Cultivating Innovation Culture in the Physical Environment

An ecosystem framework for the design of Urban Innovation Districts

Research Paper | Tim Jun Li | Janurary 2019 | TU Delft

Mentors
Dr. ir. R. Cavallo (Roberto)
Dr. ir. M.G.A.D. Harteveld (Maurice)
ir. Kuijper (Joran)


KAAS & Worst
op WIELEN
KAAS EN WORST


BINK36.N
PIP CLUB

Introduction

In the turn of the new century, the rise of the New Economy has led to the promotion of mixed-use development policies to enhance urban quality (Hutton, 2004). In the Netherlands, the Dutch national authorities have enacted a compact-city initiative to transform single-function industrial estates to a mixed-use development area, such as Binckhorst in Den Haag (fig. 1 and 2) and the Buiksloterham site in Amsterdam (Altes et al., 2008). These post-industrial sites are typically within the inner city, and therefore are prime locations for innovation, entrepreneurship and growth, given the critical mass of human capital, amenities and environmental conditions (Bailey, 2018).

Figure 1. Top image:
Picture of the opening ceremony of I'm Binck festival held in Binckhorst, Den Haag. I'm Binck is an annual event where local entrepreneurs gather to showcase their product, co-create and produce new innovation.
("I'M BINCK Festival", n.d.)

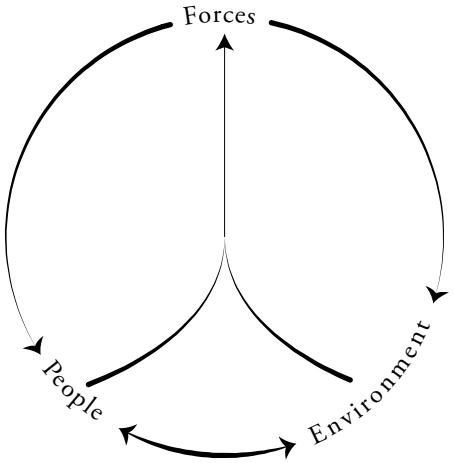
Figure 2. Bottom image:
Picture of Bink36 located in Binkchorst, Den Haag. Binck36 is an industrial complex that has been transformed to an creative hotspot for start-ups and entrepreneurs.
("Binck36", n.d.)

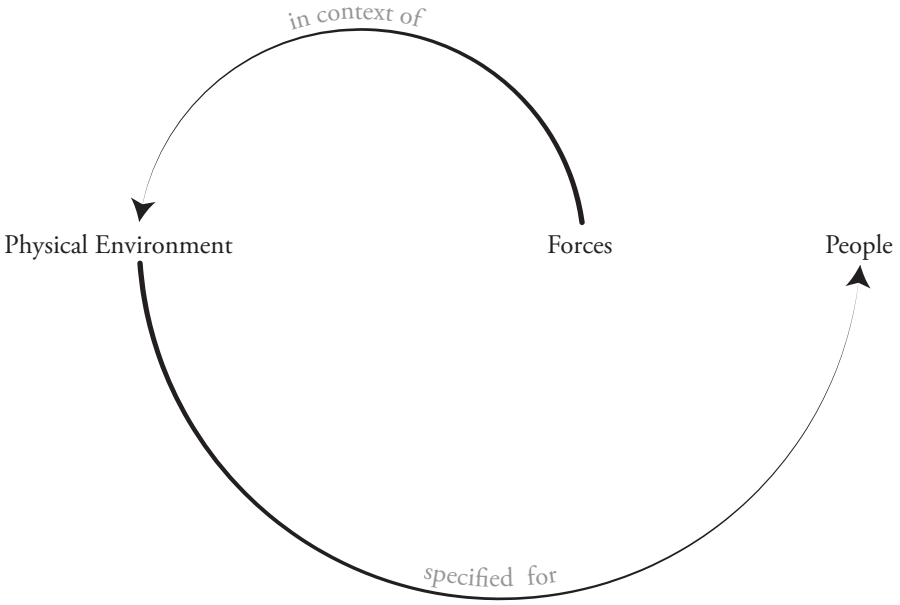
As a key strategy to optimize land use and human capital, the municipalities in the Netherlands are heavily invested in the cultivation of Urban Innovation Districts (UID), which is defined by Katz & Wagner, (2014) as "geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators." However, given the nature of these postindustrial sites that traditionally harbored heavy polluting industries, there are many issues that needs to be addressed in the transformation to a livable and sustainable neighborhood. (Altes et al., 2008)

The cultivation of Urban Innovation Districts is a central topic of discussion in the national project, Stad van de Toekomst – City of the Future in the Netherlands 2018, as part of the solution to the underlying question "How can we design and develop a transformation area into an attractive and future-proof environment" ("BNA Onderzoek – Stad van de Toekomst", n.d.). It is however clear that the design propositions from the multidisciplinary teams are lacking empirical foundation, and a more comprehensive understanding on the demographics of innovations spaces and their user groups are required. Furthermore, it is evident from Van Windel et al., (2013), that although success-stories of UID's are well documented, there is an absence of research on the mechanisms behind their success. Without the proper profiling of the user groups, there is the danger of design proposals based purely on the intuitive disposition of the architects, which can be pathological in practice as described by Almeida (2013).

This research takes the position that although it is impossible to predict how the future will look like, the architect can play a pivotal role in steering the future of the society through designing the physical environment to empower people who are creating innovation. This is a critical area of study, as the impact of innovation can be reflected in a recent publication of an article in Medium magazine, which states that in Netherlands, within the year 2017-2018, there has been 218 green startups, and since 2014, energy startups have raised from 10.8 million euros in venture capital within the sustainable industry, to 113 million euros in 2017. ("StartupDelta", 2018)

This paper calls for a new role of the architect, as the mediator between the public and the built environment. It employs a socio-anthropocentric methodology cultivated since the mid-20th century to establish a people-based framework to inform the design of Urban Innovation Districts. The focus is on answering the question "How can we transform the urban environment to optimize future innovation?" It aims to address the discourse in between the top-down and bottom-up approach to design, through superimposing phenomenological and praxeological research, to sustain a necessary dialogue between the public and the architect.


Forces
People
Environment


in context of
Physical Environment
Forces
People
specified for

Methodology

In order to understand how to transform the urban environment to optimize future innovation, it is important to understand what constitutes innovation culture, defined as "a culture that encourages cooperation, rewards creativity, and fosters a positive working style that creates more opportunities for every individual." ("What is Innovation Culture", n.d.) The research methodology employed is derived from the theoretical background developed by Setha Low (2016) and her publication on "spatializing culture". The principal idea falls back on the concept of place-making, which stipulates that social relations within a physical context is what gives a space "meaning and form". Therefore, in order to acculturate a space, it is critical to understand space in context of the person, shaped from both a temporal and spatial dimension (Low, 2016).

Setha Low (2016) further elaborates that the spatial-temporal dimension of any given space can be studied through the "dialogical process made up of the social production of space, and the social construction of space." The first step to understanding how to spatialize culture is to understand the "social production of space" which is defined as factors that shape the environment. This is relevant to the study of innovation spaces, as many innovation spaces are physical manifestations of "economic, demographic and cultural forces" (Wagner & Watch, 2017). An example is the emergence of new coworking venues such as SPACES. For more information on SPACES, refer to appendix A ("SPACES", n.d.).

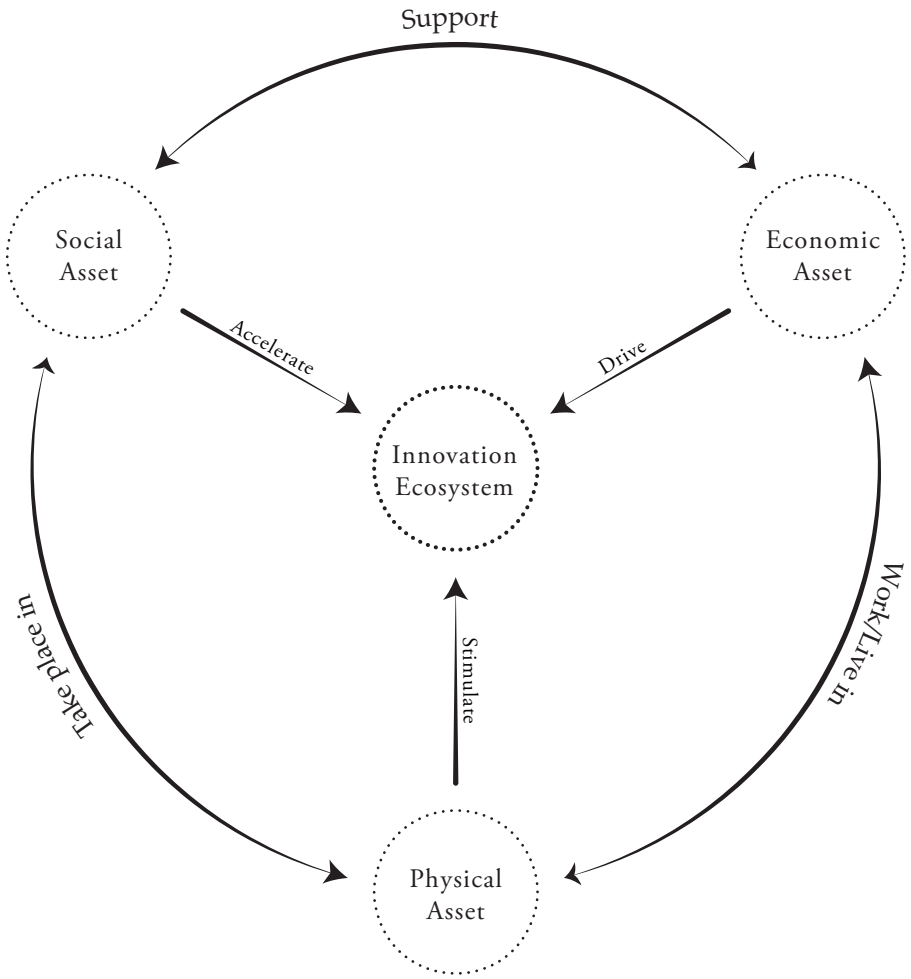
What is unique about the emergence of innovation spaces such as SPACES is that unlike traditional office buildings, there is a diversity of users with different academic background, age and nationalities, which is critical for innovation (Morrison, 2015). The starting position of the research therefore lies in the phenomenological study on the emergence of innovation spaces – in order to answer the following questions:

