managing the diversity and

reputation of the campus is key to its success, says Frans Schmetz (managing director of HTCE):

“Managing the mix of residents at the campus is an important task for me and my management team, one that helps maintain the unique profile and global reputation of this campus. We’re 100% privately owned, which creates clarity and speed, but also implies we need to be profitable in order to invest in future campus developments. We thus have to maintain a very delicate balance. On the one hand, we have square meters to be rented by companies and also have quite some unused space to be further developed. On the other hand, it is super important that we attract the right companies to the campus. Therefore, we carefully assess each applicant in terms of the fit with our profile and what this newcomer would contribute to the existing facilities, infrastructure, or community at the HTCE. We’ve especially been very selective with regard to firms in the periphery of hightech R&D, such as many service providers.”

### ***Connectors that initiate and manage collaboration***

Creating value from complex R&D networks of enterprises and other organizations cannot be done without connectors. A *connector* has a key role in bringing together organizations across a particular, newly emerging, value chain. Over the years, the HTCE has attracted several programs and organizations that provide capabilities for initiating and managing collaboration between these residents. Examples of these *connectors* are Solliance, Holst Centre, [EIT Digital](#), [ARTEMIS](#), [ITEA](#), and [High Tech NL](#). For instance, [Solliance](#) is a joint venture of several research institutes and universities that have combined forces in developing the next generation of solar cells. At the HTCE, the academic and industrial partners of Solliance work together in testing and producing thin-film PV modules.

An important connector at the HTCE is the [Holst Centre](#) that, with more than 30 industrial partners and around 200 employees, develops generic technologies in the area of wireless autonomous sensor solutions and flexible electronics. A key feature of the Holst Centre is its partnership model with industry and academia, based on shared roadmaps and programs. One of many spinoffs created by the Holst Centre is LifeSense, the fast-growing startup in the area of sensor technology mentioned earlier.

The HTCE has also set up [HighTechXL](#), an incubation and acceleration program that has grown into the leading hub for hightech startups in Europe. HighTechXL supports hardware startup founders, from idea to prototype to scale-up, by connecting them to a top-tier community of entrepreneurs, corporates, and investors. The HTCE ecosystem also benefits from the presence of connectors elsewhere in the region, such as [Brainport Industries](#), [Sioux](#), [Mikrocentrum](#), and [Eindhoven University of Technology](#). For example, Sioux has been successfully orchestrating several new value chains in the area of high-end equipment for precision engineering.

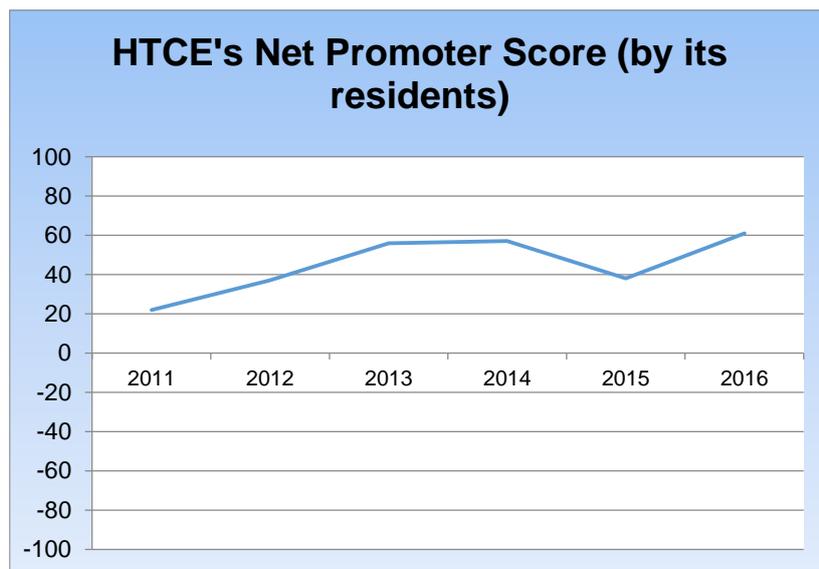
### ***Responsiveness to what residents need***

The HTCE management team appears to act as an “excellent landlord that is very responsive, honest and straightforward in answering our questions and requests”,

says Guido Dierick, CEO of **NXP** Netherlands. This high level of responsiveness also pertains to unconventional requests. For instance, the HTCE effectively responded to a request from **ABB** that develops charging infrastructure for electrical vehicles (EV's) at the campus. Wil van Gils, VP Research & Development at ABB:

“In ABB’s unit here at the campus, we’re currently working on fast charging stations for electrical buses. This EV charging infrastructure operates on extremely high power levels, up to 450 kW or even higher. Last year, we needed a testing site where we could park a bus and connect it to the prototype of our charging station. This site needed to be as close as possible to our building on the campus, which is quite challenging given the substantial space required for moving and parking a bus. The campus management was very helpful in arranging a solution and providing the space that we needed.”

