Amsterdam University of Applied Sciences

Co-creation at Amsterdam Science Park

van Winden, W.; Switzer, Andrew; Schrama, W.; van den Buuse, D.J.H.M.

Publication date
2019
Document Version
Final published version

[Link to publication](#)

Co-creation at Amsterdam Science Park

May 2019

Urban Management programme
Winden, W. van; Switzer, A.; Schrama, W.; Buuse, D.J.H.M. van den

Amsterdam University of Applied Sciences
Commissioned by *Gemeente Amsterdam*

Table of contents

1. Introduction

As part of a broader ambition to improve its position as an internationally competitive knowledge city, Amsterdam has the ambition to strengthen its innovative capacity in the natural sciences and in high-tech (Gemeente Amsterdam, 2015). The ingredients are there: world-class universities, a strong corporate sector, a thriving start-up scene, a high quality of life and excellent international accessibility.

Amsterdam Science Park (ASP) is a pearl in the crown of the Amsterdam knowledge economy, with its high-level research institutes (the Faculty of Science of the University of Amsterdam, several institutes of the NWO, the Dutch national science organisation) and a growing number of knowledge-based companies that reside in the multi-tenant Matrix buildings at the park. At ASP, the number of examples of co-creation is steadily growing. Larger tech firms (including Bosch and ASML) have located there and engage in deep collaboration with university institutes. Many more companies have expressed interest in collaborating with researchers located at ASP, not only in order to gain access to promising talent, but also to more extensively involve university researchers in their R&D processes. Another trend is the growth of science-based start-ups, now hosted at ASP's Start-up Village: an appealing hotspot, made of sea containers.

Players from business and university signal a rising need for new and more integrated concepts that facilitate collaborations between larger firms, start-ups and research groups. And also, the ASP management would like to see more co-creation. From its spatial and organisational design, the park is however characterised by a separation of activities: each faculty and institute operates its own building and facilities, with the firms hosted in the multitenant Matrix buildings. ASP is being developed along the lines of a masterplan based on strict zoning (Gemeente Amsterdam, 2013).

This study explores how, and under what conditions further co-creation could be facilitated at ASP. To research this, we conducted a literature study on university-business interaction and co-creation, and interviewed sixteen key stakeholders at Amsterdam Science Park. The aim of the empirical research was to understand the perspectives of key stakeholders on co-creation, to gain insight into current practices and needs for university-business collaboration, and to collect first ideas for new viable concepts at the ASP.

This study is part of a larger, long-term AUAS Urban Management project about the development of campuses and innovation districts in Amsterdam, in which we experimentally explore new types of business models and forms of collaborative governance to achieve synergy between business and science. The Amsterdam University of Applied Sciences (AUAS) takes the role as knowledge partner for Campus Amsterdam, a recently started network of campuses and innovation districts in Amsterdam that want to learn from each other and contribute to the development of Amsterdam as leading European city of knowledge, science and creativity.

This report is organised as follows: section 2 reviews relevant literature on co-creation, defines the concept, and identifies conditions under which co-creation can flourish. In section 3, we outline our research methods; sections 4- 6 present the results of the analysis, and section 7 concludes and makes suggestions for further research.

2.   The theory of co-creation

2.1   Terminology

There are many terms and concepts relating to the systemic nature of innovation.

Open innovation: Open innovation refers to a situation where an organisation does not only rely on its own internal knowledge, sources and resources (such as their own staff or R&D) for innovation, but also uses multiple external sources such as customer feedback, published patents, competitors, external agencies, the public etc. to drive innovation. Two types are discerned: inbound innovation (sourcing and acquiring expertise from outside the organisation, and scanning the external environment for new information to identify, select, utilise and internalise ideas), and outbound open innovation: the purposive commercialisation and capture of internally developed ideas in the organisation's external environment (Chesborough and Bogers, 2014).

Triple helix collaboration: this concept focuses on dynamic network arrangements between the overlapping institutional spheres of industry, government, and academia. Each sphere relates to the other two, with an emerging overlay of communications, networks, and organisations among the helices. Innovations emerge in this network of relations, in a subdynamics of intentions, strategies, and projects. Favourable environments for innovation emerge at the intersections of the spheres, evoking creative synergies, new venues for interaction and new organisational formats, where individual and organisational actors not only perform their own role, but also 'take the role of the other' (Etzkowitz 2003).

Co-creation: In the economics and management literature, the term co-creation often refers to the inclusion of the consumer/end user in the development process of innovations (Von Hippel, 2005). However, in recent years, more encompassing definitions have been developed. Wierdsma and Swieringa (2011) define co-creation as a form of co-operation between two or more parties that creates added value for them and where the shared objectives are predetermined, but where process is not. For Prahalad & Ramaswamy (2004), co-creation is a management initiative, or a form of economic strategy, that brings different parties together, in order to jointly produce a mutually valued outcome.

In this research, we study co-creation in the spatial context of the Amsterdam Science Park, and analyse the need for new types of facilities and facilitation of co-creation. The policy question is how the science park can facilitate emerging types of innovative collaboration between its tenants and also with partners outside the ASP. With this in mind we will adopt a relatively wide definition of co-creation. We define co-creation as a time and space bound collaboration, in which two or more partners work together to develop and create new technologies, products, services or solutions. The partners involved in co-creation can be companies, knowledge institutes, governmental organisations, or NGOs. With this definition, we exclude permanent collaborations such as joint ventures: It is the project orientation and temporary nature of co-creation that poses challenges, because it creates a fluctuating and at times unpredictable demand for space that is difficult to facilitate in a science park setting with buildings/facilities that are designed for single, stable tenants and permanent use.