1. What are the economic, cultural and demographic factors that cultivates innovation space?
2. How does the physical environment embody these factors?
3. Who are the user groups of innovations spaces, and why are they attracted to the innovation space?

This line of inquiry is also supported by Kurt Lewin (1938), a German-American psychologist who specialized in social, organizational and applied psychology (fig. 3). In his publication on "The conceptual representation and measurement of psychological forces", he was able to effectively demonstrate how cultural patterns are a result of a constellation of forces that shapes the social processes which gives meaning and form to space. Through a praxeological investigation on "why people eat what they eat", Lewin through interviewing 5 housewives was able to correlate income levels and availability of restaurants (economic forces) with the frequency of eating out (social patterns), which ultimately effected the vibrancy of the local area (physical manifestation). From extrapolating the concept from this example, it becomes clear how architects can spatialize innovation culture. Through understanding the forces that shapes innovation culture, a toolbox can be created to inform the intervention of the physical environment to encourage social patterns that cultivates innovation (fig. 4).

Figure 3.
Interrelation between forces, people and environment.
(Self illustration)

Figure 4.
Architect position in acculturating space through designing the physical environment in context of forces to support social patterns of a given culture.
(Self illustration)


Support
Social Asset
Economic Asset
Accelerate
Drive
Innovation Ecosystem
Stimulate
Take place in
Work/Live in
Physical Asset

Results

i. **The forces that constitutes innovation culture**

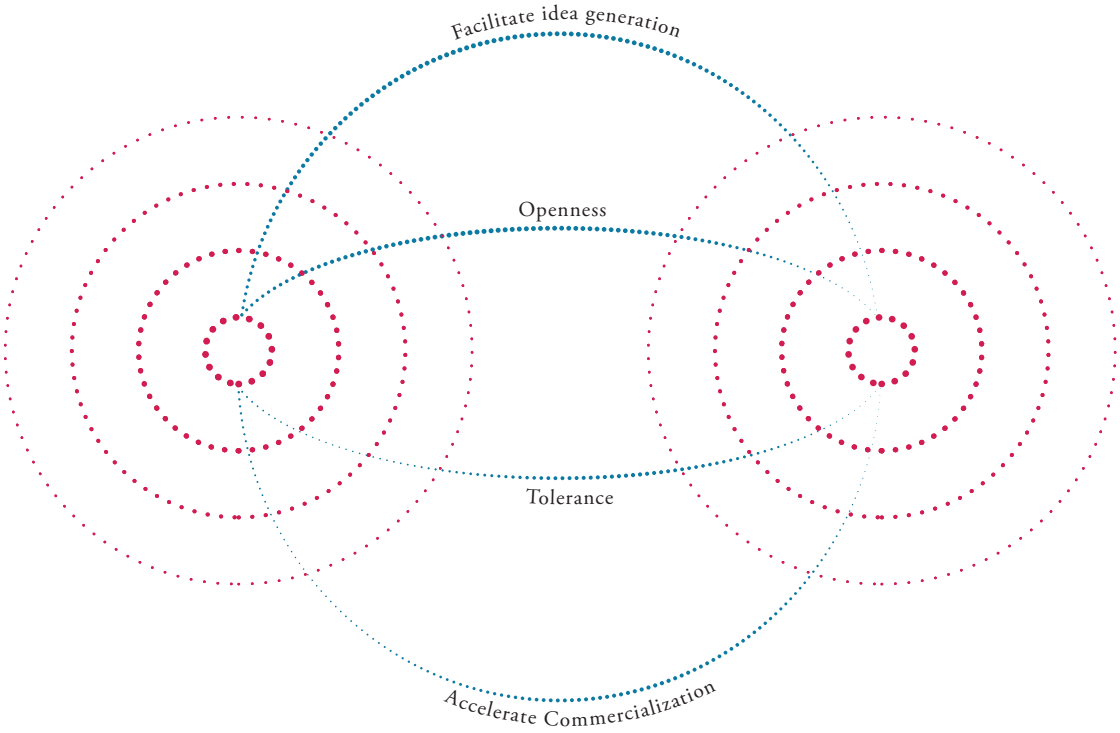
As established in the introduction, the departure point in creating a framework for the design of UID's is to question 'what is innovation culture?', in order to cultivate a value system that attract and retains members to create a community that "drives social and economic growth" (Frenkel et al., 2013). The first step to achieving this is through the study on the nature of innovation spaces to comprehend why people are drawn to it, and how they naturally emerged from "economic, demographic and cultural forces" (Wagner & Watch, 2017).

In the turn of the new century, emerging information and communication technologies (ICT) and global trends have given rise to a new type of worker referred to as the knowledge worker. The creative cluster, defined as "people who are employed, engaged principally to develop new technologies, propose new solutions, design new products and to any other forms of innovative work", (You & Bie, 2017) are taking a more prominent standing in today's society.

With the emergence of the knowledge industry, there is an increase in popularity for urban diversity, and an open and tolerant environment for the development of new ideas. (You & Bie, 2017) The cosmopolitan atmosphere has become perceived as an attractive feature, and therefore urban living has once again become re-affiliated with status, sophistication and open mindedness. This results in the migration of a critical mass of highly educated and productive people in inner cities locations, which is highly valued as it is recognized that "people are the motor of social and economic growth and urban development" (Frenkel et al., 2013).

The phenomenon of emerging innovation places in inner cities occur when 3 conditions are met. Katz & Wagner, (2014) refers to this condition as the innovation ecosystem derived from 3 types of assets, physical, economic and social. The theory stipulates that when the physical environment stimulates high levels of connectivity (physical asset), when there are amenities that helps to strengthen relationships (social asset), and when there is infrastructure that supports new ventures (economic asset), then naturally an innovation ecosystem will be established which is described as "a synergistic relationship between people, firms and place that facilitates idea generation and accelerates commercialization." (Fig 5.)

Figure 5.
The innovation ecosystem.
(Zandt, 2018)



Knowledge/creative worker

Value system of innovation culture

ii. **Overview of innovation culture**

Through literature reviews on existing research studies of emerging innovation spaces, it is possible to have a general idea on what is innovation culture. The premise to this study, is to learn who the user groups are. Although it is impossible to understand the preferences of every individual, as they are personal, clusters of users with the same type of preferences can be made. In the following an overview of the user groups of Urban Innovation Districts (UID) is given, from a more general description to a more in-depth study on the 4 different types of user groups in UIDs: companies, workers, residents and visitors based on the study of Zandt (2018).

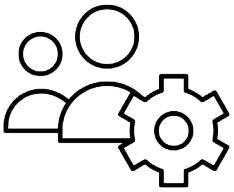
In a study by Morrison (2015), knowledge workers, millennial and creative workers were identified to constitute the core of innovation spaces. They are described to be attracted to an area of increasing economic opportunities and high quality of life; millennial in particular are drawn to "where the action is, and prioritizing a lifestyle that reinforces their own identities as creative people" (Morrison, 2015). Zandt (2018) classified two types of creative and knowledge workers, the super creative core which encompasses fields such as architecture and engineering, math, arts and design, education and training, entertainment and media as well as social sciences. The second type is the creative class which encompasses fields of finance, management, health care, business as well as legal and high-end sales.

