COWORKING SPACES

FROM INDUSTRIAL COMPLEXES TO THE FOURTH INDUSTRIAL REVOLUTION?

TIN PHAN

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CHAPTER LAYOUT

1.0 **INTRODUCTION** - Summary, research question and research design.

2.0 **LITERATURE REVIEW** - Literature and theory discusses the concepts and relation between 21st century industrial complexes and coworking spaces.

3.0 **BACKDROP & CONTEXT** – The history of entrepreneurial roots and development in Silicon Valley and Oslo. The history of these two brings up an important discussion; Whether the entrepreneurial and startup-culture are ideological import of global trends or if it in fact is locally rooted in Oslo.

4.0 **CASE STUDIES** - investigation of 3 Oslo-based and startup-related coworking spaces in the context of cluster, science city, science park and district. The investigation will revolve around aspects such as management, image, profile, criteria for entrance, physical layout, urban implications, working and social culture etc. There will also be a spatial analysis of all these aspects, and a discussion of the future model of coworking spaces.

5.0 **DISCUSSIONS** - Bridging the literature review and case studies and concluding the key findings of the notion of community.

6.0 **APPENDIX** - bibliography, captions, interviews, public meetings etc.

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ACKNOWLEDGEMENTS

StartupLab
2012

Tøyen Startup Village
2016

MESH
2012

The Simula Garage
2014

Case studies 1:50.000

1.0 INTRODUCTION

Summary

In the summer of 2012 Oslo went from 0 to 4 coworking spaces. In 2016, the number of spaces has more than tripled. This thesis investigates 3 startup-related coworking spaces in the Oslo area looking at the spatial culture and urban implications of coworking spaces. This means to study coworking spaces as such and how they are integrated in the larger industrial complexes in decline and the urban fabric. In other words, the study of the relation between heavily tech-based industrial complexes and coworking spaces.

In this development we see skilled labor migrating from corporations to coworking spaces leading to a series of shifts; from corporate to collective ideology, economic security to uncertainty, unified to fragmented institutions, possibly influencing a shift from major developments to micro-city facilities. In the face of the digital age and context of neoliberalism, where so many can work apart and every individual is a competitor, coworking seems to emerge as an enduring necessity, exploring notions of community.

Research question
What characterize the spatial culture of coworking spaces and their urban settings?

Sub questions
- What are the cultural, social and economic factors causing the rise of coworking spaces and in which direction is this development heading in the contemporary society?
- In the digital age and economy and in regards to the concept of a fourth industrial revolution where everybody virtually can work apart from each other; in what way is local proximity still relevant?
- What is the culture of coworking spaces? What are the spatial properties of coworking?

Research design
The understanding of industrial complexes and coworking spaces seem interchangeable with social trends, technological advances and the global market, meaning that dynamic change and revision of theory is common practice when dealing with the subject. Therefore, the social reality and the researcher, as in I myself are independent on one and another in order to not create biased results.

I will approach the thesis with an inductive reasoning and based on empirical studies I will research theory to create new knowledge. This thesis relies on two separate sections of theory; one on industrial complexes and one on coworking, and studies the connection between these two. There exist little or no theory that on how the industrial complexes and coworking spaces relate to each other, however, there are striking similarities between the ideas on and existence of coworking spaces and industrial complexes. There is also the aspect of coworking being under constant dynamic change, rendering the literature and theory on the subject quickly outdated and very scarce. This also applies to the theory on industrial complexes, in which does not say much about how to react to current trends and dynamic changes.

The empirical strategy for approaching the subject is mainly through case studies, which are restricted to 3 Oslo-based coworking spaces. The purpose is to compare and contrast the actual conditions of these spaces, and how they are planned and managed. The existing theory on the subject addresses the facilities and describes meticulously the components of coworking, but never actually in relation to physical layout (drawings, designs or design principles). In this study, iconography, stereotypes, physical layout, working and social culture will be investigated in each of the case studies. The data is collected through interviews, observations, reports, floor-plans and current and future masterplans. The research design combines several methods and is mainly based on qualitative data with some quantitative data as secondary information.

The timeframe of this thesis will be cross-sectional, measuring the coworking spaces at a single point of time being their current state. The data collection and data analysis will revolve around the subject of coworking spaces as the main focus and how they relate to existing industrial complexes, as half of the case studies are placed within industrial complexes and the other half discuss the essence of an industrial complexes in urban contexts. The case studies are StartupLab, The Simula Garage, MESH and Tøyen Startup Village in Oslo. The current trend is startup-related coworking spaces, heavily influenced by entrepreneurship, tech services and innovations and temporality of being a startup. By interviewing interest organizations, community managers/curators and local entrepreneurs in each of the case study, I will be able to acquire knowledge on social and corporate culture, management and current and future ambitions of each coworking space. The specific floorplans will not only provide information about the physical layout of coworking spaces, the differences in profile and floor-plans for each of cases, may indicate where the coworking development are heading. The implications of this thesis reveals that coworking spaces may in fact be the next stage of development for industrial complexes.

The research design is modeled after Saunders research onion diagram.

2.0 LITERATURE REVIEW

CORE LITERATURE:

2.1 INTRODUCTION

The literature review makes a point of framing the subject of this thesis, coworking spaces, in the context of 21st century industrial complexes. There are currently no literature connecting the two as important aspects in the development of the next generation industrial complexes. The theoretical findings in this literature review implicates a certain decadence of the industrial complexes and the pertinence of coworking spaces. Therefore, there will be a framing of various and often unrelated literature on the subject to understand the definitions, complexities, simplifications and contradictions to provide an overview on the 21st century industrial complexes and coworking spaces and how they relate to each other. The rise and decline of industrial complexes may give a better understanding of the relevance of coworking spaces. The angle of this literature review will put much more emphasis on the social culture and physical layouts of complexes such as the technopole, the cluster, the science city, science park, and finally, coworking spaces.

The framing of unrelated scholars

The literature and theory on the 21st century industrial complexes both contradicts and overlap each other. It seems that theories on the subject is still evolving as concepts in the field of sociology, human geography, economics, urban planning is still being defined and redefined. The literature review makes a point in placing the different and unrelated scholars, which have not been discussed in context of each other, within the same framework of understanding the 21st century industrial complexes. This is in order to grasp both complexities and simplifications in their written work and to consistently use the appropriate terms on the appropriate complexes. The unrelated scholars are Manuel Castells & Peter Hall (sociologist and urban theorist), Michael Porter (economist), Bruno Moriset (geographer & planner) and Richard Florida (urban study theorist) and those critiquing the established knowledge.

It is also worth mentioning that the literature and theories written about the concept of 21st industrial complexes did not materialize until the 90s till now, as there has been no substantial or academic study of these structures during the formative years of the 21st century industrial complexes, which was in the 50s, hence the earliest and most well-known examples of these complexes are Stanford Research Park and Boston's Highway 128. The substantial works in the 90s and early 00s can be found most prominently in the works of Porter, Castells & Hall, Florida etc.

What defines the 21st century industrial complexes and what are their distinctions?

Generally speaking, an industrial complex refers to a factory or a collection of buildings related to industrial production. The 21st century industrial complexes are considered to be post-WWII creations to handle technological advances during the Cold War, from mechanical, military to civilian manufacturing, and in the next step; from hardware to software, or to put it bluntly, from material to immaterial production of innovation. The term industrial complexes transcend from just a mere collection of buildings related to

Michael Porter
economist
cluster theory

**Manuel Castells
& Peter Hall**
sociologist & urbanist
21st cenury industrial
complexes, technopoles etc.

Bruno Moriset
geographer & planner
coworking spaces

Richard Florida
urban theorist
the creative class

CRITICAL VIEW:

Vivek Wadhwa
tech entrepreneur
cluster theory

Donald Siegel
doctor of Philosophy
science park

Ari-Veikko Anttiroiko
adjunct professor of
government management
science city

Susan Bagwell
professsor of
Entrepreneurial
Studies
cluster theory

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Entrepreneurial
Economics
science park

Mike Wright
professor of
Entrepreneurship
science park

industrial production to a concept introducing social, psychological and urban aspects. These aspects have led contemporary scholars to rename these complexes and to call them 21st century knowledge complexes, including the word knowledge, which is rooted in human beings and not machines. This chapter will provide descriptions and definitions on the variety of complexes such as the technopole, cluster, science city, science park which falls under the definition, 21st century industrial complex; what their commonalities and differences are; their rise and possible decline; and their relevance for coworking spaces in this discussion.

2.2 LITERATURE AND THEORY

Manuel Castells & Peter Hall and the 21st century industrial complexes
One of the early core books that makes a comprehensive attempt of distinguishing industrial complexes and adding a social aspect to the discussion can be found in the work by Manuel Castells and Peter Hall 1994, *Technopoles of the World – The making of the 21st century industrial complexes.* Technopole is used as a generic term for 21st century industrial complexes and the authors go in depth analyzing history, demographics, entrepreneurial and corporate culture, innovation, urban development, quality of life etc. of at least 20 of the greatest industrial complexes in the world before linking them to different categories. Their joint background as renowned scholars in their respective fields, Castells as a sociologist and Hall as an urbanist, allow them to synthesize a vast array of aspects in the understanding of these industrial complexes and their impact on society – urban, economically and socially. It is worth mentioning that their work was updated for our contemporary society in 2015 in the book *Making 21st Century Knowledge Complexes – technopoles of the world revisited* by Julie Tian Miao, Paul Benneworth and Nicholas Phelps as the world has changed profoundly since Castells & Hall wrote *Technopoles of the World*. Nonetheless, the theme is the same and focuses on knowledge complexes in cities and regions through 12 more contemporary case studies. The book by Miao, Benneworth and Phelps is meant as a manual to give policy makers and practitioners a critical insight in managing and developing what they call high-technology urban complexes.