In our definition we exclude collaboration that is merely transactional (buyer-supplier): there must be an element of research, development and innovation, implying a certain degree of risk and an uncertain outcome. Also, there must be a degree of physical personal co-presence of the collaborating partner organisations. We thus exclude collaborations that mainly consist of external funding (of facilities, projects, PhDs or chairs), or joint supervision of thesis work, but where the researchers in fact work at the location and within the routines of their parent organisation.

Given the dominance of knowledge institutes at the Amsterdam Science Park, we will focus on co-creation in which either the university (research as well as education) or the science institutes play a role. We will make a further distinction between internal and external co-creation. Internal co-creation occurs between players that are located at the science park itself; In the case of external co-creation, also external players are involved.

2.2 Trends in co-creation

What are relevant trends and developments regarding co-creation?

First of all, universities and public knowledge institutes are increasingly opening up to the outside world, and are developing a plethora of relations with external stakeholders. This is something which is actively encouraged by government policies and/or institutional strategies (see Siegel et al. 2003). They engage with industry and society to access funding, to access research facilities, to exploit/commercialise research findings, to test theories/concepts, to benefit from relevant knowledge in the private sector, to increase the relevance of the curriculum and to expose students to real world problems/challenges.

Companies, especially science-based or knowledge intensive ones, have become increasingly interested in engaging with universities: to access scientific knowledge, to remain alert for new technologies, to recruit talent, to exploit scientific knowledge commercially, to develop human capital (training), to solve specific problems or address challenges together, to enhance their corporate image, or to achieve cost savings (Ernø-Kjølhede, 2001; Huhtelin & Nenonen, 2015; Kreiner and Schultz, 1993). Also, governments and non-profit organisations increasingly seek to collaborate with knowledge institutes, to address societal challenges.

Co-creation, and the synergies arising from it, are seen as promising in developing solutions to R&D problems which lead to marketable products as well as publishable research. Bjerregaard (2010) notes that in the last years, the gap between university researchers and science-based firms is closing. He observes a cultural convergence around shared norms and role expectations. Firms in science-based industries are adopting publishing norms of the university, and are increasingly prepared to share knowledge. This tendency can be described as a 'scientification' of industrial R&D (Campbell and Guttel, 2005; Etzkowitz et al., 1998). From the other side, university departments have increasingly adopted entrepreneurial norms about practical applicability and commercial relevance. A growing number of researchers have experience in both the public and the private sectors, and have acquired the social skills to navigate across the logics of public and private R&D.

2.3 Under what conditions can co-creation flourish?

The literature hints at a number of relevant conditions for co-creation. Some are related to the characteristics of the partners that engage in co-creations, others more to place-based attributes such as proximity and intermediation/curation. The following observations are made in the literature:

Co-creation is complicated when partners have different institutional logics (profit making vs publishing; different time horizons; scientific perfection vs applicability; knowledge sharing vs confidentiality/protecting) (Bourdieu, 1990; Bjerregaard, 2010). For example, within academia, resource allocation principles and career paths are based on publications and citations; R&D in firms is primarily guided by a commercial profit-making logic. Effective co-creation requires that partners can rely upon common knowledge about their respective R&D practices; they need to have 'a shared language', as a basis for mutual understanding and communication; Boschma (2005) speaks of cognitive proximity in this respect.

The better partners understand, know and trust each other, the less they need formalised contractual agreements to underpin their collaboration; high trust leads to lower levels of formalisation in written contracts, and facilitates ad hoc coordination, something supportive of co-creation.

Co-creation requires relevant experience-based collaboration skills, the more so in complex situations in which the partners have different institutional logics and lack prior relationships or common project experience. To solve tensions, participants in co-creation projects must actively reflect upon and confront the conflicting logics on which their interaction and respective R&D practices were based.

Physical proximity is important for the exchange of tacit knowledge (Bathelt, Malmberg, & Maskell, 2006), a key aspect of co-creation. Experimental research hints that co-innovation is more fruitful when participants are within thirty meters of one another (Olson and Olson 2003).

In many cases, intermediation and curation is needed to drive the co-creation process. An intermediary players or curator can play a role to bring actors together, to facilitate the collaboration, or to offer physical facilities (rooms, equipment) that support the co-creation process. Steward and Hyysalo (2008) see 4 roles for intermediators:

- Connector: bringing actors together;
- Broker: communication and negotiation between the involved parties represented by the intermediary, to align and decide on multiple issues related e.g. to contracts, technology functionalities, implementation;
- Facilitator: creating opportunities to others and new environments to ignite innovation),
- Configurator: adapt, arrange, or adjust innovations and products with a view to specific applications or uses.

2.4   Implications for campus design and management

The notions listed above have implications for the design and management of a campus.

First of all, one cannot expect co-creation to just "happen" as a result of co-location in the same area. While physical proximity is an important supporting condition for co-creation, the evidence is mounting that interaction between actors with different stakeholders will not take place on its own (see Brown, 2017). Based on the considerations above, and supported by evidence from Van Winden et al (2012), we posit that the prevalence and success of co-creation on science parks depends on four aspects:

- Campus content: the tenant mix and subsequent identity/image of the campus;
- Campus design: the physical design/layout of the campus;
- Building design: The availability of spaces and facilities that enable co-creation;
- Campus orgware: The presence and quality of intermediation and curation; the ability of the campus management to co-create common identity and to enable knowledge sharing.

Each aspect can be influenced, albeit to a varying degree, by the campus management. We will elaborate each aspect below.