The common interest of all user groups in innovation spaces is their drive to cultivate knowledge either to "facilitate idea generation" or to "accelerate commercialization." (Frenkel et al., 2013) As such, the key value within innovation spaces is openness and tolerance (Fig. 6). The culture and identity of innovation districts therefore need to "promote trust, socialization, knowledge, inspiration and incremental innovation in the creative industries characterized by risk and uncertainty." Perceived vibrancy and life in innovation spaces is critical to the attraction and retention of user groups (Zandt, 2018) which is characterized by the quality of life, ease of new ventures and spaces for collaboration and inspiration. Many literature studies stresses on the importance of social diversity defined as "heterogeneity in terms of lifestyle, ethnicity and sexuality", as it is demonstrated to increase "social vibrancy, lower social barriers, increase responsibility and help in establishing authenticity" (You & Bie, 2017).

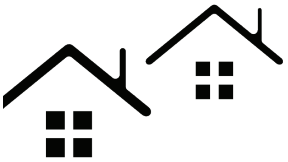
Figure 6.
Value system of innovation culture in relations to knowledge and creative workers.
(Self illustration)

Early Development

Companies

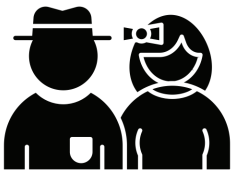


Workers



Residents

Late development



Visitors

iii. User groups of Urban Innovation Districts

Although the general culture and value systems to cultivate UID's has been established, the different user groups must be identified, as they serve a unique purpose in establishing the identity of UID's, and it is important to address their needs. Zandt (2018) classified the user groups into 4 user groups, each serving a different purpose in UID's as illustrated in the following table:

Companies/Workers

Companies and workers are the first to be attracted to UID's. They play a critical role in the making and preservation of the UID identity. They also contribute to the vibrancy and liveliness of the district during the day.

Residents

Residents are important for establishing perceived safety within the area. They are also important to ensure that there is life even during the night after work hours.

Visitors

Visitors contributes to the diversity of UID's. They ensure the vibrancy and liveliness of the district during the during weekends, activities and events.

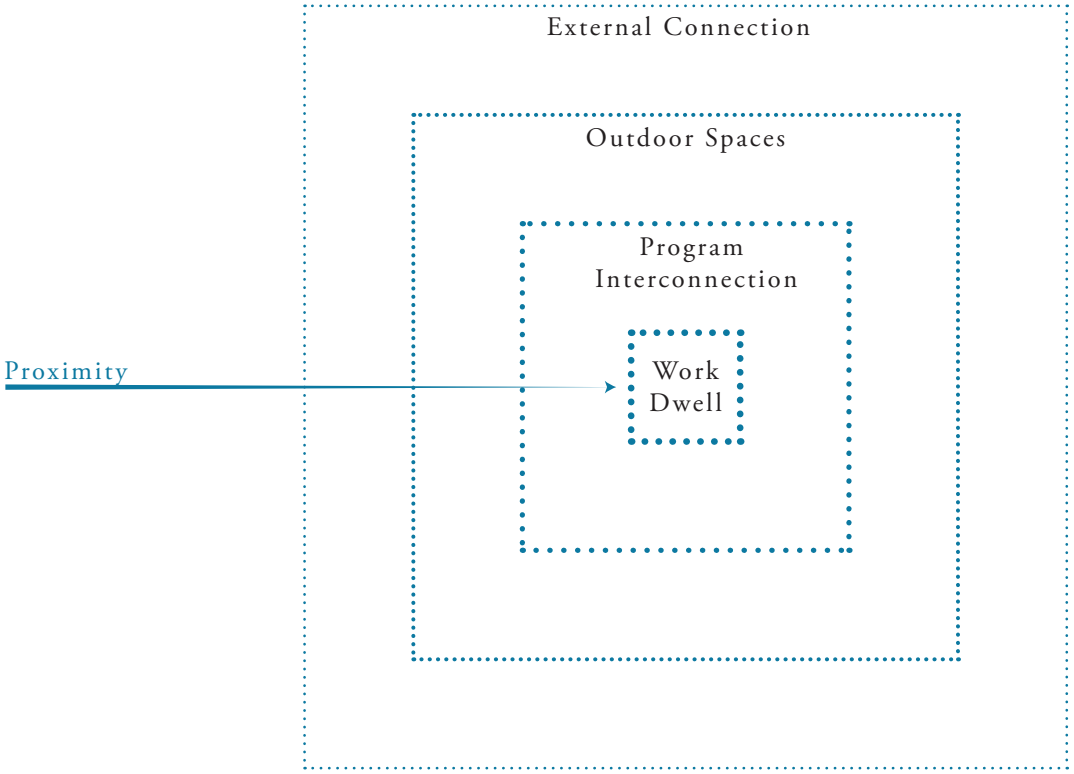
The user groups of UIDs also has very different desires from the physical environment of UIDs, as such in order to have the necessary balance of social capital within an UID, this needs to be understood separately and considered in the holistic design. This was identified by Zandt (2018), and classified under the 3 types of assets of the innovation ecosystem.

Table 1: Design preference of UID user groups according to the different assets of the innovation ecosystem.

	Companies	***Workers***	***Residents***	***Visitors***
Physical Asset	Variety of amenities; Accessibility; Flexibility of space;	Variety of amenities; Accessibility;	Variety of amenities; Accessibility; Cleanliness;	Variety of amenities; Accessibility; Safety;
Economic Asset	Business support; Economic incentives; Cost of space;	Employment opportunities; Economic incentives;	Cost of space; Employment; Opportunities;	-
Social Asset	Presence firms; Business events; Business community; Social tolerance; Potential employees;	Social tolerance; Presence of workers; Business community; Business events; Social diversity	Social tolerance; Urban diversity; Liveliness; Presence of people; Friendliness	Variety of events; Urban diversity; Variety of restaurants and shops; Attractions;

From the table it is clear that each user group has varying needs, and therefore requires a different balance of physical, economic and social asset. This distinction can be used to inform the progressive timeline on how a UID should develop (fig. 7). For instance, if a UID is still in the early stages of development, it is critical to develop the necessary infrastructure, building typologies and amenities that are critical for the attraction of companies and workers, such as the availability of office spaces. Conversely, if a UID is in the more later stages of development, and wants to attract visitors, then it is more important to cultivate the attractions which includes more high-end restaurants and shops as well as cultural venues to hold events and activities. Despite the different needs of the user groups, from the table it is also apparent that there are conditions which overlaps between user groups. These type of conditions are opportunities for interaction, and when designed with special attention, has the potential to transform into a creative hotspot.

Figure 7.
Advised timeline for the development of UIDs according to the needs of different user groups.
(Self illustration, incon by noun project)


External Connection
Outdoor Spaces
Program
Interconnection
Work
Dwell
Proximity

iv. **The ecosystem model**

From gaining an understanding on the user groups of UID's and the forces that shape it, it is possible to translate them into a physical framework. Research on social environments have demonstrated that "spaces can alter positively, or negatively cognitions, effect and behavior of its inhabitants," (Petty, 2016) and therefore plays an instrumental role in the development of social network systems. This is further elaborated by Anholt (2006) where he developed the concept of city branding and the idea that "positive identity transforms how people think about a place and behave towards it." Pluijmen (2017), describes place branding of UID's as the "built environment that should support the claim of innovation." If this is not achieved, regardless of the marketing strategy, UIDs will not be able to retain its identity, and with low credibility, people will be discouraged from visiting, investing or moving there.

Through further readings, 4 different layers of the physical environment are identified, work/dwelling, program interconnection, outdoor spaces and external connection (Dempsey et al., 2009; Rivera, 2011; Bouma et al., 2015; Emenike et al., 2012; Leuderitz et al., 2015; Wagner & Watch, 2017). Each layer must be seen as a complex social network system that makes up an ecosystem; they must be addressed holistically in order to create a sustainable community and a strong identity for UIDs (fig. 8 and 9)

Figure 8.
The ecosystem model made of 4 layers of social network systems.
(Self illustration)

Workplace/dwelling

Workplace and dwelling are physical spaces where a person spends most of their time. As such, it is the most primary level of social network system within the ecosystem model, Pluijmen (2017) draws on the importance on new working/living typologies. Flexible workplaces and affordable dwelling are critical physical, economic and social assets for user groups of UID. Contrary to traditional working and dwelling spaces, the clear distinctions between the two areas have become more blurred. There is a growing complexity in shared and combination spaces, where the public have the opportunity to engage in an active environment. The diversity required of UIDs calls for new typologies in both mixed income and mixed function typologies (for more detail, refer to appendix B).

Program interconnection

Program interconnection refers to the prevalence of amenities and services, and how they are linked to the larger urban framework. It is the secondary level of social network system within the ecosystem model, and is critical as they are mediatory spaces where UID user groups have common interest in (for more detail, refer to appendix C). Zandt (2018) in her praxeological research on the user groups of Strijp-S, an Urban Innovation District in Eindhoven, classified 3 types of amenities, functional, recreational and cultural. Functional amenities are essential facilities such as supermarkets that are necessary for daily activities. Affordable functional amenities are critical economic asset for user groups of UID. Recreational and cultural amenities are facilities such as exhibitions, gym, bars or cafes. They are pivotal social assets for UID's.