Michael Porter and the cluster theory
Meanwhile, in the work *The Competitive Advantage of Nations* in 1990, Michael Porter, an economist and professor at Harvard Business School, also talks about the benefits of a significantly large concentration of expertise within a geographical area, but under a different term, the cluster, as a generic term for 21st century industrial complexes. Porter's work has been a core element in shaping national policy in countries around the world and changed the thinking in states, cities and regions. In his theory Porter presents the paradox that the enduring competitive advantages in a global economy lie in local circumstances, like local knowledge – relationships and motivation distant rivals cannot replicate. Porter adds an economic perspective to the discussion of the 21st century industrial complexes as it ultimately is about growth, gains and prestige. He explains cluster affects competition in three ways:

- Increased productivity in one area, or increased productivity of the companies within the cluster, while similar companies outside would a significantly lower production.

- Driving the direction and pace of innovation, the proximity and competitiveness among companies will affect this greatly.
- Stimulating new businesses within the cluster, with rapid regeneration and growth on all levels of society, these factors will inevitably not only stimulate, but also attract new businesses.

Richard Florida and the creative class
Another scholar of interest is Richard Florida, an urban theorist with the famous work, *The Rise of the Creative Class* where he specifically talks about the cultural community within the framework of 21st century industrial complexes and he describes more detailed what Porter is starting to present about the people as the social glue. He identifies a new social class as the key factor to why some cities and regions grow and thrive, while others fall behind. He defines the three T's, technology, talent and tolerance as key aspect attracting the creative class. The book uses the term, creative class, to define a group of both educated and highly educated that use creativity in their everyday work. His work is a reversal of conventional wisdom, major production-based industry is no longer the cornerstone of city growth, but the creative class itself. He also reverses the conventional wisdom that the major companies are the attractor for skilled workers; it now seems to be the opposite. As society is tapping into a more global competitive and knowledge-based economy, Florida states that the general welfare is hinging on the ability to innovate and retain an international competitive force within the city or region. He also states that there is a strong correlation of people- and business climate and in establishing them.

People climate being the general intellectual social community established, and business climate is the heterogeneity of related businesses in an area. Florida stresses the fact that government officials and city leaders must set the tone for social inclusion and tolerance for a healthy business growth. This will in the long run benefit the businesses in the area as well as the social life.

Bruno Moriset and coworking spaces
There is also the literature of Bruno Moriset, an associate professor in geography and planning at the University of Lyon, who establishes coworking as the very essence of a successful industrial complex, without actually being an industrial complex. The essence being the focus on the people, a collaborative community towards innovation, and the ongoing trend towards an immaterial production within these facilities, may render the physical requirements and the sheer size of industrial complexes irrelevant. However, Moriset explains that by December 2013, coworking spaces has so far remained almost ignored by the academic literature. It is also important to mention what tendencies is defining the scarce literature on the subject. Brad Neumberg who coined the term coworking, is actually a product engineer at Dropbox with a B.A. in Computer Science and is by no means a scholar in his field or in the field of urbanity or finance (Neumberg's blog). This fact is actually very representative to how coworking space as a term has been defined during the last decade – by independent websites, blogs, media, magazines, entrepreneurs and practitioners, and definitely not by scholars. However, 2013 is also the year Moriset published the research paper, "Building new places of the creative economy: The rise of coworking spaces". His work is currently one of the most accomplished ones on the subject, giving a better understanding how coworking may constitute the contemporary industrial complex.

2.3 INDUSTRIAL COMPLEXES

Technopole

The industrial complexes may be described under different monikers with elements such as techno, science, 21st century, park, plaza, polis or -topia, some borrow established terms such as a science city when they are not, while others literature do not even make any distinctions between them, labeling the complex as something different (Castells & Hall 1994: 1). The technopole, a French term equivalent to the 21st century industrial complexes popularized by Castells & Hall, refers to a center of high-tech manufacturing in research, education and commerce. This description is quite generic, in terms of physical description, how it is managed and what its aim is. It resembles very much so as the general description of the 21st century industrial

Technopole & cluster: commerce (orange), education (pink) industry (grey), meeting ground (pattern), research (blue). Credit: author.

complex. The difference here from just mere production as industrial complexes usually are, lies in the main drive and aim of technopoles, which create a synergy between research, education and commerce. The synergy is sought after by governments because it is considered to lead to growth on all levels of society, may it be tech, economics, innovation, research, business ventures, reindustrialization etc. For a synergy to happen, networking, shared knowledge and face-to-face interaction between actors of the three components are considered essential. Castells and Hall introduces 3 critical factors to establish a synergy or in their own words, creating an innovative milieu (Castells & Hall: 1-11):

- University, a generator of raw material in R&D and an attractor of young minds to the location.
- Availability of skilled labor, they further innovation and R&D. The university plays a double role with its raw material and produces labor. Raw material in terms of what researchers generate of knowledge, and labor in terms of educated and skilled workers.
- High-risk capital investors, they back up new business ventures and spin-offs through capital, investments, incubators, corporate infrastructure etc.

Since technopole is described more as something fundamental without going into any specific properties or details of such industrial complexes, it is also hard to find any papers that actually critique the technopole.

Cluster

The cluster, which was characterized and popularized by Michael Porter in 1990, as "*critical masses in one place linked to industries and institutions from suppliers to universities to government agencies that enjoy unusual competitive success in a particular field*" (Porter 1998: 77). In other words, a cluster is a complete set of interconnected firms, suppliers, related industries and specialized institutions that arises in a
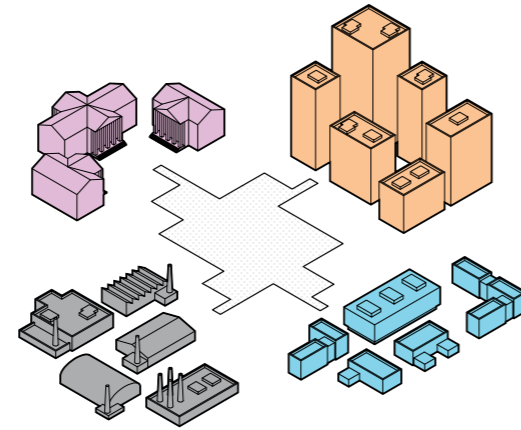
geographical vicinity to each other. The term cluster can also be used as a fundamental description equivalent to the 21st century industrial complexes and to describe synergistic and positive tendencies of firms, suppliers, industries etc. "clustering" together.

In the field of architecture, the term agglomeration is also used about these formations, which is considered as an ancestral term to clusters defined by the economist Alfred Marshall. The term cluster, was first coined in Porter's work, *The Competitive Advantage of Nations* through the diamond model (Harvard Business School homepage), which focuses very much on the business environment with multiple dimensions of microeconomic competitiveness within a local proximity. Aside from an economist's perspective, Porter argues that economic activities within the cluster, are in fact embedded in social activities, it is the people as the social glue that binds the cluster together. As Porter mentions the term cluster is applicable to all industries, his categories also responds to this, such as (Porter 1998: 77-91):

- High-tech clusters: knowledge and tech-oriented with renowned universities and research centers at their core. This type serves as the model for many current clusters.
- Historical know-how-based clusters: as the name states these are more traditional and has amassed over the years, and some over centuries, gaining an edge in certain industrial fields.
- Factory endowment clusters: geographical-specific benefits, such as wine productions in sunny areas.
- Low-cost manufacturing clusters: usually placed in development countries where the production cost is low and of industrial nature, such as textile, automotive, electronics etc.
- Knowledge services clusters: also usually placed in development countries because of lower-cost skills.

In 2001 the British government adopted Porter's cluster theories as part of the City Growth Strategy initiative to encourage regeneration of deprived inner city areas in the U.K. Interestingly enough they identified 3 critical factors for a successful cluster, very similar to the ones identified in Castells & Hall's technopole:

- Presence of functioning networks and partnerships.
- Strong innovation base with supporting R&D (research & development) activities.
- The existence of a strong skill base, or skilled labor.

Critical views on clusters

Although the cluster theory is treated as a policy in many nations, the critique on clusters is pointing in the direction that the cluster has been wrongfully understood and labeled as policy, when it should be treated more like how technopoles is described; as a mere observation of something fundamental to 21st century industrial complexes and not a definite approach to develop these complexes. Taken Porter's background as an economist into consideration, the cluster theory does provide a much more extensive economic aspect to the industrial complex discussion.