The HTCE also monitors the level of satisfaction of its residents more systematically, via surveys and other tools. Generally speaking, these measurements signal a positive trend in the satisfaction levels of residents. A key measurement is the Net Promoter Score (**NPS**) that increased substantially since 2011 (see Figure below). Notably, organizations with average performance levels have NPS scores between 0 and +10, whereas best-in-class organizations score between +50 and +80.



### **Overall picture**

The five drivers of the HTCE ecosystem, previously outlined, reinforce each other. For example, short distances between people reinforce opportunities for knowledge sharing. And the various network events as well as the capabilities of ‘connectors’ help fuel the commercialization of breakthrough ideas and technologies (and their value chains) emerging from the HTCE ecosystem. Engaging in only a few of these activities would make the HTCE much less successful in implementing its key offering. The success of this ecosystem arises from a deep and inclusive understanding of the conditions for a vibrant R&D ecosystem, and the commitment

to carefully grow and sustain these conditions. Guido Dierick, CEO of **NXP** Netherlands, thus believes the HTCE provides a very attractive location for NXP:

“This campus is a perfect location for the hightech talents we are looking for. Its global reputation as well as the presence of many other tech companies makes it highly attractive for people to come and work for NXP. In recruiting new talent, we explicitly use HTCE’s reputation as the ‘smartest square kilometer on earth’. The HTCE provides a very pleasant, green and vibrant location for our staff, at the center of the highly innovative Eindhoven-Brainport region. At NXP, we especially appreciate the excellent facilities, including the conference center, gym, supermarket, many restaurants and other services—all available within walking distance.”

The overall picture of the HTCE as a leading location for hightech innovation is also supported by evidence collected via the annual *Erasmus Competition and Innovation Monitor*. Based on this evidence, Henk Volberda, a professor at the Rotterdam School of Management, concludes that companies at the HTCE have an exceptional focus on both performance and innovation. Moreover, he **observes** that the HTCE serves as a springboard for companies, including startups, to realize disruptive as well as incremental innovations:

“We found that High Tech Campus Eindhoven is outperforming the others in *all* the innovation types. They show very high scores on radical innovation, incremental innovation, but also social innovation. (...) we’re seeing evidence in our survey that they are leading with other types of innovation — co-create with partners, giving room for ideas for employees, getting rid of hierarchical pyramids.”

A similar observation is made by John Blankendaal, the managing director of **Brainport Industries**—a collaborative network of more than 90 suppliers in the value chains of ASML, DAF Trucks, NXP, Philips and several other OEMs:

“The High Tech Campus Eindhoven plays an important role in creating the industries of the future. In close cooperation with other actors in the Brainport-Eindhoven ecosystem, the HTCE provides access and connections to many competences needed to realize the hightech ambitions of this region. It provides an innovation ecosystem from which new OEM’s and value chains emerge, but also fuels the continuous renewal of existing value chains in the Brainport region and elsewhere.”

## **Future outlook and conclusion**

The HTCE is pursuing a growth strategy that prioritizes quality over quantity. That is, it expects to grow to a size of more than 200 residents, employing at least 15,000 people, but it intends to do so gradually. This means the HTCE management team has no pre-established targets and time horizons for this growth ambition. The focus on quality is also evident from the careful selection of new residents, as explained earlier.

With regard to the infrastructure of the campus, the HTCE seeks to develop a more flexible and open workplace culture. Although the central facilities at the Strip are open for anyone (incl. non-residents), most hightech companies themselves have rather closed buildings and workplaces at the campus. As such, the HTCE community can become more open and inclusive, especially by embracing a more flexible and open workplace culture, as recently also advocated by **Vermeulen**.

Overall, the HTCE offers a rather unique ecosystem for companies in the area of hightech systems, nanotechnology, smart pharma, embedded systems, life sciences, and security and encryption. First, it provides access to shared resources and facilities, to facilitate R&D and product development activities. Second, the HTCE involves an innovation community that enhances knowledge sharing between people at the campus. In this respect, the HTCE draws on a deep understanding of how it creates value for its residents:

- R&D efforts by engineers thrive on direct interaction and collaboration, and therefore the HTCE enables value creation by minimizing the physical distances between the various buildings, offices and shared facilities.
- The HTCE facilitates knowledge sharing and informal networking by a dynamic portfolio of thematic workshops, meet and match sessions, sports and recreational events, and many other informal events and initiatives.
- The HTCE carefully manages its diversity and reputation by gradually increasing the population of residents, within the scope of HTCE's profile, while being rather selective in accepting new companies on the campus—especially by assessing what a newcomer contributes to the ecosystem.
- To enable value creation from complex networks of enterprises and other organizations (also outside the campus), the HTCE attracts and hosts 'connectors' that have the capability to initiate and/or manage collaboration across a newly emerging value chain.
- Each resident at the campus has its own needs, and the HTCE therefore is highly responsive to their questions, requests and feedback.

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