JUICE

Outdoor spaces

Outdoor spaces is the third level of social network system within the ecosystem model. It is the matrix that connects the entire urban framework of UID's. Mitigating the transition from outdoor space, to semi outdoor space to the interior spaces of buildings is critical for encouraging positive social interaction between user groups of UID's. Pluijmen (2017) in particular stressed on the importance of encompassing a diversity of open spaces, from small scale plazas and parks to accommodate for cultural events and activities, to more intimate pockets of spaces for meeting places that have relations to the interior of buildings on the ground floor (for more information, refer to appendix C). Al-Hagla (2008) in his publication on "Towards a Sustainable Neighborhood: The Role of Open Spaces" classified outdoor spaces into 2 sub-sets, green space and grey space. Green space refers to "any vegetated land or structure, water or geological structure within urban areas" and has 6 different typologies, parks and gardens, amenity green space, children play areas, sports facilities, green corridors and natural/semi natural greenspaces. Grey space refers to "urban squares, market places, and other paved or hard landscaped areas with a civic function." It has 3 typologies, civic squares and plazas, market places, pedestrian street as well as promenades and seafronts. Depending on the user groups of UIDs a selected combination of outdoor spaces should be designed as they play a critical role as social assets and identity creation.

External connection

External connection is the fourth and last level of the social network system within the ecosystem model. It refers to the external relations of the UID with regards to the rest of the urban context. In a study conducted by Wagner & Watch, (2017), all user groups find the diversity of transport systems are critical for UIDs. This ranges from private transport, to a range of transit systems such as trams and buses to bike/pedestrian paths from neighboring districts. External connection however relates to more than sheer accessibility. The planning of transport systems has significant impact on the walkability and bike-ability of UID's which has been widely confirmed as key determinants of high-quality urban environments (Pluijmen, 2017). Furthermore, critical nodes such as drop off points, bus and tram stations as well as train stations etc. when designed properly in conjunction with amenities can be prime locations for cultivating social interaction between user groups of UID's.

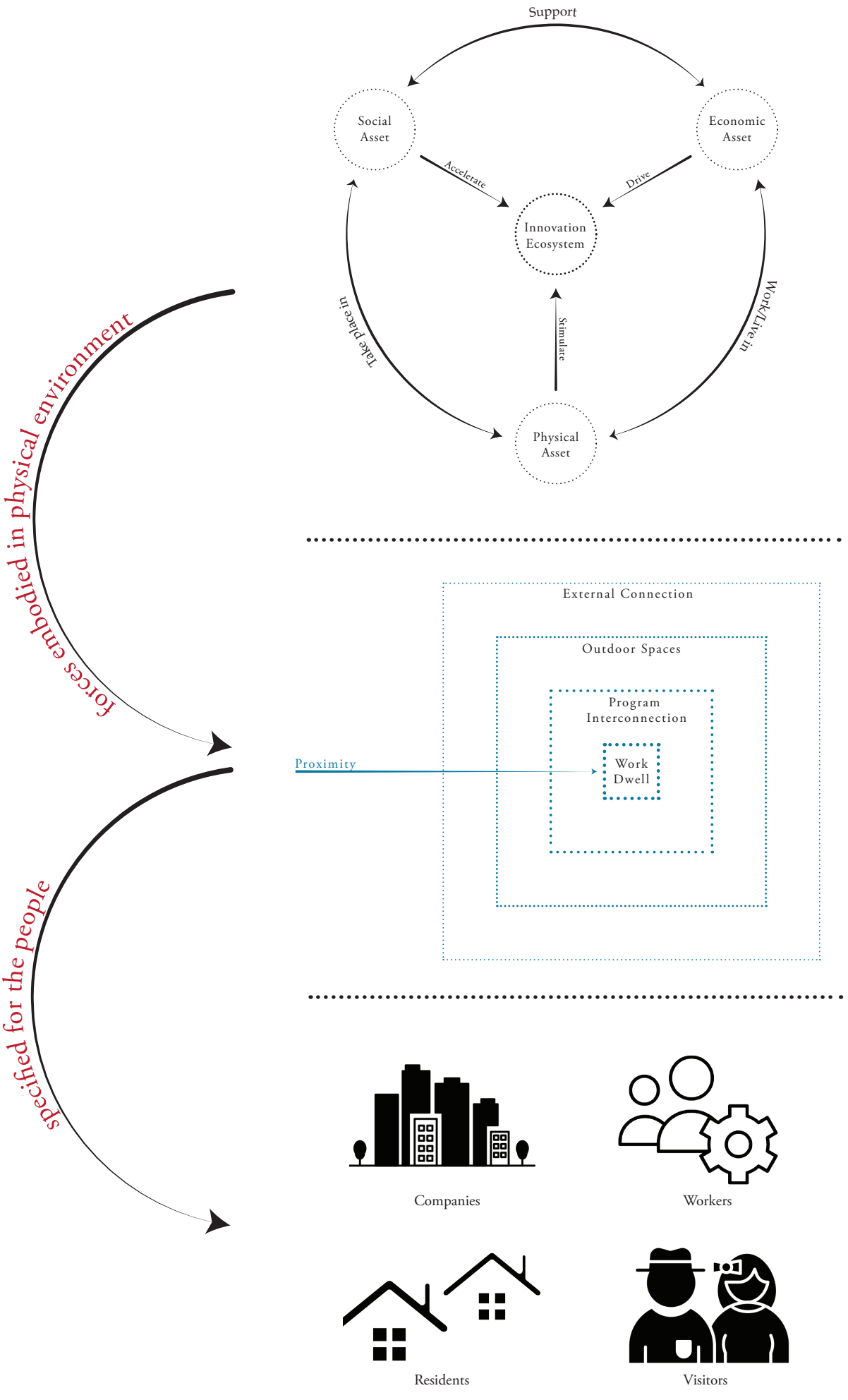
Figure 9.
The 4 layers of social network systems:

Top image: Dwelling/working
(P, 2016)

Second image: Program interconnection
(S, 2016)

Third image: Outdoor spaces
(Bratz, n.d.)

Bottom image: External connection
(Baldwin, 2018)


Support
Social Asset
Economic Asset
Accelerate
Drive
Innovation Ecosystem
Take Place in
Stimulate
Work/Live in
Physical Asset
forces embodied in physical environment
External Connection
Outdoor Spaces
Program Interconnection
Proximity
Work Dwell
specified for the people
Companies
Workers
Residents
Visitors

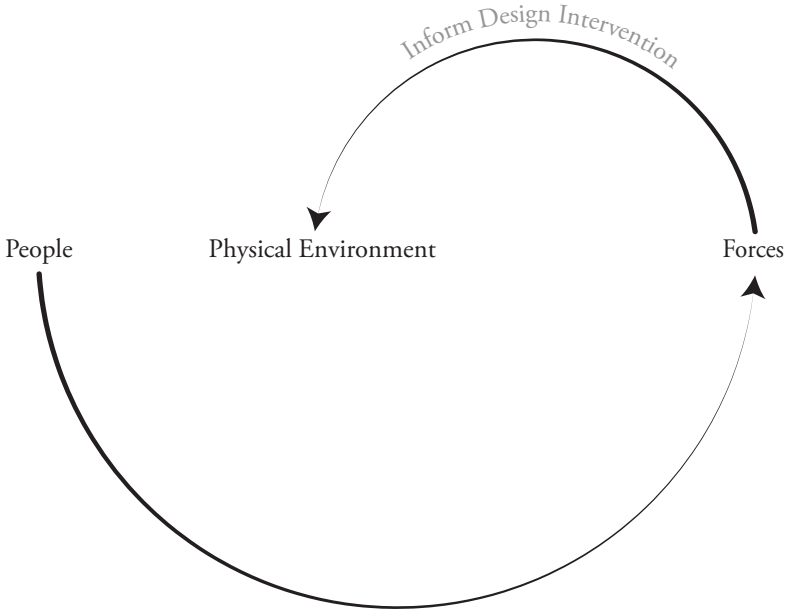
Conclusion

Given the agenda of the national project, Stad van de Toekomst – City of the Future in the Netherlands 2018 on the topic of "How can we design and develop a transformation area into an attractive and future-proof environment", this research paper explored the role of the architect as the mediator between the public and the built environment to transform the urban environment to optimize future innovation. The superimposition of phenomenological and praxeological research on innovation culture was employed to create a dialogue between the public and the architect, and in establishing an empirical framework for the design of UIDs (fig. 10).

Figure 10.
Architect position in spatializing innovation culture through embodying the forces of innovation culture in the physical environment to support social patterns within innovation culture.
(Self illustration, icon by noun project)

Through the phenomenological study on the emergence of innovations spaces, three constituents of innovation culture were identified, forces, people and the physical environment. The mapping on the mutual relationships of the three constituents demonstrates how architects can spatialize innovation culture, through embodying the forces that shape innovation culture in the physical environment to cultivate social patterns of the people.