In relation to the initiative in the U.K., Susan Bagwell, a professor in entrepreneurial studies of the Cities Institute at London Metropolitan University, investigated the concept of cluster as a valid development

policy. Bagwell points out that Porter's model is unclear on many counts (Bagwell 2008: 31). It does not specify what kind of firms that have to interact locally. This question has been raised by different scholars discussing the importance of local interaction. Cluster as a policy is a chaotic and problematic concept, as Bagwell is pointing out that there the cluster idea is very flexible on what a geographical boundary of a cluster should be. For example, Silicon Valley and Hollywood are considered the most famous and successful clusters in the western culture. But Silicon Valley is just a nickname and not a geographically specific term and Hollywood covers the entire central region of Los Angeles. The two were also a result of almost complete autonomous processes with little to no government interference or official policies.

The success and failure of clusters seems arbitrary and there is no clear evidence if government interference helps. Many regional clusters may succeed for a short period of time but ultimately the majority of them fail and the ones that actually do succeed, are arguably a result of self-selection processes by firms within the cluster, which indicates an autonomous nature of cluster that may be hard to replicate. If clusters are supposed to serve as a basis for economic development, it is necessary with a stronger understanding of its properties and varieties, and the linking between market failures and cluster strategies, in order to see which development approach should be used in to a particular context (Bagwell 2008: 33). Vivek Wadhwa, an influential tech thinker and entrepreneur in Silicon Valley, criticizes the aspect that policy makers believe there exist a recipe to create clusters. He also has observed clusters all over the world going into obscurity or dying a slow death. Governments' arguments rely heavily on successful examples, such as Stanford Industrial Park in Silicon Valley or North Carolina's Research Triangle Park, both government-sponsored clusters. Wadhwa's main argument is that policy makers should be focus more on the people within the cluster, not the idea of cluster itself. Wadhwa proposes simple but essential measures to better the cluster strategy, such as the knowledge of how to start companies, removing the fear of failure, more mentors and networks, government incentives towards community making, and repairing the research commercialization system. (Wadhwa 2011).

Science City

The concept of science city is more specific in terms of handling the matter of actual policy, meanwhile the cluster and the technopole do not describe any geographical limitations; how far or close companies and research institutions should be to each other, whereas the science city concept is slightly more precise. The science city, or also commonly referred to as the science town are according to Castells and Hall, new settlements generally planned, built and governed by governments. Meaning autonomy of businesses and relations are non-existent as they are more or less under full control of and
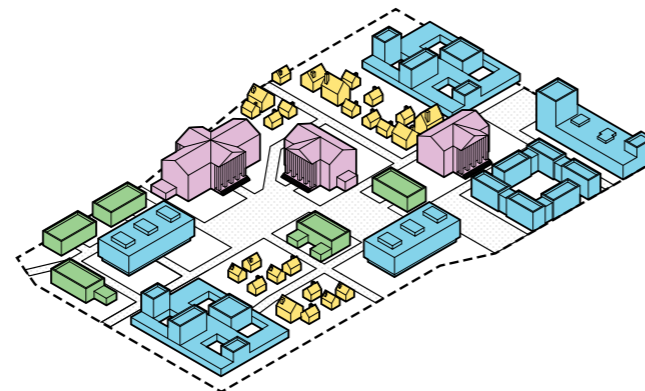
Science city: commerce (orange), education (pink)industry (grey), meeting ground (pattern), recreational (green), research (blue), residential (yellow).
Credit: author.

managed by the government. The main agenda for developing science cities are mainly aimed at generating scientific excellence and synergistic research activities by concentrating expertise within a high-quality urban space. Castells and Hall note that the spatial expression is similar to a campus development: isolated and secluded from "*the day-to-day conflicts and petty interests of society at large*". It is a privileged space to enable scientists, researchers and scholars alike to build a community of intellectual networks and to spur a collective advancement (Castells & Hall 1994: 39-41). These complexes are post WWII inventions from the late 50s-70s, however coined in the 90s. They are interestingly enough non-existent in the U.S. Most science cities can found in former Axis nations in East Asia, Russia and some concentrations in Europe. The period of the 50s -70s was also at the height of the Cold War, and this may serve as the answer to the lack of science cities in the U.S. Most science cities developments fit better in the planned economy and ideology of the East. Ari-Veikko Anttiroiko's research paper, "Science Cities: their characteristics and future challenges", explains science cities with five core characteristics while listing at least four versions of mislabeled science city types. The five core characteristics are:

- Government play a key role, either it be local, regional or national.
- Focus on scientific activities, research and universities according to campus model.
- Little to no industrial activities and manufacturing.
- Clear-cut development in the urban fabric.
- An urban dimension including infrastructure, housing, entertainment, recreational facilities.

What makes the term science city confusing is how it is used in different initiatives and Anttiroiko defines four mislabeled science cities, or in his words, quasi-science cities, to clarify the concept of science cities. One type of mislabeling is typically to use the term on smaller concentrations of international prestige, such as science parks, technocities or high tech metropolitan areas. Another type is science museums, theme parks or sites for recreational learning. There are also examples of single research sites or laboratory labeling itself as an entire science city. Lastly there is the virtual science city, being websites that concentrate on education, information sharing and entertainment (Anttiroiko 2004: 4, 7).

Critical view on science cities

Anttiroiko uses the Tsukuba Science City of Japan to describe the current decline and future challenges of science cities in general, which also applies to the Siberian Akademgorodok and the South Korean Daedeok. For example, Tsukuba faced difficulties in internal flow and local interaction. Since the government plays a key role, this also affected the various R&D units to serve national interests rather than local interests for the science city community (Anttiroiko 2004: 23). Paradoxically enough, the key factor for science cities is the spatial concept of isolation in the city and the clear-cut development in the urban fabric. In other words, or as in the words of Castells & Hall, science cities are secluded and isolated entities as a physical design and an urban development. This makes the science cities completely dependent on local interaction and a well-working synergy. In the general comparison of science cities of the world by Castells and Hall, they come to a critical conclusion: it is not about the return on investment or cost effectiveness as science cities generally have a modest impact on regional economy, but to showcase the symbolic and materialized value of

science. With the government spearheading the development, it is also about declaring its capacity to master modernity and power (Castells & Hall 1994: 39-75). This logic may also have been influenced by the setting of the Cold War, a battle for the image of world supremacy.

Anttiroiko argues that science cities should get rid of its core characteristics, such as isolation and campus mindset and instead seek external connections and interaction with strategic partners/stakeholders to increase the regional/national economy. This is to enable it to increase internal dynamism, synergy and inter-sectoral partnerships. According to Anttiroiko, the future of the science city lies in its ability to adapt to current trends, to expand, network and integrate into the wider urban setting, towards a more entrepreneurial science city. The government control on the science city should rely more on result-oriented guidance, support and greater autonomy (Anttiroiko 2004: 24-25). What Anttiroiko is unknowingly proposing is actually the description of its more autonomous counterpart, Science Park, explained in the following sub-chapter.

Science Park

The science park, although with the government and university as the main initiator (like the science city), is governed according to neoliberal ideology and invites private firms, startup companies and enterprises into the context of researchers and academia. In contrast to the science city, these complexes operate more autonomously. One could also say it is a designated area with the aim of concentrating and attracting a great number of high-tech industrial firms. This in turn provides jobs and skills. The universal goal of the science park is to attract investments by private firms providing a continuous growth while the aim to uphold an image of prosperity, as for the science city, is downplayed.
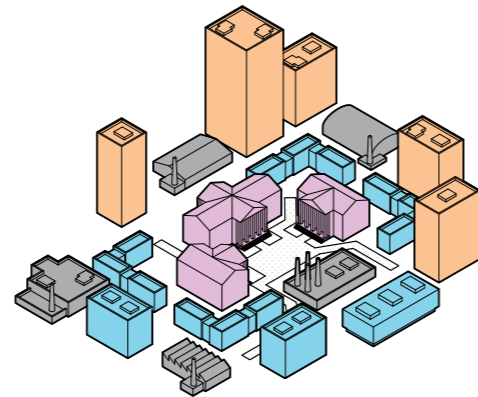
Science park: commerce (orange), education (pink), industry (grey), meeting ground (pattern), research (blue).
Credit: author.

The science park is considered much more successful than aforementioned such as the cluster and science city, as it encourages cooperation and collaboration between public and private sector, university and private companies. The most famous science parks are in the Western world and the former Allied nations. The Stanford Research Park in San Francisco established in 1951 is considered the world's first science park. Its success gave the bay area its famous moniker, Silicon Valley. Another famous science park is Sophia Antipolis Science Park in France from the 70s. Their emphasis is on manufacturing; some may specialize on the R&D aspect of manufacturing. Castells and Hall were among the first scholars to describe the different approaches to develop a science park. Approaches such as building around a major research university attracting local spin-off firms called the "*Cambridge phenomenon*"; deliberately attracting advanced foreign firms to let them diffuse and tap into local know-how thus generally upgrading the entire industrial structure. The science park has many different aliases, depending on its profile of industries; names such as technology park, industrial park, research park, university research park, technopolis and biopark (Castells & Hall 1993: 84-85).