Campus content. The mix of tenants at the campus sets the margin for internal co-creation, i.e. co-creation between campus players. A study of US science parks showed that specialised parks grew more over time, suggesting that specialisation contributed to the formation of ecosystems of interactions among tenants increasing the park's attractiveness (Link and Scott, 2006). Kocak and Can (2013) found sector homogeneity to be closely related to higher degrees of knowledge sharing in science & technology parks. These findings fit with studies showing that people are more likely to collaborate when they are close to each other not only physically, but also cognitively (e.g. Boschma, 2005). The tenant mix also marks the identity and reputation of the knowledge location as a "place to

be" for specific types of firms or organisations. This synergetic effect has been reported in the case of Arabianranta, Helsinki (van Winden et al., 2012), a knowledge location built around the theme of art & design. The concept acted as a "lighthouse", making the location very attractive for national and international companies. Conversely, when a park has tenants with very different profiles and interests, the concept's clarity is low (Stankiewitz, 1998).

Campus design. The physical design and layout of the campus matters, as it helps to connect tenants. The interconnection of knowledge workers –the very basis for co-creation- resonates with certain characteristics of the day-to-day urban environment; this touchable scale of place is where personal and social life happen, is the soul of the dynamic interaction between people and their routine/environment (Clifton, 2008; Heebels and Van Aalst, 2010). Place quality at campus scale can be assumed as personal experience at street level, where knowledge workers enjoy different types of entertainment—e.g., music, food—as well as different ways of socialising (Darchen and Tremblay, 2010). This scale fosters the connection of firms and individuals and spill over of knowledge Offering an appealing ambiance will empower competitive advantages for attracting and retaining knowledge workers and industries. (Esmaeilpoorarabi et al., 2018)

Building design. Co-creation as such does not need a dedicated space; it can be –and often is- hosted at the premises of one of the co-creation partners. However, this might give rise to various tensions and problems. First, not all organisations are empowered to facilitate and fund flexible project-like environments that allow external partners to enter into the buildings in a co-creation process. Second, some co-creation activities might benefit from a more neutral environment, rather than being hosted –and perhaps dominated- by the host organization. Furthermore, it is important that flexible spaces are available that are easily able to adapt to fluctuations in demands for (types of) space. In terms of building design, Wagner & Watch (2017) have discussed a number of aspects regarding building design, such as:

- Team mixing through design: a number of techniques were distinguished to mix people in space, such as organising users in pods, shared equipment, floorplans prompting people to engage in conversations or the regular reconfiguration of space;

- Design for communication: this concerns the building form and height, the number of floors – single story buildings being preferred, the presence of atriums or staircases and corridors designed to encourage meetings;

- Public gathering places: a number of aspects can be distinguished including shared kitchens, lounges or adaptive spaces, public spaces on the ground floor or transparent and permeable ground floors.

Campus orgware refers to the presence and quality of intermediation and curation, and also the ability of the campus management to co-create a common identity, to enable knowledge sharing and create the right conditions in terms business models. Huhtelin & Nenonen (2015, pp. 138) state that "campus management has a major role in the facilitation of multidisciplinary interaction between students, scientists and entrepreneurs… one significant tool to support open innovation with diverse stakeholders is to provide supportive spaces with relevant services". As Surman (2014, pp. 193) suggests it is a question of "navigating the balance between organic and intentional". In making the physical proximity work at the level of the building or co-creation spaces, Merkel, (2015) emphasises the importance of curators in enabling interaction between users of the space. Curation can be seen

as the "intentional creation of interconnections between people, ideas, objects and places within a new context and narrative" (Merkel, 2015, pp. 131). Further, they can be seen as cultural entrepreneurs, who leverage social and cultural dynamics to manufacture meaning and reduce uncertainties inherent in the process of co-creation (Merkel, 2015). Merkel (2015) found two different types of curators, differentiated by how they understand and interpret their own activity: (1) The service provider: focuses on the facilitation of a compelling work environment and associated services; (2) The visionary host: is more concerned with community aspects of co-working, such as organising events, meetings, communications and introductions amid the co-creating organisations.

In terms of tools that curators can employ, Brown, (2017) suggests communication strategies used to communicate values and community symbolism , events to offer exchange opportunities also enabling encounters with more distant actors, manager knowledge including linkages to broader networks to broker between actors.

3.   Research setup

The central aim of this study is to explore how, and under what conditions further co-creation could be facilitated at ASP. For the empirical part of this study, in the period from January to March 2018, sixteen semi-structured explorative interviews were carried out among directors the major organisations and departments active at ASP who are active in education, research (university and NWO), business, property development and the development of spaces for co-creation (see Appendix 1 for the list of interviewees). Our goal was to better understand how key actors at ASP collaborate, with whom, what their needs are with regard to new facilities for co-creation and how supportive conditions could be created. Also, their more general view on the assets and shortcomings of ASP were discussed.

Related to the literature study in section 2, the focus was on three key topics:

1. Campus content: Here, we analysed the current baseline of internal and external co-creation practices at the ASP. We highlight concrete and recent examples of co-creation projects, the spatial level on which these collaborations have taken place, trends and developments with regard to co-creation in the triple helix. This is discussed in section 4;

2. Campus and building design: under this heading, we assessed the role and appreciation of ASP as a place for various forms of co-creation such as meeting, collaborating, exchanging knowledge and sharing facilities. In addition, we explored needs for spaces for co-creation projects, the initiators in the case of existing collaborations. This is discussed in section 5.

3. Campus orgware: Here we assessed the prevalence and appreciation of orgware at the campus, including curation but also positioning, broader governance arrangements and business models that were seen as needed to make these and spaces for co-creation possible. This is discussed in section 6.