From identifying the three assets that cultivates innovation ecosystem, and its relation to the different user groups of UIDs, an ecosystem framework was developed to inform empirical based interventions of the physical environment of UIDs to optimize innovation. The innovation ecosystem provided an insight on how the urban planning of physical space can be designed as social and economic asset for the user groups of UIDs. The further elaboration on the different user groups of UIDs provides an effective mean to study the stages of a UIDs' development, and what interventions are required to bring it forward. Finally, the ecosystem framework breaks down the physical environment into 4 layers of social network systems, external connections, outdoor spaces, program interconnection and working/dwelling places, giving a more holistic overview on how to create a comprehensive environment to cultivate innovation; this can directly impact positively on a city's global competitiveness, while encouraging self-induced and self centered economic activities and growth that is independent of governmental interventions.


Inform Design Intervention
People
Physical Environment
Forces

Discussion

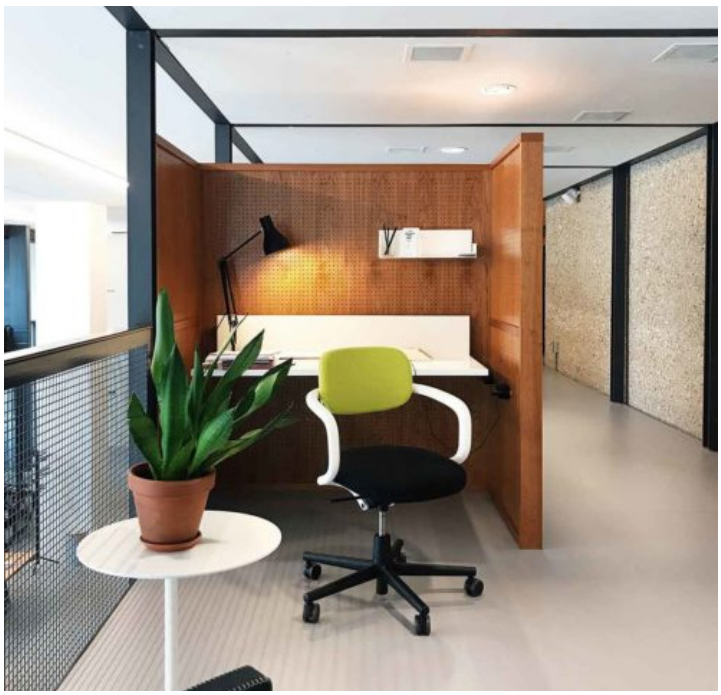
Although the ecosystem framework is a very good tool base to inform the intervention of UIDs, it must be acknowledged that all UIDs are different, and therefore it should only be used as a preliminary structure for the assessment of a UIDs development. There are two reasons for this. First of all, as acknowledged by Pluijmen (2017), "physical interventions alone are not enough to stimulate the process of innovation of firms and institutions", it must work along with policy making established from a strong network between the government, private parties, market actors and educational institutions. The second reason is because since UIDs are typically large areas that are composed by a series of sub-areas with their own character, a place-based approach is required, and the ecosystem framework provides only a general background on the type of user groups, in which the ratio may differ depending on the context of the specific site.

To effectively employ the ecosystem framework for the design interventions of UIDs, a place-based ethnographic study is further required of a given UID. This place-based approach calls for a site-specific analysis on the physical, economic and social asset of the area, subsidized with interviews and questionnaires targeted at existing user groups in order to customize to their precise needs (fig. 11). The application of the ecosystem framework will be further investigated in the next paper, where it will be used to analyze Binckhorst, an Urban Innovation District in the Den Haag that is still in the early stages of development.

On a further note, more investigation is needed on the specifics of how spatial elements can stimulate connectivity for instance, materialization and sequence of space from private to public. This is because the public "apprehend urban environments through kinesthetic experience" (Cullen, 2010). Innovation spaces also calls for new typologies of both living and working places. Although two examples are given in appendix A and B, they are amongst the few of many different spatial strategies. Similar to how Robert Venturi and Denise Scott Brown, populist architect in the 1950's was able to abstract elements from vernacular environments of pop culture to inform their design (Avermaete, 2010), a set of spatial tools can also be developed through the analysis on the physical attributes of innovation spaces that stimulates high levels of connectivity. This calls for a more visual ethnographic approach, and a more comprehensive catalog of typologies that represent innovation spaces.

Figure 11.
Placed based approach to the application of the ecosystem framework.
(Self illustration; Zandt, 2018)


CREATIVITY
CONTINUAL
SURPRISE
INSPIRE
YOUR
COMFORT
ZONE
Dreams
DON'T
Work
Unless



Appendix A, Case Study: SPACES

SPACES is a company that provides a unique service where the public pays monthly commission in order to have access to a creative working environment, with shared facilities such as café's and meeting rooms ("SPACES", n.d.) The business model allows the public to also have the flexibility to acquire their own office space or desk through different pricing options. SPACES originated from Amsterdam, but quickly expanded nationally covering major cities such as Den Haag and Rotterdam, and has even penetrated into the UK market located in central areas major inner cities including but not limited to Edinburgh, Glasgow and London (Fig. 12).

Figure 12.
SPACES offers a series of private and flexible spaces for working that cultivates an environment for diversity, cooperation and interaction.

Top left image:
Flexible working space.

Top right image:
Common area with cafeteria.

Middle right image:
Meeting room available for booking.

Middle right image:
Event space available for booking.

Bottom left image:
Personal desk space for rental.

Bottom right image:
Personal office space for rental.
("SPACES", n.d.)


Albert Heijn

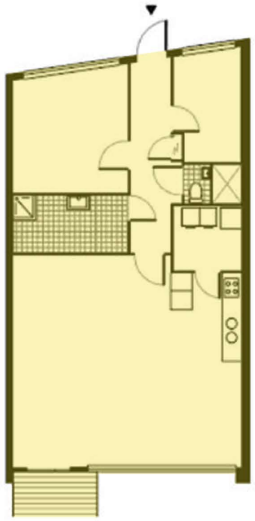
Appendix B - Case Study: De Zilvervloot by AUAI

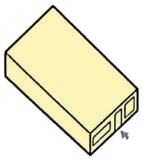
The precedent selected for the study of effective dwelling/working social network system of the ecosystem model is De Zilvervloot situated in the city of Dordrecht by AUAI architects (fig. 13). It was chosen because of various design strategies employed which aligns with the importance of creating perceived vibrance and life, and celebrating diversity which are key characteristics of Urban Innovation Districts according to the study of Zandt (2018). The building project is medium-high in density, with 120 units per hectare, and is intentionally designed to express diversity. In consistent with Pluijmen's (2017) research on innovation spaces, De Zilvervloot is a new typology of work and residential complex that is both mix-income at the same time providing flexible live-work units necessary for UIDs.

Figure 13
Top image:
East facade
(Robinson, 2018)

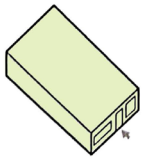
Bottom image:
South facade
(Robinson, 2018)

Located in the Wielwijk neighborhood that was built in the 1960's by the housing corporation of Woondrecht as a social housing project, the exclusive low-income quarter became drug-infested and dangerous. To radically change the neighborhood's image, Rob Hadgens, the director of Woondrecht hired the architecture firm, Atelier d'Urbanism, d"Architecture et d'Informatique (AUAI) to transform the area. Cultivating a sustained dialogue with the community's residential team, AUAI created a master plan including De Zilvervloot which incorporated a range of mixed-income units, while adding functional amenities in a dedicated commercial space. De Zilvervloot complex, completed in 2005, played a pivotal role in the neighborhood redesign accomodating for 50% social housing, 25% luxury units and 25% units for middle-income residents with a total of 130 dwelling units. (Robinson, 2018)

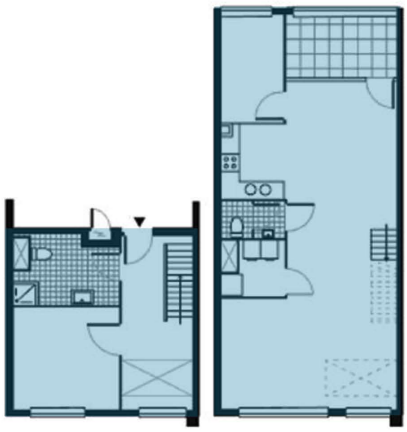


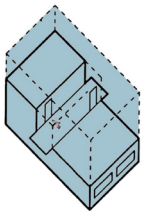


South-facing flat

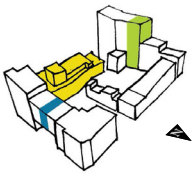


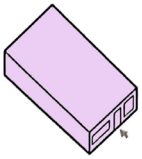
Upper-income flat



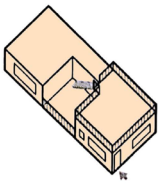


Skip-stop maisonette

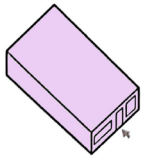




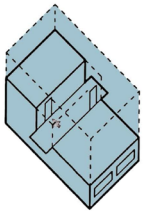
Apartment



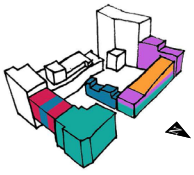
Penthouse



Live-work unit



Skip-stop maisonette



Incorporation of mixed-income typologies (figure 14)

One of the most unique aspects of De Zilvervloot is the diversity in residential typologies. With a total of 130 dwelling units, there are 105 apartments, 18 maisonettes, 3 penthouses, 1 studio and 3 rowhouse dwellings; they are distributed across 9 interconnected blocks namely De Steven, De Parkhuizen, De Genua, De Schatten, De Steiger, Het Want, De Brug, De Graffel and De Serre. The arrangement of the building accommodates for variation, serving the different needs of people of varying income and life stages (Robinson, 2018). The mix of different typologies encourages social diversity which is highlighted by You & Bie (2017) as critical for UIDs as the "heterogeneity in terms of lifestyle, ethnicity and sexuality" increases "social vibrancy, lowers social barriers, increase responsibility and help in establishing authenticity." The diversity is further celebrated with materialization and outdoor spaces which will be elaborated further in the following pages.