Critical view on science parks

However, an article on business venture (Phan, Siegel & Wright 2005: 1) argues that there is no systematic framework to understand science parks; that there is no clarity of its dynamic nature and nature of performance. Castells & Hall argue that the difficulties in harnessing the science park as a development strategy lies in the very definition of it – the collaboration between the public and private sector. According to Castells & Hall the science park's success lies in the linkage and synergistic interaction of three components:

•   Public research centers and university.
•   Large firms.
•   Small and medium firms.

Castells & Hall's assessment on science parks shows that the relationship between public research center/ university and large firms are especially problematic because they are often secluded and hostile to each other. True collaboration and synergy are rather provided by small and medium firms (a nod towards startups), and then, if larger firms become a part of this synergy, a new productive dynamism can occur, as was the case for Sophia Antipolis. Paradoxically enough, Castells & Hall mention government as crucial in the development of the park, but the growth of the park must happen through private investments and entrepreneurial initiative, again through autonomous processes (Castells & Hall 1993: 109-111).

Coworking Space

The definition of coworking spaces is currently open-ended and generic, but with some unique properties in line with the necessities of an efficient industrial complex. Coworking space is characterized as a working community of different companies, suppliers, consultancies etc. within a single facility. Together all the members become a community sharing amenities in a shared working environment typically run by private stakeholders as a completely autonomous entity. The emphasis on community is important and the altruistic core is a main characteristic. Coworking space is for independent professional activity (Moriset 2013: 4-6).
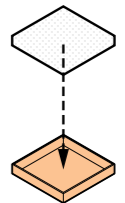
Coworking space: commerce (orange), education (pink), industry (grey), meeting ground (pattern), research (blue).
Credit: author.

In 2005 Brad Neumberg created, defined, and coined the term coworking space, as a means to satisfy the much needed community freelance work and entrepreneurship is missing (Neumberg's blog). According to Neumberg, the general purpose of these spaces is to serve as a hosting, working and meeting place for entrepreneurs, freelancers, consultants etc., which are carriers of ideas and wish to share them with others. The physical layout, equipment and special events within the facility is to encourage meeting, collaborative and discussions. Moderators, managers or curators are usually necessary to ensure the serendipity production happening within the facility. Generating a successful collaborative community is the outmost priority, while successful corporate prestige or return on investment looms more in the background. Therefore, the core characteristic of coworking spaces is based on altruistic values, that is what benefits the greater good and not only a simple return of

investments. Moriset wrote in 2013, that these spaces do not deal with scalable growth and they are not startups (Moriset 2013: 4-6, 17). In the table "Generics and specifics of coworking spaces" in chapter 4: Case studies, the characteristics are displayed and defined.

If the sheer size of major complexes and industries are irrelevant, the simplification of the meeting grounds are necessary and the notion of community the outmost priority, why continue with the same development strategy with elaborate and expensive physical layout, when there is no assurance for success? What actually stops the direction of these developments to go into more micro-city facilities?

The concept of serendipity production, lone eagles and the third place
So far in the literature review, there are some aspects to the 21st century industrial complexes and coworking spaces that still remains undefined as secondary but important concepts. The common aspects between the two tie industrial complexes together with coworking spaces, yet it is in the different aspects which seemingly separates the former as decadent and the latter as pertinent. The theory and literature on industrial complexes and coworking spaces put much emphasis on the synergy and the people, but their properties are not well-defined in the context of physically planning these complexes. There are also notions of a common space or a meeting ground in the co-location of research, commerce, education and industry, yet there is no specific term to describe what these spaces are. In this section, we lend terms in sociology such as serendipity production, lone eagles and the third place as they specifically address the desired traits of industrial complexes whereas the critical scholars do not. It should be noted however that Moriset actually applies these terms on coworking spaces. These concepts are included here to understand better what is missing in the discussion of the 21st century industrial complexes and the direction of development that the industrial complexes are taking.

Serendipity production, or serendipity itself refers to the occurrence and development of events by chance in a happy and beneficial way, or the phenomenon of finding valuable or agreeable things not sought for. The concept of serendipity production relates to the core of this thesis' subject, coworking spaces, because of the attempts to capitalizing on the phenomenon of serendipity within coworking environments. This phenomenon was popularized by the coworking pioneer Chris Messina, founder of Citizen Space. It is the idea that people through frequenting certain places will increase the probability of fruitful encounters and informal meetings (Moriset 2013: 8). The concept has been thematized for the urban setting by many sociologists. Serendipitous encounters happen at all kinds of meeting points outside formal offices; around lunch tables, cocktail parties, clubs, lobbies, conferences, golf course or the train (Gottmann 1971: 329). Proximity within physical boundaries enables well-frequented locations with a continuous flow and predictable attendance (Bourdieu 1992: 164). Being a part of a city means being a part of an extremely intense and dense information loop; one of the qualities is the unplanned mix of human encounters, information, experiences, interpretations etc. (Sassen 2001). However, proximity in itself is not enough to generate or produce desired serendipity, it has to be complemented with a degree of social and/or professional proximity. This is in keeping with some of the fundamental aspects of the 21st century industrial complexes. The co-location of clusters, technopoles, science cities and science parks, and even the co-

location of companies within a coworking spaces are in fact a concoction of carefully selected players in order to generate unplanned synergy and relations across, not random but selected players. In other words, a carefully crafted serendipity production within industrial complexes and coworking spaces. Moriset argues there has to be a certain balance between coworking space filled with strangers and a place of total professional homogeneity and skills (Moriset 2013: 9).

Lone eagles, refer to knowledge workers and skilled labor working from anywhere, primarily due to technological advances in telecommunication. The importance of this term is not defined by only tech advances in telecommunications, but has an increased importance due to many other trends also, led on other technological currents. Invented by Phil Burgess from a Denver-based telecommuting think tank, the term lone eagles were popularized throughout academic circles by William B. Beyers and David P. Lindahl. The rise of lone eagles causes institutional fragmentation and geographic splintering of value chains, fueling the trend of outsourcing. This is a direct result of the current globalization, digitization and IT ubiquity. Corporations and firms no longer have the skills or business-related know-how in-house, but instead are dependent on hiring competent labor at any given point, hence the decline of the conventional conception of industrial complexes. There is a rise of a new corporate mentality called open innovation, meaning major firms or corporations no longer can keep a sustainable flow of innovation by keeping all operations in-house. The corporation and the large firm as an institution are thus at risk with the emergence of the ultimate form of open innovation, "wikinomics", where single well-defined entities of innovators and producers can potentially be replaced or complemented by myriads of contributors (Moriset 2013: 3-4). Hence, the rise of coworking spaces. 6In other words, the knowledge workers are the driving force or force of labor in both industrial complexes and coworking spaces. Yet it is the ideology behind the knowledge workers in each of the workplaces that makes the entire difference, from conventional skilled labor in industrial complex and the lone eagle in coworking spaces.

The third place, is a term coined by sociologist Ray Oldenburg, and defines here the regular, voluntary, informal gatherings of individuals beyond the realm of home and work. These places are regarded by Oldenburg as irreplaceable in the production of the urban social fabric. The typical third places are cafés, restaurants, hotel, airport lounges, hairdresser or barbershop. Oldenburg even extends the third place to contemporary franchises and brands such as Starbucks and McDonald's. Essentially, the notion of the creative class inhabiting the third place predates the digital age of computers and the Internet, as it resembles café litteraires in the early and late 20th century such as the birthplace of Dadaism at Cabaret Voltaire in Zürich or the counter cultural hub at City Lights Bookstore in San Francisco (Oldenburg, 1989). This term is relevant to industrial complexes and coworking spaces, because it clearly defines the coveted characteristics and traits of a serendipitous or synergistic meeting or common ground. The difference here, is that Oldenburg defines the the synergy and serendipity production as a physical and manageable entity. Whereas in the literature and theory on 21st century industrial complexes, these highly coveted spaces are not described well enough. Again, this is where coworking spaces differs, as it is described as the third place itself, a place where unrelated knowledge workers sit next to each other, across companies, in one facility generating new unforeseen encounters on a daily basis.

2.4 CONCLUDING REMARKS

Discussions on the relation between the 21st century industrial complexes and coworking spaces

Finally, we arrive on the discussion of what is the connection between industrial complexes and coworking spaces. In this context and if there is a connection, what relatable knowledge gained about the industrial complexes can cast light upon the importance of coworking spaces?

Based on the knowledge gained through the literature review presented here, the main critique of the industrial complexes seems to lie more in the misunderstanding between observation of successful industrial to planning them. As mentioned, the cluster and technopole are fundamental observations and not descriptive, yet the cluster is still considered as a highly relevant development strategy. There are also some recurring questions that have to be addressed directly: Is it possible to actually plan and develop an industrial complex, of such scale as implied by Castells & Hall, Porter etc.? If not, is the coworking concept in fact, a more reliable development strategy?

The general commonalities

The theory and literature on the industrial complexes may seem confusing and complex. The endless terms and definitions introduced on the same topic is interpreted, reinterpreted and framed in the same context to identify the subtle nuances that define the differences between the 21st century industrial complexes, from clusters to technopoles, technopole to science city etc.