4.   Campus content: Current co-creation practices at ASP

As discussed above, creating the right content mix is an essential condition for co-creation on a campus. Getting the balance between homogeneity and heterogeneity of tenants is important to ease knowledge sharing. Moreover, the content mix directly influences the identity and plays a role in attracting new tenants that contribute to the innovative potential of the campus. At Amsterdam Science Park, various forms of industry-university co-creation can already be observed. The forms of co-creation vary in both size and duration from short term co-creation organised between individual researchers and industry contacts to long term relationships and programmes between institutions. Table 1 presents an overview of the various forms of co-creation that were mentioned in our interviews. These examples reflect existing forms of co-creation between the university and industry and are representative of a much larger number of collaborations which have come to the fore during the exploratory interview with ASP stakeholders. Moreover, the examples are of (very) recent date, which can be seen as an indication of the transition that is taking place.

Table 1: Categorisation of co-creation at Amsterdam Science Park

Type of co-creation	Example at ASP	Explanation
Student involvement in industrial projects	Tesla Minor	Interdisciplinary group of students works on a complex challenge for a company or societal organization. This allows them to utilize science and their academic background in a project on the interface of science, business and society
Joint research programme	UvA Bosch Delta lab	Joint lab between the university and industry, where UvA and Bosch cooperate closely in research to promote stronger exchange between fundamental and applied research through knowledge transfer between ten PhD students and postdoctoral fellows (UvA.nl, 2018a)
Joint research programme	Amsterdam Green Campus	Joint programme between the university and industry (multiple partners). Focuses particularly on small and medium-sized enterprises in the province of North-Holland, where student teams are involved in different types of collaborative projects
Cooperative research projects	SURF Sara Open Innovation Lab	Open lab focused on gaining insight in to applications for technology and developing new services
Joint research programme	AIRlab	Joint programme initiated by Ahold Delhaize focused on the application of AI in the retail sector. Seven PhD's will conduct research into socially responsible algorithms (UvA.nl, 2018c)

Given the extent to which co-creation is currently taking place at Amsterdam Science Park, it would seem that favourable conditions are in place. Still, in our interviews a number of respondents emphasised the importance of the right content at ASP and its profiling and suggested that these should receive more attention[1]. They stated that the lack of clear profiling is a problem, as it is unclear what Science Park, as a whole, stands for prospective companies, institutes or other target groups. Strengthening this is of importance in maintaining and improving the right content for co-creation. The respondents made a number of suggestions with regard to what the profile of Amsterdam Science Park could be. These are discussed in detail in section 6.2.

---

[1] It should be noted that the profiling was not initially included in the topic list for our interviews. Despite this, six different interviewees indicated is importance.

5. Campus and building design: ready for co-creation?

Following the discussion above, we see the importance of the design of both a campus and buildings in facilitating spontaneous interactions which can result in co-creation. Furthermore, although dedicated spaces are not necessarily needed for co-creation, flexible spaces that can easily accommodate it can ease actors in engaging in it. Below we will first consider the appreciation of the interview respondents for the design of Amsterdam Science Park with regard to co-creation followed by a discussion of the buildings and spaces.

5.1 Campus Design

In a number of interviews, the design of Amsterdam Science Park emerged as a point of attention. Currently, distances between buildings are perceived considerable and there is a central road which acts as a barrier, separating several of the major tenants. Some found that the campus feels 'closed' especially due to gates surrounding some of the buildings. Furthermore, respondents felt the need for more places such as Café Polder where spontaneous encounters can take place. Start-up village was seen as a good example. It offers its 'inhabitants' the physical proximity and density needed for co-creation to happen: numerous collaborations would not have arisen up without this proximity. Organisations find each other in the coffee corner, but also because Erik Boer and his Amsterdam Centre for Entrepreneurship (ACE) are curating intensively.

5.2 Building design

Section 4 shows that, already, a substantial number of co-creative activities take place. Based on our desk research and interviews, a number of buildings, spaces and facilitation were found at ASP, which already cater to co-creation. These include:

- Matrix Innovation Centre: provides firms which are connected to research conducted at the university with the opportunity to be physically present at ASP: the seven buildings offer tenants work space. This has proven to be in high demand in recent years (Matrix VII will be fully occupied in 2019, and plans for Matrix VIII to be completed in 2020 are already underway). Matrix is increasingly focusing on creating spaces for co-creation in Matrix VII and VIII and facilitating it, through the Innovation Lab Chemistry for example;
- ACE incubator and Start-Up Village: both facilitate innovative start-ups to develop and grow their businesses (ACE). Start-Up Village is an example of a place which provides a physical space in which these start-ups (some of them started by university students) can engage with different types of partners from industry;
- Innovation Center for Artificial Intelligence (ICAI): is a yet to be built co-development building, in which space for educational purposes, research space and co-creation space for collaboration with business will be realised. In the building, joint labs between university and industry will be created. The plans were officially launched in April 2018.

In our interviews, respondents were asked to indicate their appreciation for facilities and facilitation of co-creation at ASP and to indicate what would be needed to enable further co-creation. Most of the interviewed stakeholders focused primarily on the quantity of space rather than specific qualities of the existing facilities. They indicated that currently, there is a lack of space at ASP and stressed the urgency of creating new spaces for co-creation. ASP currently works at full capacity, with occupancy rates approaching 100%, and most institutes still growing. Many interviewees indicate that (flexible) space for educational purposes (e.g. projects with industry and societal partners) would be a welcome addition. Several interviewees confirmed that the nature of research is becoming more interdisciplinary, increasing the need for flexible spaces and flexible laboratories where mixed groups can work on projects. Accordingly, several interviewees indicated that more of these spaces are needed at ASP. More specifically this concerned:

- Spaces for collaboration and experimentation: There are many profitable co-creation projects at Science Park, scattered among many faculties/ organisations. It is a challenge to aggregate the demand of all these temporary activities and channel it into a larger, central concept of space;

- Space for external partners connected to Science Park to have a (temporary) presence. There is a large untapped demand for small-scale, temporary office/ work space (corporates, larger SMEs, start-ups, educational programs that work with external assigning companies, innovation labs) looking for flexible project spaces (MATRIX does not cater to this demand).