An important social principle of De Zilvervloot is that the combination of units is dispersed across the building. As there is no legible pattern, residents are unable to differentiate which units are social rental unit, which are moderate income for purchase, and which are luxury units. Therefore, even though the complex accommodates for different income groups, it does not create segregation. (Robinson, 2018)

Figure 14

Different typologies present in De Zilvervloot (Robinson, 2018)

WOOD
STUCCO PANEL
STUCCO PANEL
WOOD
METAL PANEL
WOOD
METAL PANEL
METAL MESH
WOOD

Expressing of diversity: Materialization (figure 15)

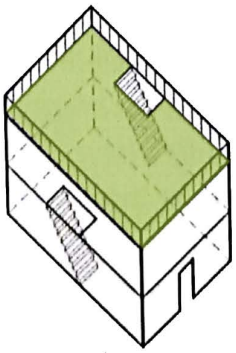
In contrast to many housing complex projects, De Zilvervloot distinctly expresses diversity through breaking down the façade into 9 buildings, each with "its own material, fenestration and color palette" (Robinson, 2018) Although due to budget reasons, some of the original material choices were changed, for instance, brick was replaced with stucco and metal panels, the project still came through and the initial vision of the architect was achieved.

Figure 15

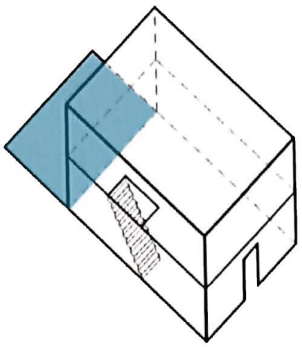
Expression of diversity through materialization

(Self illustration)

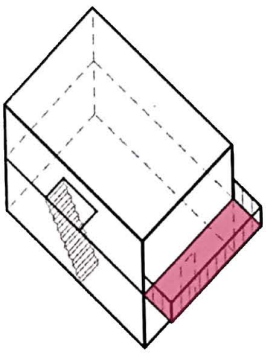
Roof terrace



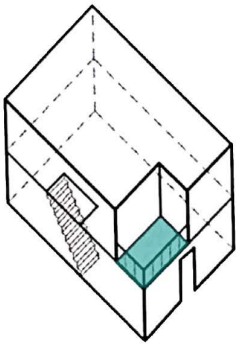
Back garden



Balcony



Logia



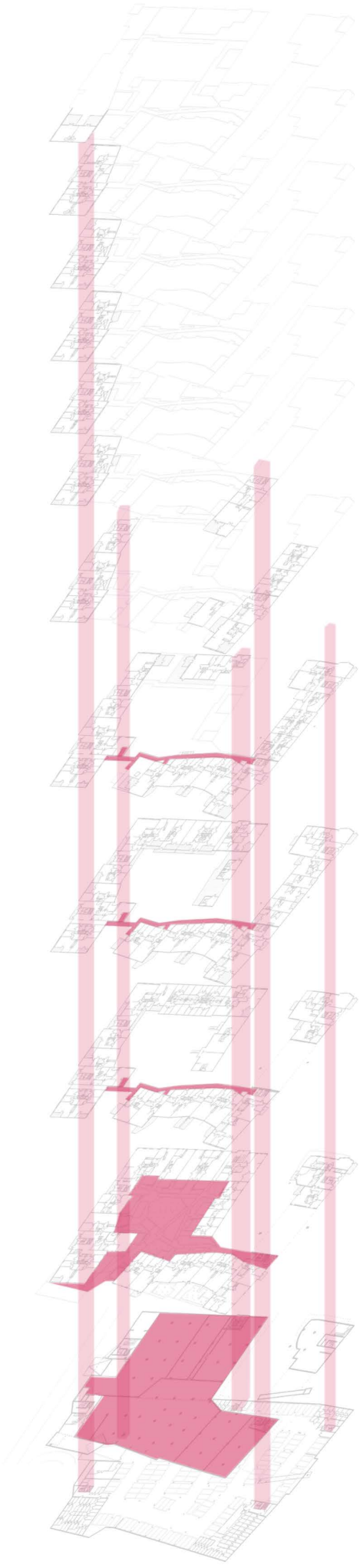
Expressing diversity: Outdoor spaces

As mentioned previously, each dwelling unit has an outdoor space. A design principle of De Zilvervloot is in the clear expression of the outdoor spaces, whether it is balcony, loggia or roof terrace. They differ in size and orientation according to the functional needs of a specified inhabitant. For instance, due to the windy location of dwelling units facing the East and South, instead of balconies, they have loggias as exterior space. This contrasts with the dwelling units on the courtyard facing East, and the North, which is more protected and characterized with terraces and balconies. (Robinson, 2018)

Figure 16

Expression of diversity through outdoor spaces.

(Robinson, 2018)



Shared access system

The access system of the different dwelling units plays a key role in the design. Each housing block encourages neighborhood interaction through shared entrances that is typically in complex housing projects limited to a very small number of people. They are expressed on the exterior of the block and visible to other residents. This allows someone living in one of the social housing projects to share the same lift as another resident who may live in a penthouse or a luxury apartment. (Robinson, 2018)

Figure 17

Access system of De Zilvervloot

(self illustration)


RESIDENTIAL COURTYARD
COMMERCIAL ACTIVITIES
COMMERCIAL COURTYARD

Communal commercial and residential courtyard (figure 18)

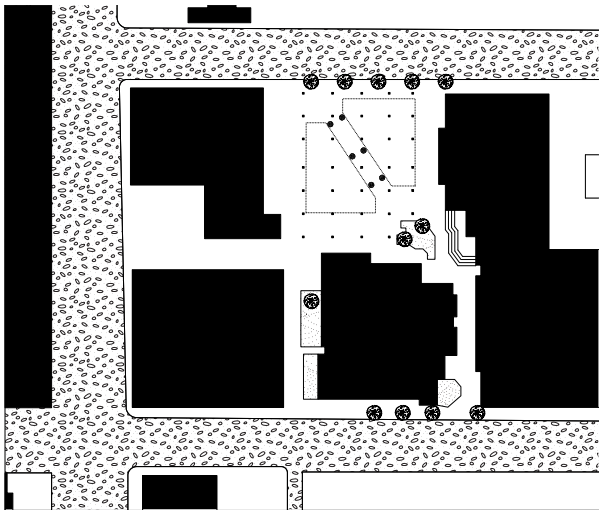
All of the access systems of the dwelling units are connected with either the commercial, public courtyard, or the private residential courtyard. The inclusion of commercial space on the ground floor of De Zilvervloot plays a critical role in the neighborhood transformation. It includes many recreational and functional facilities, such as a new shopping area and sport facilities. These spaces are essential for UIDs because they are combination spaces which allows people from different backgrounds to interact. (Robinson, 2018)

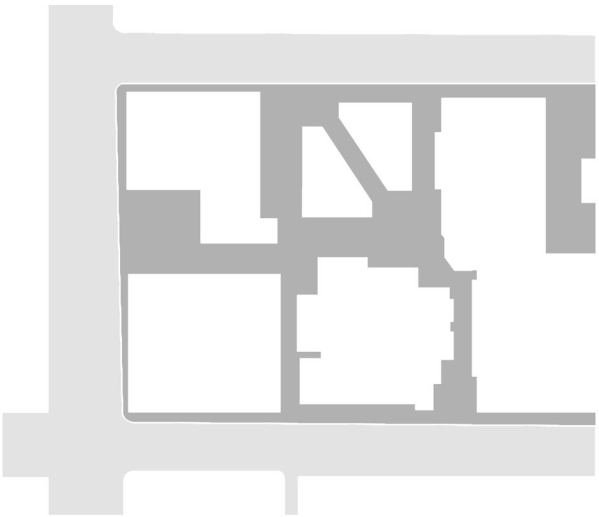
Figure 18

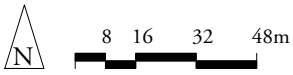
Top left image:
North gallery access over commercial space
(Robinson, 2018)

Top right image:
Residential courtyard with live-work maisonette
(Robinson, 2018)

Bottom image:
Commercial and residential courtyard
(Robinson, 2018)