However, the scholars all mention a general commonality; that the 21st century industrial complexes refer to a significantly large concentration of scientific and technological expertise within a geographical area. To put it bluntly, the three key aspects observed in the various literature of Florida, Castells & Hall and Porter revolve around the same concepts with some variations:

•   Technology, university, R&D, research institution as basis.
•   Talent or talent pool, skill base and labor, intellectuals etc.
•   Established firms, high risk capital investors, venture capital, corporate infrastructure.

The 21st century industrial complexes, or the definition of them, as stated above, are divided in many categories. Although the scholars do not discuss size, physical layout, and vicinity or specify the shared key aspects, there is a certain hierarchy or pecking order in the clarity of them.
Closer inspection even reveals very similar descriptions of different terms. All the categories within the 21st century industrial complexes seem to be treated as equals, yet there seems to be a hierarchy amongst them. It is therefore important to understand technopole and cluster more as fundamental and general complex and the science city and science park more specified and partially executable policies.

Lastly, we have to ask a simple question that the scholars on the subject always bring up: what make these complexes so coveted by governments and policy makers? Creative individuals and innovative industries

Technopole & Cluster.
Fundamental descriptions to the concept of the 21st century industrial complex. An observation of how the four elements come together and form a beneficial community and generate a meeting ground, synergy etc.
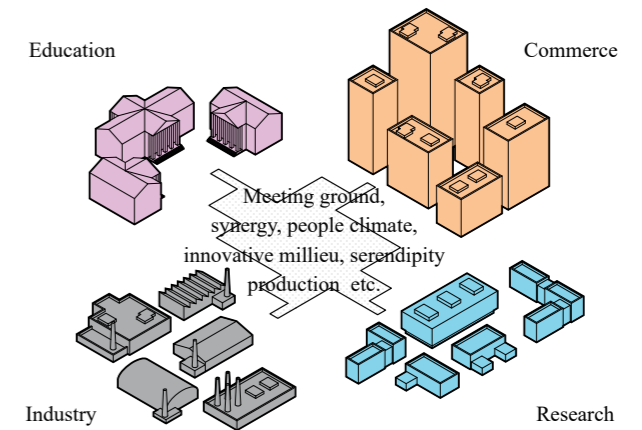
Science City
Initiated and governed by the government. introduces a sense of urban quality, infrastructure and design etc.

A secluded clear-cut development in the urban fabric. The image of tech prosperity is more important than actual tech prosperity.

The meeting ground has become too complex to function as intended for the community.
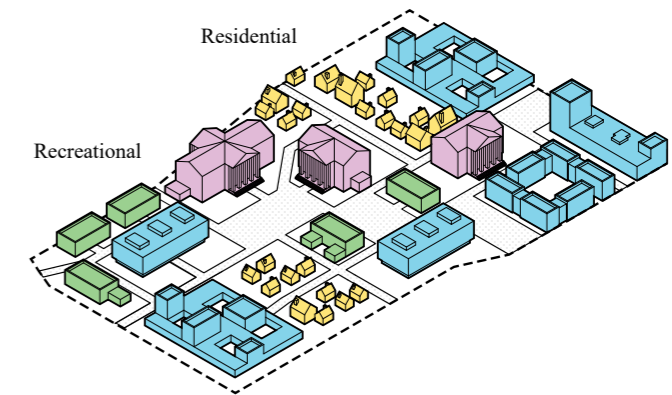
Science Park
Initiated by the government, but governed by private initiatives. Highly autonomous.

More organic urban development and an actual attempt of tech prosperity. A synergy between private and public sector.

The meeting ground has become too complex to function as intended for the community.
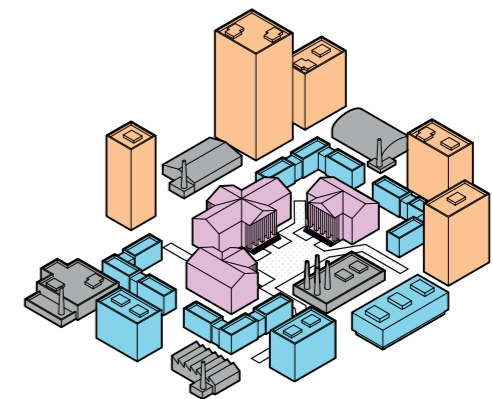
Coworking space
Can be initiated indirectly by government, but are often private initiatives, governed by private initiatives. Highly autonomous.

Not a significant focus on urban setting. A synergy between private enterprises.

The meeting ground, synergy is clearly defined within the facility.
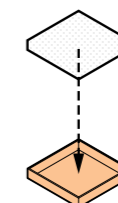
are generally regarded as key drivers of sustainable economic growth and prosperity in cities. Aside from financial gains, scientific prestige or local/regional/national growth, which these industrial complexes may bring with them, the concept of "community" plays a vital role.

21st century industrial complex as a policy?

There are facts that make the concept of the 21st century industrial complexes actually quite alarming, in terms of identifying qualities and translating the complexes to national policies. A recurring critique of the industrial complexes lies in the attempt by policy makers to regenerate near impossible and very successful examples such as Silicon Valley, Boston's highway 128 and Sophia Annapolis in contexts that have no local basis or culture to support it. Silicon Valley has proven to be a very misguiding example, as its track record suggests that a city with no industrial basis can become the cradle of innovation out of thin air, but a closer examination reveals a far more complex development (as explained in chapter 3: backdrop & context). Unsuccessful developments may be the consequence when governments mistake mere observation by scholars as a scientific fact for how to develop these. The developments have been labeled and branded as technopole, cluster, science city or science park after the success was a fact. The literature on the subject carefully explains the components within these complexes, but ironically enough they do not explain the science behind how these complexes actually work, the very complexes that produces most of our contemporary science. In other words, they do not offer a scientific answer defining the content of the cooperation and between which firms; explaining the geographical boundaries and the physical, industrial and social proximity etc. All the shortcomings of the industrial complex, seems to be answered though coworking spaces. It has a clear and defined physical boundary[1], naturally enough every player within a coworking space are in close proximity etc.

The reality is that scholars provide an incomplete approach to industrial complexes for developers to execute. For example, a successful technopole or cluster would imply that the government would single-handedly have to be able to influence market forces and industries on regional and national level. Looking at it another way, Porter's theories on clusters also contains an opportunistic view on the alternate direction of urban development, evaluating industrial densification based on geographical financial performance in relation to global markets, without taking into account what urban repercussions it may have. Even though, coworking also deals with global markets, it does not directly generate major urban repercussions, since coworking in its physical nature, resembles much more as an enterprise and not an urban project. Whereas industrial complexes are more comprehensive beings with government involvement, multiple institutions, firms, companies etc. Naturally enough, Porter is an economist, not an urbanist and his expertise does not lie in understanding urban development, but when his theories is adopted as development policy, the specifics on how to proceed has to be clearer.[2]

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1 Coworking spaces are usually defined as an entity within a facility. Geographical boundary is therefore not an issue in coworking spaces.
2 The origins of science city and science park in the 50s, the ideology behind them is insufficient, as they appear to be an important aspect of polarizing planned economy and neo liberalism. The obsession between the two super powers for public image of technological dominance was so extreme, there are actually conspiracy theories that the U.S. hired Stanley Kubrick to fake the moon landings in 69' to uphold the image of technological dominance (Time Magazine).

Geographic and urban conditions

Another issue that is especially problematic in regards to identifying these complexes, is the relativity of geographical size. The scholars are obsessed with how entrepreneurs, researchers, skilled labor etc. meet and create beneficial synergies, however, the complexes built to handle these synergies generate meeting grounds or places that are so vast and big that it may be hard to actually create a synergy between the people within the industrial complex. The scholars of industrial complexes do not present any explicit maps, drawings, measurements that explains the necessity of proximity or vicinity for the actors involved. The coworking space are much more defined in terms of geographic and urban conditions, where the meeting ground are simply enough defined within the facility. As with any enterprise, coworking spaces have a definite business model, as opposed to the unclear development model seen in industrial complexes. Coworking as an enterprise dictates an address, location and financial credibility.

Then there is the case of how many players should be involved in industrial complexes and coworking spaces. There are no concrete numbers of actors and companies/industries/research facilities etc. within a geographical location that constitute a functioning a cluster or coworking space. The recurring questions that remain unanswered are many: what are the geographical boundaries? How close and how far can companies be from each other before an industrial complex becomes irrelevant? What urban repercussions may this have for the cities developing industrial complexes? What existing urban conditions are necessary for a successful industrial complex? The scholars state that industrial complexes cannot be artificially created and developed without any basis for it. Meanwhile, it some of these questions are naturally enough answered by the coworking concept.

Autonomy

The characteristics of the science park reveals autonomy as an enduring trait sought after in all of the other complexes. Autonomy seems to be one of the first signs or tools for policy makers to actually translate a phenomenon to fact, from observation to development strategy. As mentioned above, the literature critiquing these complexes often refer to a misunderstanding where policies are based on mere observation of viable developments, such as the cluster and science city. Interestingly enough, the policy makers and critical scholars behind clusters and science cities still suggest the same direction of development for all of the industrial complexes: less government interference or top-down development and more focus on human relations and internal synergies, stronger communities, innovative milieu etc. The people within these complexes appears to be the only measure of value. Aside from physical co-location Porter, Castells & Hall, Anttiroiko and other scholars all emphasize the people, entrepreneurial mindset, their ability to adapt to current trends, to network, to create bonds to interact, as crucial factors. Industrial complexes are big but slow machineries, as the literature (and chapter 3: Context) indicates; they do not respond well to dynamic changes. Florida's reversal of conventional wisdom becomes very interesting, as he states it is the creative class and the people climate that matters and not the critical amount of industrial complexes that have amassed.