Supportive amenities

During the interviews, a large number of respondents emphasised the necessity of supportive amenities which could ease co-creation both between actors at ASP or with external parties. The amenity mentioned most often was a conference/ visitor centre. This was linked to a need for more visibility of the work being done at ASP for tenants of the park and external visitors alike. This could, if programmed in the right way, be used to facilitate information sharing and formal and informal contact between people at ASP. This is related to building trust and the breaking down of barriers between science and industry. The first step in this direction is to get to know each other. Stakeholders say it is good to show what all different actors on campus actually do. "There is a need for more visibility at the ASP: People who work here have no clue about all the different things that are going on here" is a quote much heard. Another quote expressed by stakeholders is: "people have no idea what is done within the science buildings, let alone across the campus." These buildings do not generate direct exploitation revenue, but are important for the longer-term positioning of the science park. Furthermore, collective facilities and amenities (hotels, congress venue, restaurants, meeting spaces, expat housing, project spaces) for users of ASP were seen as necessary in relation to co-creation by various respondents. They could generate direct revenue through exploitation. Many of the individual players expressed their willingness to use them and pay for them, but each is too small to sustain it fully. Collective action is needed to address this and reduce the risk of the investment; key players could agree to guarantee a set demand for a certain facility.

6.   Campus orgware

As we have seen, orgware in terms of curation and intermediation and campus management are essential in creating the right conditions for co-creation to take place. Below we discuss the appreciation of respondents for the orgware present at Amsterdam Science Park and the needs they have in this regard. The discussion is structured around the following themes: curation and intermediation, the identity and positioning of the campus, campus management and governance and revenue streams and commitment.

6.1   Curation and intermediation

In keeping with theory, many respondents emphasised the importance of curation and intermediation in facilitating co-creation. In terms of appreciation of the current curation and intermediation practices, both ACE/Start-up Village and the Innovation Lab Chemistry Amsterdam (ILCA) were seen as good examples. At Start-up Village Erik Boer and his organisation ACE are currently very active in curating. The ILCA supports start-up chemical companies in terms of access to facilities, valorisation and networking. It is supported by various organisations[2].

Turning to ways in which curation could be improved, many respondents focused on what Merkel (2015) has termed the visionary host: community building networking and communication. It was suggested that the organisation of spontaneous meetings (serendipity) as a means of showing each other's work is a possibility to address what they saw as the somewhat 'closed' character of ASP. Concretely this could take the form of searching for linkages between disciplines and groups, the organisations or regular meetings for researchers and businesses to show what they are doing. These were seen as a starting point in building trust: "First you need to know each other before you get to trust each other in order to work each other". As such it is a long-term process: "Curation has a point of persistence in it. It takes a while before there is a rhythm." "You start with a single project that can outgrow to something more substantial: it takes longer term relations to build trust", is another quote often heard. This was seen as even more important with people in technical sectors: "you have to invite them, it is usually not in their nature to look for [collaboration] themselves" one of the interviewees stated. Furthermore, it should be in keeping with the hardware. With regard to who should play the role of host, respondents emphasised that the co-creation host needs to have profound insight in the networks and activities of different actors. "One needs to facilitate serendipity through programming, organising new events, and create linkages between different interests". An important point of attention was focusing collaboration and co-creation on areas of (strategic) relevance and important, for instance embedded in existing programmes. Co-creation becomes more relevant when organised around certain themes, such as the new ICAI building which aims at the theme 'artificial intelligence'. One respondent suggested that the Amsterdam Science Park Science and Business foundation or a new entity could play this role.

---

[2] Matrix Innovation Center, Top Chemie Δ, Topteam Chemie, the different knowledge institutes of Amsterdam (TTOs UvA and VU), TI-COAST, ACE Venture Lab and the Port of Amsterdam

6.2 Identity and positioning

As discussed above communication of values and the identity of a community are an important aspect of the orgware facilitating co-creation. At present, interviewees found that a clear and shared identity was absent at Amsterdam Science Park. This could serve as guidance for communication with target groups, acquisition and investment decisions, and entry or exit criteria for tenants. While our interviewees tend to stress their own field as key element when asked what a potential positioning/ branding strategy for Amsterdam Science Park could be, several key directions emerged: (1) a place for top-notch fundamental research in multiple fields of study; (2) A hub or mainport for innovative technology (Internet/ AI/ Blockchain-related) research and business; (3) a gateway to top-notch knowledge for firms (MNEs/ SMEs); and (4) an exciting area for science-based or science-linked business. Other interviewees stress the importance of themes at ASP in this regard. From the four themes that have been flagged at ASP (artificial intelligence; sustainability; high tech systems & new materials; and life Science Green (green campus)), artificial intelligence already has acquired its own future co-creation space at the ICAI building.