Pure pedestrian road

Vehicular transport road

Appendix C - Case Study: 2110 Bay Street by Studioneleven

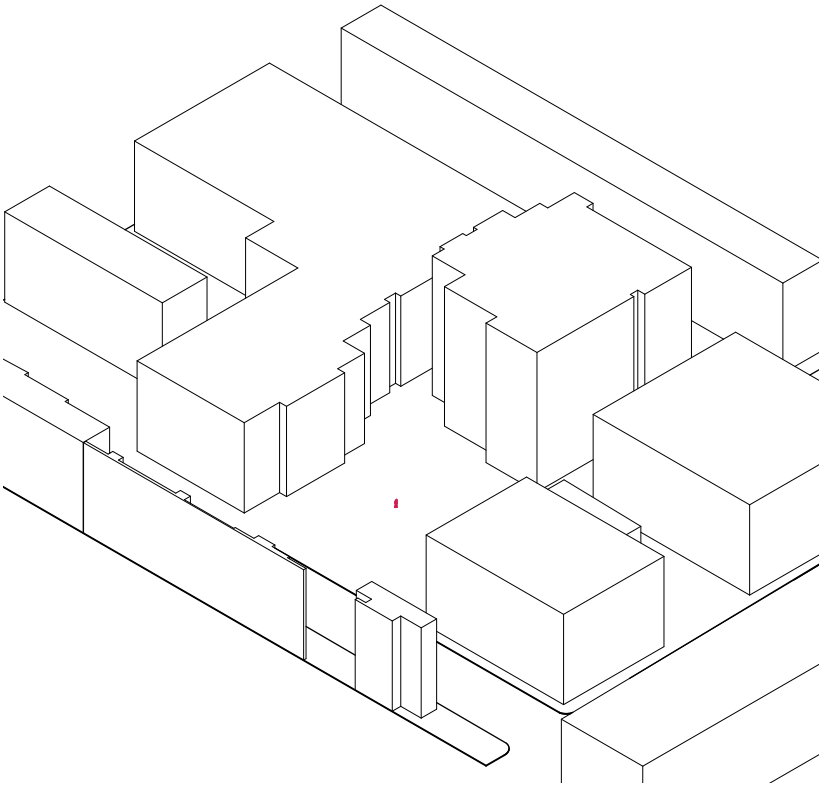
2110 Bay Street by Studioneleven is selected as a case study to examine some spatial strategies that is effective for the design of Program Interconnection, Outdoor Spaces and External Spaces in UIDs. In the design of the urban framework, Studioneleven has introduced a new typology, a mediatory space that fosters inter-relationship between dwelling, working and recreational/ functional amenities. The site covers an area of 145,000 square feet and is located in a derelict area of the art district in downtown Los Angeles. As part of a revitalization intervention, the firm has transformed an empty parking lot into a pedestrian-friendly neighborhood. While preserving the three existing buildings, the design team created 100,000 square feet of office space, a hundred live/work units and an adaptive reuse shed. In the following, several features of the design is highlighted which can be effective tools for the urban design of a UID.

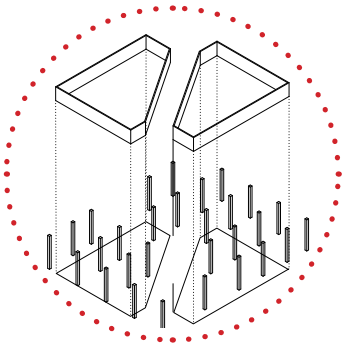
Prioritization of pedestrians over vehicular transport (External Connection, fig. 13)
As can be seen in figure 13, the site is designed to optimize the walkability and bike-ability of the neighborhood. Vehicular oriented transport is restricted to the main roads, this allows for pedestrians to walk unrestrained. As demonstrated in the findings by Pluijmen (2017), this type of arrangement is a key determinant for a high-quality urban environment, which is critical for creating an innovative environment.

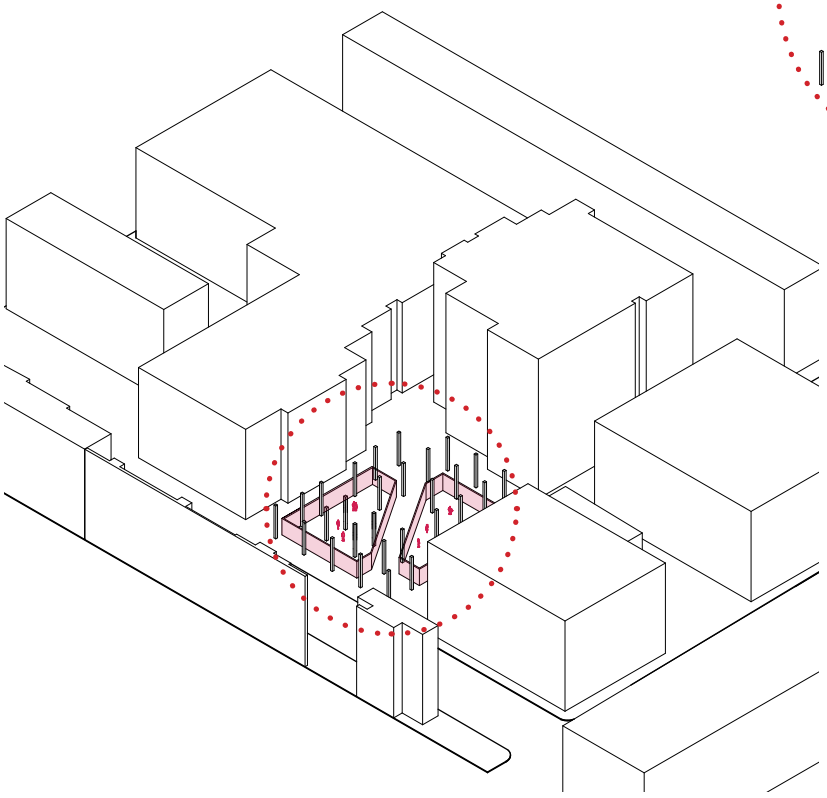
Figure 13.
Top image:
Perspective rendering of adaptive reuse shed.
("Studio One Eleven", n.d.)

Bottom left image:
Plan of site area.
(diagram: self illustration)

Bottom right area:
Restricting vehicular transport on outskirts of urban fabric.
(diagram: self illustration)







Human scale (Outdoor Spaces, fig. 14: top image)

The design of the adaptive reuse shed is effective for UIDs because of 2 primary reasons. First of all, given that the surrounding buildings are 10 stories or higher, the plaza without the shed will lose a sense of human scale. In both studies by Zandt (2018) and Pluijmen (2017), maintaining small scale parks and plazas are critical as social assets for user groups of UID. The contrast of the high-rise residential buildings and the 3-story shed enables the necessary density of UIDs without comprimising the urban quality of the site area.

Diversity of open spaces (Outdoor Spaces, fig. 14: middle and bottom image)

The second reason is that the structural system of the adaptive reuse shed creates a diversity of open spaces. The juxtaposition of the gridded columns and the infills creates a unique condition, whereby the structure creates the transparency and openness that is important for perceived vibrancy in UIDs (Zandt, 2018), while the infills creates compartments of spaces that provides the opportunity for more intimate interactions. Moreover, this system also permits a senstitive mitigation of transition spaces, from outdoor to semi-outdoor to indoor.

Figure 14.

Top image:

Plaza without adaptive reuse shed - lack of human scale.

(Diagram: self illustration)

Middle image:

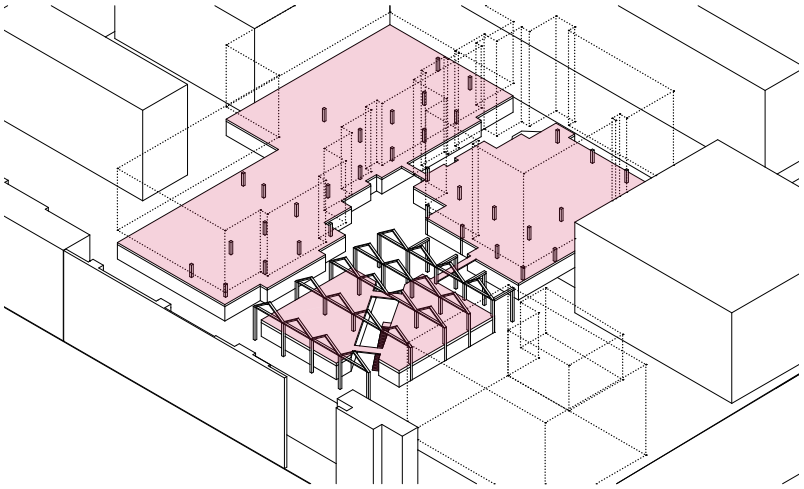
Structural system of adaptive reuse shed, gridded columns with infills.