All of these factors can also be seen as certain descriptions of coworking spaces. To make the point clearer, coworking is as a private enterprise managing many other private enterprises. In other words, it becomes the very incarnation of autonomy, without any government interference with total focus on the concept of

community. An enterprise is nothing without the people behind them, therefore the people becomes the only measure of value in coworking spaces. The coworking concept can also be interpreted as a micro-version of a cluster, technopole etc. but a cheaper, smaller and more efficient version of it with all the critique of how the former industrial complexes can be better embedded in it, especially the part about autonomy. To a certain degree, a coworking space is actually a micro version of the more successful science park.[3]

Signs of a new contemporary industrial complex

In the context where digital innovation is dominating through immaterial production and the globalization of industries, sudden trends and change do occur frequently. The constant renaming, relabeling and mislabeling of established concepts convey the nature of industrial complexes. Industrial complex as a concept has to transcend, change and readjust according to technological trends and development. If community and human interaction plays a bigger role, how will this affect the physical layout of these complexes? Where do the creative class or innovative milieu want to be? What kind of environment does all of these factors dictate for the next generation of researchers, entrepreneurs etc.? Or to put it bluntly, what is the next industrial complex suitable for the contemporary society? All the aspects in the different discussions between industrial complex and the coworking concept seems to clearly indicate that coworking may be the better choice.

Let us examine the core necessities this review has brought up as indications and jump from industrial complexes to coworking spaces. These are factors for what an industrial complex must revolve around:

- The community, people climate, innovative milieu etc. is the social glue and key element attaining synergy or serendipity production and numero uno priority and cannot be contested otherwise.
- Increased understanding of these complexes more as an autonomous phenomenon rather than replicable development policies.
- The geographic boundaries and the proximity or vicinity of companies and research facilities must be a more specified than it currently is.
- As the industrial complex inevitably gets of a certain size, so does the complexity of the meeting ground in these developments.
- Major complexes and the master planning of industrial and urban developments may be irrelevant as tools to handle innovation being static and slow, thus unable to adapt sudden changes and trends. The bigger the complexes, the harder it is to adapt.
- The trend of lone eagles is greatly contributing to the irrelevance of major complexes and the improbable change in the physical layout of the 21st century industrial complex.
- Autonomy is of great importance in order for the complexes and the actors within to adapt to sudden changes and trends.

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3 More successful in relation to the 21st century industrial complexes.

3.0 BACKDROP & CONTEXT

3.1 INTRODUCTION

This chapter explores some Norwegian origins and customs on entrepreneurial and technological development and asks whether the current rise of startup-related coworking spaces is a complete import of global trends or if it in fact is partially locally rooted. Silicon Valley of San Francisco is the most famous cluster, science park and startup community in the world. It is natural to investigate the origins of Silicon Valley, in order to differentiate local and global trends. This chapter also explores the industrial revolutions as the backdrop for this thesis, or most prominently the 4th industrial revolution, in order to understand the current rise of coworking spaces. Moreover, in the digital age, global economy, and in regards to the fourth industrial revolution where everybody virtually can work apart from each other; in what way is local proximity still relevant?

At the turn of an industrial tide, from corporate to collective ideology

ICT Norway, an interest and lobbyist organization for the IT industry, notes a recent and ongoing trend in Norway and globally, where highly competent and skilled labor find it more appealing to work in coworking spaces and form tech-related startup companies rather than working for corporate firms and headquarters. What are the factors for this current trend; what does it reflect; and what repercussions could it have for the general working society?

There may not be a coherent string of factors leading to the rise of lone eagles, but many unrelated ones at play both nationally and globally. Traditional industries such as oil and gas currently experience their biggest downturn since the 1990s. Wood MacKenzie, a consulting firm, has identified a remarkable drop in exploration investments among 678 large oil and gas projects worldwide. In 2016 this marks a loss of 250.000 oil industry jobs worldwide, not only workers on the floor, but also highly competent oil engineers (New York Times 2016). In Norway alone, this means 25.000 jobs. Despite general speculations that the crisis may turn within a year in the oil sector, the crisis has created a considerable window for current migrations between professions (TV Vest news channel 2016). CEO Heidi Austlid of ICT Norway sums up Norway's predicament very neatly in an article for Stavanger Aftenblad: on the one side, there are unemployed and highly skilled engineers in the oil industry, on the other side, there are 6300 IT-related positions that has to be filled.

Simultaneously, the digitalization and automation have become the main pillar in streamlining the efficiency of society, causing further unemployment in what has always been considered traditional jobs and professions, everything from cashiers to general practitioners (ICT Norway web article 2015). This is generally considered to contribute greatly to the demand for more digital tech, software solutions and innovation, tasks that tech-related startups usually handles.

Another factor is the decline of the contemporary industrial complexes' additional role as a synergistic community, in line with Wadhwa's critical observation of the cluster strategies should obsess more about the people rather than the facilities It has also been recorded the same tendencies in Oslo Science City and IT Fornebu in 2003 by the National Institute of Urban Research (NIBR) and 2004 by an Oxford Research report, although IT Fornebu as a cluster was technically abandoned before it had a chance, due the dot.com bubble in 2001. These reports do not only critique performance- but also social aspects of the complexes as they are considered interlinked (Johnstad 2003: 47, 49, 59 & Rognlien 57, 58, 61). This is where startup communities and coworking spaces come in.

Startup company

Since the concept of startup is such an important aspect of this thesis it is in place to give the startup company a proper description. A startup company, or more commonly referred to as startup(s), is an entrepreneurial venture generally considered to be a newly emerged, but fast growing business. The main characteristic of startups as that the business model is designed to rapidly develop a scalable business model. Therefore, its state as a startup is considered to be only temporary. Scalability as a business-related term, is the ability to expand and generate revenue growth while minimizing operational costs. One would assume that in the context of immaterial production such as social services, internet innovation that minimizing the cost while expanding is not a hard task. However, as startups aims to grow quickly, the expansion costs come in the increased employment of knowledge workers in a growing startup. As the term became internationally widespread during the dot.com bubble, startups is in contemporary society often related to advanced tech, internet, communication, robotics etc.

3.2 INDUSTRIAL REVOLUTIONS

Industrial revolutions shaping the city we know it today

Society has not always been very receptive to technology and industrial history reveals that the technophiliac spirit leading to a more advanced society was carefully cultivated through conscious choices by intellectuals and government officials. It also reveals how important the concept of community has been in the development of technology and industrial complexes. What significance have different industrial revolutions had in popularizing entrepreneurship and establishing a global culture for shared knowledge?

First Industrial Revolution – integration between urbanity and industry

The first industrial revolution that took place in Europe, most dominantly displayed in Britain, approximately 1760-1840 and in the U.S. 1790-1870, caused a shift in society from working at home to working in factories. Porter would probably have called these industrial settlements the archetype of his cluster theory, but the terms agglomeration or company town are more suiting in this context. These agglomerations were made possible only by steam power; the containment of energy led to the efficiency of mechanical production and railroads. Mills and factories could now be developed independently of geographic location. Geographic independence led also to agglomerations and what can be called industrial complexes, which the general public found unappealing. To circumvent this mindset, the factory owners built new villages and

schools around the factories to attract labor, causing new urban centers to emerge. The rapid urbanization in the cities caused below standard living conditions along with the horrendous working environment in the factories.

Second Industrial Revolution - separation between industry and urbanity
The second industrial revolution commonly known as the technological revolution (1870-1914) is generally considered as a continuation of the 1st industrial revolution. Electricity became one of the main factors changing the way workers proceeded in workspaces with division of labor, mass production of material manufacturing and paved the way for further improvements of urban aspects (social and working culture, health issues etc.)

Moreover, science improved the household technology, drastically impacting the general health in the city. The works of Pasteur and Koch help reduce mortality rate after the 1870s through simple agents such as soap and understanding of hygiene and properly treated food (Mokyr 1998: 12-13). The urban implications of the 1st industrial revolution were another social class and a new typology in urban planning, namely the middle class and the suburbs. There was also an emphasis on the urban design of the cities, leading to strategies such as the Garden City movement popularized by Ebenezer Howard. These cities were planned as self-contained communities separating between industry, agriculture and residences while providing an ideal for the newly invented suburbs. Shared knowledge also became consciously important for societies and cities to advance. Although the concept of shared knowledge can often be mistaken for larceny, as in 2002 the US Congress recognized Antonio Meucci as the real inventor of the telephone. It turns out that Bell, in the contradictory spirit of both shared knowledge and entrepreneurship, had access to Meucci's work and took out a patent on the technology (The Guardian årstall). This example also serves as one of the defining factors of creating Silicon Valley as a cluster, science city, startup community etc., which will be explained in detail later in this chapter.