6.3 Campus management and governance

At the level of a campus, the management or governance is vital to realise campus design, identity and positioning and curation. During our interviews our respondents emphasised this. They saw the governance of ASP as important for both improving the achieving the collective action needed to develop a co-creation building and other amenities. A number of respondents mentioned that, in their view, the governance of ASP is too fragmented to enable the development of collective facilities or clearly position ASP. In relation to the positioning and branding, a lack of active positioning and branding was seen as resulting from the absence of an organisational body that takes the initiative to do so: there is no collective/ shared vision that all key stakeholders agree on or subscribe to, only the individual positioning of the individual faculties/ tenants. The fragmentation in governance not only makes the decision making with regard to new developments tedious and time consuming, it also results in a lack of clarity about which organisation is responsible for what. During the interviews, the respondents who discussed the issue of governance suggested that one strong organisation with a considerable formal mandate and responsible for the development of the ASP would be a way of improving the governance.

6.4 Revenue streams and commitments

Each of the potential functions of a co-creation space should be explicitly coupled with a revenue stream as part of the wider business model, in order to make the co-creation space economically viable. In addition, more general schemes are possible. A business case may also include subsidies from the municipality given the importance of ASP for the local Amsterdam economy. Moreover, cross-funding or cross-subsidising schemes could be designed to fund riskier activities with revenue from safer ones. For example, subsidising or guaranteeing investments for a co-creation building with revenues from the conventional rental contracts in the Matrix buildings.

When co-creation is framed as (inter-organisational/ interdepartmental) collaboration, which could potentially lead to new revenue streams for research, most of our interviewees are enthusiastic about the prospect for co-creation at Science Park. For the functions listed above, these revenue streams include:

- Revenues from additional external funding for research projects (Postdoc/ PhD as well as MSc/ BSc) which would be conducted in the co-creation space/building; Faculties could guarantee a 'minimal' annual/monthly commitment to occupy/rent space;

- Revenues from education: By embedding research projects in the education programs/ CROHO labels of multiple fields of study, a co-creation space/ building could be (partially) financed as part of the budgets of their respective faculties (which could also attract more external parties to fund research projects at Science Park);

- External revenues: organisations which (temporality) rent office space at Science Park could pay an annual/ monthly fee;

- A conference/ visitor centre could be financed by:
    - Fees payed to the organizing faculty by participants, whereby it would be wise to have a detailed overview for each faculty of when this space will be occupied;
    - Purchase-commitments by faculties and institutes;
    - Funding from the communication budgets of the businesses, university and institutes.

- General and supporting facilities, such as a hotel, bar, or stores, could be exploited commercially by third parties.

7. Conclusion & Recommendations

Co-creation between industry and university is becoming increasingly prominent due to clear advantages for both parties. Amsterdam Science Park is no exception. In recent years the number of co-creation projects and initiatives has increased considerably. Policy at both the regional and park level aim to support this and there are indications that there is demand for more co-creation facilities. Against this backdrop we have explored to which extent conditions supportive of co-creation are present at Amsterdam Science Park, what the appreciation for them is and the improvements in these conditions that actors at the park consider necessary to further their ambitions for co-creation. We see co-creation as dependent on three conditions: the campus content (the users of the park and their practices), the design of the campus and buildings and the orgware (identity and positioning, curation and intermediation, campus governance and business models).

Campus content

Our interviews have shown that a variety of co-creation activities is present at Amsterdam Science Park ranging from short-term student projects in industry to joint research programmes. An important finding is that the scalar level at which these activities take place and at which actors at

the park collaborate is not only limited to ASP. Co-creation activities based at the park are sometimes of a regional nature such as the Tesla Minor or the Amsterdam Green Campus and many researchers work on projects with international partners and make contact through conferences and existing contacts. Of the co-creation activities located at Amsterdam Science Park a number such as the UvA Bosch Delta Lab are located in the existing building of the University of Amsterdam. These conclusions are important when considering the extent to which physical buildings are needed to accommodate co-creation. In relation to the campus content an important conclusion was the need to devote more attention to the profiling and image of the park in order to attract tenants who could contribute to existing co-creation or initiate new activities.

Design of campus and buildings

In our research the design of the campus emerged as a condition which needs attention. Specific points mentioned concern the need to address various barriers hindering physical proximity (gates, roadways) and create spaces for spontaneous encounters such as which actively encourage this such as Café Polder.

In terms of buildings, in recent years a number have been developed, which such as Start-Up Village and the Matrix Buildings which are increasingly tailoring their supply to accommodate co-creation activities (e.g. Matrix VII and VIII). With occupancy rates approaching 100% at ASP, there is a scarcity of short term and flexible work spaces/ laboratories where partners can collaborate. Also, more creative spaces for interdisciplinary educational purposes would be welcomed at ASP. There is a need for a longer term, robust co-creation concept where short-term projects can be housed. As the nature of research is becoming more interdisciplinary, there is an increasing need for flexible spaces where mixed groups can work on projects. Depending on funding, there are potential synergy effects when research agendas of knowledge institutes and business are combined. Next to that, there is a need for more collective facilities and amenities such as a congress venue and a visitor's centre. Collective action is needed to address this and reduce the risk of the investment.

The need for supportive facilities especially a conference or visitors centre was the most strongly stressed. It was seen as both fulfilling a need for more places for informal meetings as well as to host international delegations. Furthermore, the need for this centre relates strongly to the need for a stronger identity of ASP as well as the form that co-creation or collaboration that ASP stakeholders engage in: regional, national and international.

Campus orgware

In keeping with theory, curation and intermediation emerged as central topics in our research and something that was seen as demanding increased attention at Amsterdam Science Park. Curation and intermediation can be seen as a way of increasing social and institutional proximity in which are necessary ingredients for co-creation and innovation more generally. At ASP, the Amsterdam Centre for Entrepreneurship/Start-Up Village and the Innovation Lab Chemistry Amsterdam were seen as existing examples. Needs focused on visionary hosts who focus on community building and networking. By bringing people together, they can address the physical barriers imposed by the campus design and build trust between stakeholders. The role of curator could be fulfilled by the Amsterdam Science Park Science and Business foundation or a new party. The group or person taking on this role will need a deep understanding of the type of work being carried out, the practices

of stakeholders (see campus content) and be able to build on and imbed co-creation in existing programmes and areas of strategic importance (e.g. the identity of the park). With regard to this last point, despite emphasizing the importance as discussed above, no one area emerged. Rather a number of potential areas were stressed.