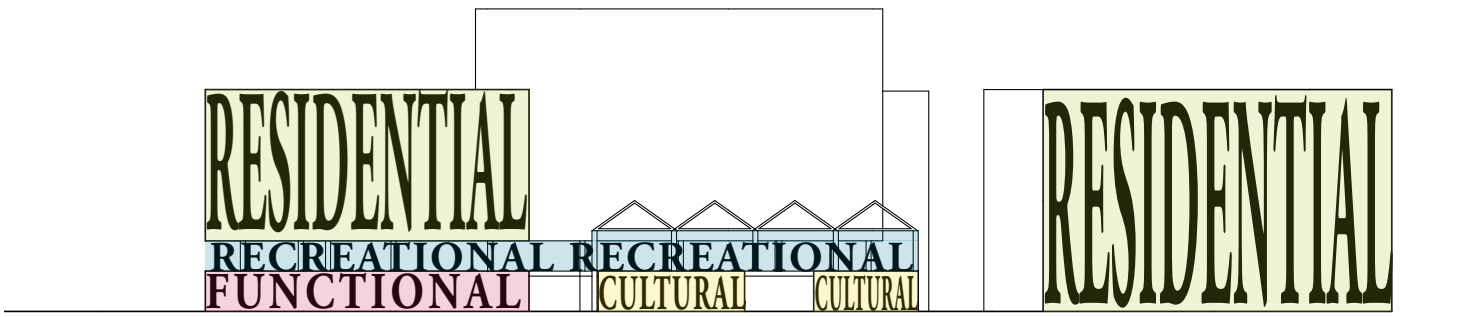
(Diagram: self illustrationn)

Bottom image:

Compartmentalization of plaza for more intimate spaces.

(Diagram: self illustration)




RESIDENTIAL
RECREATIONAL
FUNCTIONAL
RECREATIONAL
CULTURAL
CULTURAL
RESIDENTIAL

Interconnectivity (Program Interconnection, fig. 15)

As can be seen from the render perspective, and the diagrams, the adaptive reuse shed has multiple levels of connectivity with the adjacent buildings. Harboring 3 essential amenities, natural, cultural and recreational as defined by Zandt (2018), it functions as a critical platform for different user groups of UIDs to come together. On the ground floor, the transparency of the shed and the adjacent building creates a visual connection between the exhibition space and the restaurant. On the second floor, the gym of the residential complex connects directly to the second floor of the shed.

Figure 15.

Top image:

Perspective render of pedestrian street.

Middle image:

Interconnection of shed with adjacent building on the second floor.

(Diagram: self illusration)

Bottom image:

Relationship between programs.

(Diagram: self illustration)


GALLERY

Materialization (Outdoor spaces, fig. 16)

The careful selection of material contributes to the unique identity of the area. The use and exposure of the steel frames, combined with the warm color of the wooden framing of the roof creates the image of a transformed industrial area into an appropriated space for relevant activity of a new community. This aligns with Anholt's (2016) study, where he stipulates that "positive identity transforms how a people think about a place and behave towards it," in this case the materialization of the shed serves as a reminder of how something that is outdated such as the structural system that is atypical for industrial factories, can be reinterpreted to function an entirely new program – hence subtly promoting the spirit of innovation.

Figure 16.

Top image:

Perspective rendering from inside adaptive reuse shed.

("Studio One Eleven", n.d.)

Bottom image:

Extracted components

(Self illustration)

References

i. **Publications**

Al-Hagla, K. S. (2008). Towards a Sustainable Neighborhood: The Role of Open Spaces. International Journal of Architectural Research, 2(2). doi:DOI: 10.26687/archnet-ijar.v2i2.239

Almeida, T. (2013, March 08). Le Corbusier: *How A Utopic Vision Became Pathological In Practice*. Retrieved from https://orangeticker.wordpress.com/2013/03/05/le-corbusier-how-a-utopic-vision-became-pathological-in-practice/

Anholt, S. (2016)., & Plummer, L.A. (2005) Penetrating the "knowledge filter" in regional economies. *Annals of Regional Science, 39*(3), 439-456. doi: 10.1007/s00168-005-0245-x

Avermaete, T. (2010). The Architect and the Public: Empowering the people in Postwar Architecture Culture. *Urbanism and Landscape*, *14*, 83-95.

Altes, W.K., & Tambach, M. (2008). Municipal strategies for introducing housing on industrial estates as part of compact-city policies in the Netherlands. *Cities, 25*(4), 218-229. doi10.1016/j.cities.2008.04.005

Bouma, J., Poulman, W.A., & Voorbij, A.I. (2015). *Supporting social contact design principles in common areas of cohousing communities*. Rotterdam University of Applied Sciences.

Cullen, G. (2010). *The concise townscape*. London: Architectural Press.

Dempsey, N., Bramley, G., Power, S., & Brown C. (2009). The social dimension of sustainable development: Defining urban social sustainability. *Sustainable Development, 19*(5), doi:10.2495/sc160221.

Emenike, A.I. (2016). Developing sustainable anad livable neigbourhoods: The role of public open spaces. *The Sustainable City* XXI. doi:10.2495/sc160221.

Frenkel, A., Bendit, E., & Kaplan, S. (2013). Residential location choice of knowledge-workers: The role of amenities, workplace and lifestyle. *Cities*, 35, 33-41. DOI: 10.1016/j.cities.2013.06.005

Hutton, T.A. (2004). The new economy of the inner city. *Cities, 21*(2)

Katz, B., Wagner, J. (2014). The rise of innovation districts: A new geography of innovation in America. *Metropolitan Policy Program at Brookings*, May.

Lewin, K. (1938). *The conceptual representation and the measurement of psychological forces*. doi:10.1037/13613-000

Low, S. (2016). *Spatializing Culture*. doi:10.4324/9781315671277

Luederitz, C., & John, B. (2015) *Principles for sustainable urban places: The why, what and how.* Retrieved October 5, 2018

Morrison, A. (2015). *Innovation districts: a toolkit for urban leaders.*

Pluijmen T. (2017). *A closer look at the physical characteristics of innovation districts* (Unpublished master's thesis). TU Delft.

Rivera H. (2011). Social Sustainability in Urban Areas: Communities Connectivity and the Urban Fabric. *Housing Studies*, 26(3), doi:10.180/02673037.201.

References

i. **Publications**

Robinson, J. W. (2018). *Complex housing designing for density*. New York: Routledge.

Van Winden, W., Carvalho L., van Tuijl, E., van Haaren, J., & Van den Berg, L. (2013) C*reating knowledge location in cities: innovation and integration challenges* (Vol. 54). Routledge.

Wagner, J., & Watch, D. (2017). *Innovation spaces: The new design of work*. Washington, D.C.: The Anne T. and Robert M. Bass Initiative on Innovation and Placemaking at Brookings.

You, H., & Bie, C. (2017). Creative class agglomeration across time and space in knowledge city: Determinants and their relative importance. *Habitat International, 60, 91-100*

Zandt, B. V. (2018). *The attraction and retention of users to Urban Innovation Districts* (Unpublished master's thesis). TU Delft.

ii. **Website and images**

Baldwin, E. (2018, December 3). UNStudio Designs a City of the Future for The Hague [Digital image]. Retrieved December 7, 2018, from https://www.archdaily.com/907063/unstudio-designs-a-city-of-the-future-for-the-hague?fbclid=IwAR2zABrZVFTc9245vMMF-HOOQHesHcj2YRFU6f5Xya9dqxCogi-086N0Fzo

Bink36. (n.d.). Retrieved December 24, 2018, from https://takethehague.nl/nl/location/bink36

BNA Onderzoek - Stad van de Toekomst. (n.d.). Retrieved from https://www.bna.nl/onderzoeks.project/stad-van-de-toekomst/

Bratz, J. (n.d.). 9 "Innovation Districts" Creating The Cities Of Tomorrow [Digital image]. Retrieved December 7, 2018, from https://globein.com/b/9-innovation-districts-creating-cities-tomorrow

IM BINCK Festival. (n.d.). Retrieved December 24, 2018, from https://impactcity.nl/event/im-binck-festival/

P. (2017, May 16). Big Developers Roll Out Co-Living Units to Woo Millennials [Digital image]. Retrieved December 7, 2018, from https://www.wsj.com/articles/big-developers-roll-out-co-living-units-to-woo-millennials-1494956907\

S. (2016, May 12). Why People Work in Coffee Shops and Why This Means Coworking Will Continue to Grow [Digital image]. Retrieved December 7, 2018, from https://www.smallbizlabs.com/2016/05/why-people-work-in-coffee-shops-and-why-this-means-coworking-will-continue-to-grow.html

SPACES. (n.d.). Retrieved December 24, 2018, from https://www.spacesworks.com/

StartupDelta. (2018, September 12). *285 Startups to fuel the energy transition. – StartupDelta Stories – Medium*. Retrieved from https://medium.com/startupdelta-stories/285-startups-to-fuel-the-energy-transition-7f95e26f8cf8

Studio One Eleven. (n.d.). Retrieved January 3, 2019, from http://www.studio-111.com/portfolio/detail/2110-bay-street/

What is innovation culture? - Definition from WhatIs.com. (n.d.). Retrieved from https://searchcio.techtarget.com/definition/innovation-culture