Third Industrial Revolution - separation and zoning between industry and urbanity
The third industrial revolution commonly known as the digital revolution (the timing varies and is set to both 1969-1980 and 1950-1970) is generally considered to be the jump from mechanical and analogue technology to digital electronics and computers; to put it bluntly, from material to immaterial manufacturing and production. WWI and WWII between the second and the third revolution generated an immense focus on technological advancements in modern warfare – less on working and social culture and urban planning and design. This period marked also the start of the Cold War and the Space Race, which fueled the demand for technological advancements. It was necessary to handle this knowledge through new divisions of labor, from mechanical to digital workload. This led to massive, but segregated, modern, industrial developments paralleling WWII creations such as Bletchley Park in Milton Keynes and MIT in Boston. The post-WWII industrial developments represent the 21st century industrial complexes mentioned in the literature review. The science city and the science park became the development strategies for this period. These kind of complexes put more emphasis on the image of tech supremacy and city prosperity, urban planning and design, but most importantly; civic life together

with corporate, working and social culture was implemented as a strong feature. The much-used term, synergy, is important in the creation of professional communities. These aspects will be explained in details later in the chapter in relation to Silicon Valley.

Fourth Industrial Revolution – blurring, integration and fragmentation of industry and urbanity
The fourth industrial revolution commonly known as Industry 4.0, is generally considered as the introduction of cyber-physical systems into society, such as artificial intelligence, telecommunications, 3-D printing, nano- and bio tech, quantum computing, blurring the lines between traditional sectors such as oil, gas, energy, etc. Industry 4.0 also continues the automation of work labor, data exchange, and new manufacturing technologies.

The fourth industrial revolution was once again brought to public attention in the World Economic Forum (WEF) summit in Davos 19th of January 2016.[1] The founder and executive chairman of WEF Klaus Schwab stated that Industry 4.0 would fundamentally change the way we think, work, live and relate to each other. Schwab sees extensive benefits and drawbacks, such as smart city repercussions, from automated cars to far-fetched human augmentation. He mentions the uncomfortable blurred line and hybrid between war and peace through cyber warfare etc. In the context of this thesis he raises an interesting point about how it may affect the notion of community.

"*...Sometimes I wonder whether inexorable integration of technology in our lives could diminish quintessential human capacities, such as compassion and cooperation (...) Constant connection may deprive us of one of life's most important assets: the time to pause, reflect, and engage in meaningful conversation.*" (Schwab 2016)

According to Schwab it will change how we cultivate our skills, meet people and nurture relationships, diminishing human capacities such as compassion and cooperation in both private and professional life. Although WEF has been accused by the Future Tense of creating unwarranted fear in head of states. However, WEF's real fear might be what was never present in the third industrial revolution; white-collar jobs are at risk this time around. Although Future Tense[2] makes a good argument that the fourth industrial revolution is a meaningless phrase used at every occasion looking at major technological advancements, such as at the beginning of WWII, during the Cold War, and even in the 80s tech boom. Regardless, it does not change the fact that the tech advancements in society are changing and splintering how major firms and corporations conduct business and integrate in value chains. It is necessary to coin the contemporary term of Industry 4.0 to describe the turn of our current industrial tide, regardless what may its significance in retrospect.

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1 WEF is a Swiss nonprofit foundation and the international institution for private-public cooperation dedicated to improve the state of the world by engaging business, political, academic and other leaders of society to shape global, regional and industry agendas.
2 Future Tense is a partnership between New America, Arizona State University and Slate Magazine to explore emerging technologies and their transformative effects on society and public policy.

All these factors affect the contemporary working and social culture, generating a bigger emphasis on the knowledge worker, and even urban planning and the implications in relation to smart city discussions. Instead of major clusters, what seems to develop rapidly is a conglomerate and unprecedented number of so-called micro clusters the city. Thus, we see the end of the 21st century industrial complex, as we know it. Moriset concludes:

"...IT has driven the institutional fragmentation and geographic splintering of value chains. A massive trend toward outsourcing (...) leads firms to become orchestrators rather than owners (...) well-defined entities of innovators and producers being replaced or complemented by myriads of contributors." (Moriset 2013: 4)

The argument implies that the corporation, firm, institution, and as the literature review states, the 21st century industrial complexes, belong to a dying breed in need of revision.

3.3 SILICON VALLEY

Introduction
Silicon Valley in the San Francisco Bay area, California, is a much-cited reference when discussing clusters or industrial complexes, also in Oslo. It is therefore important to explore the complexities, simplifications and not least, the serendipitous properties that define Silicon Valley. It is indeed one of the earliest examples of a successful tech cluster, with aspects resembling a major startup community across great distances. Yet it is not in the clustering itself which makes Silicon Valley work, but the different creative classes, the liberal image of cool and tolerance, social, working and shared knowledge culture and government support. It is only by taking all these aspects into account, one can understand that Silicon Valley may in fact be one of the unique examples which cannot be replicated.

A foundation based on tolerance and entrepreneurial mindset
What makes Silicon Valley a tempting example to follow, are the stories which revolve around a creative class occurring out of nowhere as parts of the bay area. Before this Silicon Valley consisted mostly of agricultural land and retirement suburbs. Its origins tell another tale: a long history of liberal, technological and entrepreneurial occurrences. We see it in its stance against slavery in 1861, the gold rush which generated both capitalistic and eccentric spirit and diverse immigrations in 1848, and surprisingly enough a significant research tradition on vacuum tubes (origins of the PC) 1912 and even Stanford University's will to create an industrial park seemingly out of thin air in the 50s (Moorhouse 1979: 42-43). Although there is no direct link, these factors may be indicators for the continuation of San Francisco's everlasting image of cool and tolerance, along with its Mediterranean climate.

The world's first science park, Stanford Industrial Park
The creation of Stanford Industrial Park may be one of the misleading factors to why policy makers adopt industrial complexes as a national policy as this science park appeared to have occurred out of thin air. At the time of its creation in 1951, Stanford University was rich on land, but poor on

Stanford Industrial Park 1960. The considerable land that Stanford University in possession of which enabled the university to successfully harboring major companies in their science park. Credit: Palo Alto Historical Association.

knowledge and tech. This excess land at Stanford University became the science park. What policy makers may have underestimated when studying Silicon Valley as a replicable model, may be the power of one individual, Frederick Terman, an educator and professor in Electrical Engineering department at Stanford University.

Frederick Terman spent his formative years in California and even got his bachelor's degree at Stanford University, due to his father's problems with chronic tuberculosis. Why is this trivial fact so important? It turns out, that his father had passed the illness over to his son. At the time, warmer climate was considered to ease the pain, hence the reason for why Terman Jr. would return back to Silicon Valley, after receiving his PhD at MIT under the great Vannevar Bush of Raytheon. One cannot hide the fact that Terman had strong ties to MIT; he was managing a high-technology military project during the WWII.

Terman brought back experiences and intellectual property, which led to the creation of the science park. However, was it the science park that led to a synergy between research and entrepreneurship? To answer that question, we have to go back in time to the 20-30s when he was the dean of Electrical Engineering department at Stanford University. It turns out that the dean single-handedly encouraged and helped students exploit research, setting up firms, lending money from his own pocket to ensure this without taking any stakes in the companies. One of the most famous companies coming out of this deal was Hewlett & Packard. So when Terman led the development of Stanford Industrial Park, he had an army of companies to fill it with, purely based on good will. His main goal was to diffuse R&D for commercial use. He leased the land to electronic firms on very advantageous terms on the basis of their

excellency and their close ties to the University. In one single move he managed to create a community of technical scholars of both research and industry. This is an important fact because it is a model of ensuring intellectual communities on and nearby campus (Castells & Hall 1994: 16). One should note that after this point, the Stanford University was irrelevant to the shaping the Silicon Valley culture, as the private market became self-sufficient.

Post-war era and neoliberalism generating two very different creative classes
During the WWII and the Cold War, MIT in the east was the base of conservative military driven industry not prone to innovation while the west gained a reputation of a strong liberal and entrepreneurial culture, which became the testbed and destination for young ambitious tech workers. This also gave all the startups around Stanford a great beginning, leading to what would become the world's greatest startup cluster (Castells & Hall 1994: 16, 31-35). On the one side, the governmental and military demand for technological advancements in the 60s due to the Cold War contributed to Silicon Valley's image; the "technophiles" or establishments fed the ongoing wars and the culture of materialistic consumption. The war thus fueled the trend of startup companies. On the other side, was the counterculture stance against the established order in the 60s. The generation of "reversionaries" criticizing the wealth, commodities, technology and political state of our society wanting to go back to our roots of living and to communal ideologies. These two classes became quite decisive in shaping the ethos of Silicon Valley, a contradictory mixture of technophiliac, entrepreneurial, corporate, collective and altruistic mindset.