Turning to the campus management and governance, this emerged as an area seen as requiring attention with advantages in terms of collective action to realise shared amenities (e.g demand aggregation) and position the park. A stronger central organisation could take on this role. Our research suggests a number of possible options, indicating that there are innovative possibilities to deliver the facilities needed. For many of these, more intensive collective action and governance are needed.

This exploratory research has provided deeper understanding of the ecosystem of co-creation at Amsterdam Science Park as well as the needs of stakeholders to further co-creation. In addition, it has indicated that the will is present amongst a number of key stakeholders to collaborate to address the challenges and chances present at Amsterdam Science Park. Following on our findings we present a number of avenues for future research. First and foremost, steps should be taken to build on the energy and ambitions that individuals have and initiate a collaborative process of action research with willing stakeholders to further explore and test new concepts in the key areas of campus design and amenities, identity and positioning, curation and intermediation as well as governance and business models that are supportive. Supportive to this process of action research could be exploratory research on:

- (International) Best practices of co-creation at campuses: The development at (inter)national campuses can be used as inspiration for the facilities on ASP. Some interviewees state that the issues they experience at ASP where solved or better organised at the example campuses they suggested. For further research the suggested examples will be examined alongside other renowned examples. International best practices include (among others): 22@Barcelona; Harvard University campus; Leuven Mindgate (UZ Leuven); Cornell Tech (NYC); RWTH Aachen University. National examples include: TU Delft campus Green Village; Wageningen University; Utrecht Science Park (Uithof); Leiden University; Eindhoven University of Technology campus.

- Possibilities for co-creation concepts dedicated to a certain theme, and research the support for the different flagged themes at ASP: Artificial Intelligence (ICAI building already launched), Sustainability, High tech systems & new materials, and Life Science Red & Life Science Green).

- Internal investigation for the commitments and viability of business models for a potential co-creation space at ASP. Each of the potential functions of a co-creation space should be explicitly coupled with a revenue stream as part of the wider business model, in order to make the co-creation space economically viable. Furthermore, make an inventory of the commitments and possibilities to build coalitions of people and institutes that have mutual interests concerning co-creation. A curational practice is needed. Which investments have to be made for shared amenities and by whom? What are the stakeholders concrete needs?

- New models of collaborative governance in keeping with the multi-actor reality of Amsterdam Science Park (e.g. commoning).

Reference list

Bathelt, H., Malmberg, A., & Maskell, P. (2006). Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Journal of Planning Literature*, *21*(1), 81–131. https://doi.org/10.1177/088541220602100106\r10.1191/0309132504ph469oa

Bjerregaard, T. (2010). Industry and academia in convergence: Micro-institutional dimensions of R&D collaboration. *Technovation*, *30*(2), 100–108. https://doi.org/10.1016/J.TECHNOVATION.2009.11.002

Bourdieu, P. (1990). *The Logic of Practice, translated by Richard Nice*. Stanford: Stanford University Press

Boschma, R. (2005). Proximity and innovation: a critical assessment, *Regional Studies*, 39, 61-74.

Brown, J. (2017). Curating the "Third Place"? Coworking and the mediation of creativity. *Geoforum*, 82, 112–126. https://doi.org/10.1016/J.GEOFORUM.2017.04.006

Campbell, D. F. J., & Guttel, W. H. (2006). Knowledge production of firms: research networks and the "scientification" of business R&D. *International Journal of Technology Management*, *31*(1/2), 152. https://doi.org/10.1504/ijtm.2005.006629

Chesbrough, H., & Bogers, M. (2014). Explicating open innovation: Clarifying an emerging paradigm for understanding innovation. In H. Chesbrough, W. Vanhaverbeke, & J. West (Eds.), *New Frontiers in Open Innovation*: Oxford: Oxford University Press, pp. 3-28.

Clifton, N. (2008). The "creative class" in the UK: An initial analysis. *Geografiska Annaler, Series B: Human Geography*, *90*(1), 63–82. https://doi.org/10.1111/j.1468-0467.2008.00276.x

Darchen, S., & Tremblay, D. (2010). Attracting and retaining the workforce in science and technology: The case of Montreal. In: *Knowledge-based development of cities and societies: An integrated multilevel approach*, ed. Kostas Metaxiotis, Francisco Javier Carrillo, and Tan Yigitcanlar. Hershey, PA: IGI Global, pp. 42–58.

Ernø-Kjølhede, E., Husted, K., Mønsted, M., & Wenneberg, S. B. (2001). Managing university research in the triple helix. *Science and Public Policy*, *28*(1), 49–55. https://doi.org/10.1093/spp/28.1.49

Esmaeilpoorarabi, N., Yigitcanlar, T., Guaralda, M., & Kamruzzaman, M. (2018). Evaluating place quality in innovation districts: A Delphic hierarchy process approach. *Land Use Policy*, *76*(December 2017), 471–486. https://doi.org/10.1016/j.landusepol.2018.02.027

Etzkowitz, H. (1998). The norms of entrepreneurial science: cognitive effects of the new university–industry linkages. *Research policy*, 27(8), 823-833.

Etzkowitz, H. (2003). Innovation in innovation: The Triple Helix of university-industry-government relations. *Social Science Information*, *42*(3), 293–337. https://doi.org/10.1177/05390184030423002

Gemeente Amsterdam. (2013). *Science Park Amsterdam*. Retrieved from https://www.planviewer.nl/imro/files/NL.IMRO.0363.U1002BPGST-OH01/tb_NL.IMRO.0363.U1002BPGST-OH01_21.pdf

Gemeente Amsterdam (2015). Voordracht voor de raadsvergadering van 12 februari 2014, 1–10.

Huhtelin, M., & Nenonen, S. (2015). A Co-creation Centre for University–Industry Collaboration – A Framework for Concept Development. *Procedia Economics and Finance*, *21*(15), 137–145. https://doi.org/10.1016/S2212-5671(15)00160-4

Heebels, B., & van Aalst, I. (2010). Creative clusters in Berlin: Entrepreneurship and the quality of place in Prenzlauder Berg and Kreuzberg. *Human Geography*, 92(4), 347**–**363.

Kreiner, K., & Schultz, M. (1993). Informal Collaboration in R & D. The formation of Networks Across Organizations. *Organization Studies*, *14*(2), 189–209. https://doi.org/10.1177/017084069301400202

Kocak, O. & Can, O. (2013). Determinants of inter-firm networks among tenants of science technology parks. *Industrial and Corporate Change*, doi: 10.1093/icc/dtt015 (online first).

Link, A. N., & Scott, J. T. (2006). *US university research parks. Journal of Productivity Analysis*, 25(1-2): 43-55.

Merkel, J. (2015). Coworking in the city. *Ephemera.Critical Dialogues on Organization*, *15*(1), 121–139. https://doi.org/10.1057/ip.2011.10

Olson, G. & Olson, J. (2003). Mitigating the Effects of Distance on Collaborative Intellectual Work. *Economics of Innovation and New Technology* 12 (1): 27–42.

Prahalad, C.K.; Ramaswamy, V. (2004) Co-Creation Experiences: The Next Practice In Value Creation. *Journal of Interactive Marketing*. 18(3), 5-14.

Siegel, D. S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: An exploratory study. *Research Policy*, *32*(1), 27–48. https://doi.org/10.1016/S0048-7333(01)00196-2

Stankiewicz, R. (1998). 'Science parks and innovation centers'. In H. Etzkowitz, A. Webster and P. Healey (Eds.), C*apitalizing knowledge - new intersections of industry and academia*. Albany: State University of New York.

Stewart, J., Hyysalo, S., (2008). Intermediaries, users and social learning in technological innovation. *International Journal of Innovation Management* 12, 295-325.

Surman, T. (2014). Building Social Entrepreneurship through the Power of Coworking. *Innovations: Technology, Governance, Globalization*, *8*(3–4), 189–195. https://doi.org/10.1162/inov_a_00195

UvA.nl (2018a). *Uva and Bosch Launch Joint Lab. 6 April 2017*. Retrieved 1 May 2018 at http://www.uva.nl/en/content/news/press-releases/2017/04/uva-and-bosch-launch-joint-lab-for-research-into-deep-learning.html

UvA.nl (2018b). *UvA and QualcommTechnologies, Inc., to start research lab. 17 June 2015*. Retrieved 1 may 2018 at http://www.uva.nl/en/content/news/press-releases/2015/06/uva-and-qualcom-technologies-inc-to-start-research-lab.html

UvA.nl (2018c). *Innovation Center for Artificial Intelligence officially launched, 26 april 2018.* Retrieved 1 May 2018 at http://www.uva.nl/en/content/news/press-releases/2018/04/innovation-center-for-artificial-intelligence-officially-launched.html.

von Hippel, Eric, *Democratizing Innovation*, MIT Press, Cambridge, MA, April 2005. Available at SSRN: https://ssrn.com/abstract=712763

Wierdsma A. and Swieringa J. (2011) *Lerend organiseren en veranderen*. Groningen: Noordhoff Uitgevers.

Wagner, J., & Watch, D. (2017). *Innovation Spaces* : The New Design of Work, (April).

Winden, W. van, L. de Carvalho, E. van Tuijl, J. van Haaren and L. van den Berg (2012), *Creating Knowledge Locations: innovation and integration challenges*, Routledge, London.

Appendix 1: List of Interviewees

1. Drs. M.J. Bartels - Van 't Hoff Institute for Molecular Sciences (HIMS), FNWI, UvA

2. Prof. dr. S.C.M. Bentvelsen - Nationaal instituut voor subatomaire fysica (Nikhef), FNWI, UvA

3. Drs. E. Boer - Amsterdam Centre for Entrepreneurship, Startup Village

4. B. Brink MSc. MBA - Royal Haskoning DHV

5. J.J.W. Buis MSc. - Instituut voor Interdisciplinaire Studies, FNWI, UvA

6. Drs. L.L. le Duc MBA - Amsterdam Science Park

7. Dhr. J. van Echtelt - Netherlands Organisation for Scientific Research (NWO), Nikhef

8. Ir. drs. G.M. Haksteen - Matrix Innovation Center

9. M. Keizer MSc. - Amsterdam Science Park

10. dr. N.L.M. Persoon - Swammerdam Institute for Life Sciences, FNWI

11. R. Pype MSc. PDEng - Proof of the sum architects & planning

12. L. Renfurm MSc. - SURFsara

13. Prof. dr. G. Rothenberg - Van 't Hoff Institute for Molecular Sciences (HIMS), FNWI, UvA

14. drs. R. Rust - FNWI, UvA

15. Prof. dr. M.P. Smidt - Swammerdam Institute for Life Sciences, Faculty of Science, UvA

16. Prof. dr. M. Worring - Informatics institute, FNWI, UvA