The unlikely culture of shared knowledge
The story of how Silicon Valley attained its trademark culture is much more a freak occurrence than something that can be replicated. The liberal image in this context became synonymous with opportunism, greed, wealth and free market. Corporate secrets were impossible due to strong migrations between free structured firms. The case of William Shockley in 1958 may exemplify this. As nobody at MIT Boston would invest in his invention of semiconductors (which would lead to the creation of microelectronics and PC's), Shockley left town, seeking his fortune somewhere else. But why did he choose San Francisco? The official reason for why he chose San Francisco, of all the east coast clusters, was that he could be closer to his mother. In San Francisco he found venture capital and established the startup company Shockley Semiconductors. But his lack of business acumen caused his opportunistic disciples to branch out and start the spin-off firm Fairchild Semiconductors integrated silicon to Shockley's invention. The reason for why Shockley's disciples left him was because he refused to see this integration as an improvement on his design. Fairchild fell prey for even more spin-offs. This tale would become the very strength and symbol of Silicon Valley, as the workers held no grudge, they actually stayed in the area and still met up over professional issues, or to be more precise, at Walker's Wagon Wheel, the local restaurant. The Fairchild's created the kind of networks that the world would hear so much about (Castells & Hall 1994: 31-35). This meant that the meeting grounds actually facilitating this serendipity production were in fact the restaurants, as opposed to major industrial complexes presented in the literature review. Shockley is today generally considered as the second founding father of Silicon Valley.

Walker's Wagon Wheel. One of the main restaurants that functioned as a meeting ground for shared knowledge. Credit: Carolyn Caddes.

The private and public sector ensuring cultural diversity causing gentrification
The city may have ensured the diverse culture of non-conformism and capitalism in San Francisco after seeing what the diversity might bring back in revenue. For example, by making it illegal for employers to refuse a job because of an applicant's sexual preference in 1972, the inhabitants giving away free coffee to the hippies and beatniks because their presence attracted more tourists, and discounts for startup companies. Both the government of San Francisco and Stanford University was ensuring its brightest tech students to stay with their companies in Stanford Industrial Park and central San Francisco (Moorhouse 1979: 127). The counterculture gave the city a strong social identity initiating a gentrification of the low-rent central San Francisco which they inhabited. Moreover, the firms that stayed and furthered innovation and reindustrialization in the Bay Area generated a great deal of corporate subcultures and entrepreneurial sense, which increased the technological community and financial economy.

Hybrid culture: from military, corporate to civilian market
The merging of countercultural and technophiliac ideology led to a creative class with an interesting agenda in the 70s. As a means to continue their fight, this creative class refocused their efforts in scaling down, democratizing and humanizing technical innovations, forming a strong compromise in their protests against establishments. Technological manufacturing was retracting as governmental spending was shutting down in the 70s and with the crack due to Japanese dominance in 1984, Silicon Valley had to redirect from hardware to software manufacturing.

In the 70s many young nonconformists detested the major tech corporations moving in claiming tech for military and commercial use, leading the nonconformists to monopolize the computer for personal use, hence the name Personal Computer (PC). This may be the first stance in creating the hybrid culture of our contemporary time. In their view, the computer could potentially give millions access to databases of the world, turning the average Joe into a self-reliant citizen. The school dropouts traded bohemian lifestyle with computer knowledge, outflanking major corporations in the US. They were very aware of creating a softer

non-corporate image. Through friendly and folksy club names such as the Itty Bitty Machine Company (an alternative IBM), Kentucky Fried Computers, or most prominently, the Homebrew Computer Club started the personal computer age in 1974. Other unknown Homebrew members at the time were Steve Wozniak and Bill Gates, the two PC hardware and software giants of today (Roszak 1986: 38-39). The name "Apple" was also an attempt on soft, organic identity opposed to the hard-edged image of high tech at the time (Roszak 1986: 38). (Castells & Hall 1993: 20).

Is it really that strange that nonconformists would challenge the corporate modus operandi of handling tech? Theodore Roszak, the author which gained a huge follower base of nonconformists and became an important advocate for the countercultural generation, made a sharp observation between these subcultures. He observed that all of his countercultural students were in fact obsessed with science fiction, even to the degree that the publishers could no longer provide enough literature. Alongside the primitive ways of living, Zen Taoism (Steve Jobs was a self-proclaimed Zen practitioner) which colored the San Francisco culture in the end of 60s, was a strong fascination of devices and space crafts (Roszak 1986: 16). The hippie ideology did not stand in the way of the appreciation of technology. This is the same tendencies seen in the nonconformists liberating the computer for personal use.

Corporate subcultures
Although the hybrid culture did create an image of major corporations being uncool, it seems as if the corporations were aware of it long before the hybrid culture movement in the 70s. Firms and corporations had become more and more obsessed with their image and reputation. They yearned to pose as a "clean energy", with human sensibility rather than a tough corporate ruling. Although very corporate, Hewlett-Packard in Stanford Industrial Park was the first to have a very humanitarian view on their employees, treating them as assets, giving stock-options, tutoring, offering flex time and job sharing. Google takes it even further creating what ranked today as the world's best working environment. Showering their employees with perks and benefits, accommodating a diverse corporate culture, encouraging personal gain and interaction between colleagues.

Invention-out-of-the-garage culture. From left: Apple, Amazon and Google. The garages and "incubators" in the suburbs served as the workspace for entrepreneurs and knowledge workers. Credit: Katie Henderson.

The urban aftermath of neoliberalism and cultural tolerance
The fact is clear; San Francisco has been successful in maintaining its image of cool and cultural tolerant. It also means that the city opened its doors for whatever migration and culture to come and was a testbed for the 20st century society and the 21st century industrial complexes. Concepts such as cluster, science park, and startup community are developed here. Not to mention how Wozniak and Jobs help popularize the invention-out-of-the-garage culture which rapidly changed the suburbs into tech territory of opportunists/wannabe-innovators (Castells & Hall 1993: 25) The sum of all the garages would make Silicon Valley a startup cluster.

The central San Francisco, home of the counterculture, underwent severe gentrification and became the target of the rich capitalists investing in the innovation of the tech boom. In a way, the beatniks and hippies ignited an urban generator attracting businesspeople, turning the entire Bohemia into financial quarter. Change in central San Francisco was bound to happen as they had somehow invoked dynamic changes and migrations in the region.

An indicator of the trend of humanizing technology in the Bay Area is the shift in technological focus from industrial achievements to commercial manufacturing and to social networking services. Even the social networks such as Facebook, YouTube, Tumblr etc. are breaking down to even smaller fractions while generating even more famous startup companies, such as Instagram, Vine, Flickr etc. To put it bluntly, Silicon Valley has gone from industrial complexes to major corporations to startup companies. This is in line with the technological trends as the tech community in Silicon Valley has adjusted accordingly so.

3.4 THE OSLO SCENE, NORWAY

The Oslo startup front
Scandinavia is today a very hot topic on the global startup front with investors pouring in 800 million dollars in 2014. Yet, out of the 800 million dollars invested in Scandinavia, Norway only managed to attract 3%, whereas Sweden took in 51%. Scandinavian cities that dominate the startup front are Helsinki, Copenhagen and Stockholm (Teknisk Ukeblad 2015). Oslo has had a great emergence of an established startup-related coworking spaces, but it is missing a unified platform of angel investors, accelerator programs and incubators to take them to the next level of growth stage businesses. Startup-related coworking spaces It is inevitable that startup companies main goal is to grow and move on from the coworking spaces. The startup front in Oslo is generally considered as very fragmented by Kjartan Slette CEO of Unacast (one of the Norwegian leading startup companies today), criticizes Oslo-based coworking spaces such as 657 Oslo, StartupLab and MESH for not seeing beyond their own gain and realize what to do for the greater good.
Oslo has in a few years gained a rapid growth of almost 80 startup related businesses. It is assumed to be the start of a major growth in the upcoming years, however Oslo is currently without a holistic infrastructure to sustain it (Teknisk Ukeblad II 2015).

Norwegian origins and customs on entrepreneurial and technological culture and development
During the interview rounds with interest groups of the Oslo-based business development and IT industry

including ICT Norway, Oslo Business Region and startup communities presented in the case study chapter, the same questions were asked: Is it wise to develop a startup front based on foreign ideals and customs? Are there national or local traditions and customs that the Norwegian startup front can/should be based on? The answers pointed in the direction that this was an international trend, meaning it would be senseless to base it on local traditions and customs. The way startups and coworking is marketed today refers more to global trends and does not cast light upon the possibilities that some of this trend may in fact be engrained in the Norwegian culture. In other words, many of the interview subjects (Archer, Holmefjord, Syversen, Winther in chapter 4: case studies) gave the impression that this tradition was mainly rooted in foreign trends and traditions. Prime examples such as Silicon Valley, Boston Highway 128 and most recent reference project, the Hackney district in London, have played a crucial role in the argumentation for the industrial complexes in Oslo and are often mentioned in relation to new developments (Aftenposten 2 2011), such as the new Life Science Center in Gaustadbekkdalen being hailed as "Silicon Valley light". Further investigations into the Norwegian IT basis of entrepreneurial and social culture show both independency and dependency of global trends and not a replication of Silicon Valley or Boston Highway 128. Rather, the investigations show an actually simulation of the same conditions as in the 60s seen in Silicon Valley, all out of an office building at Ole Deviks vei 10 in Oslo. The Nowegian origins does not play a crucial role for this thesis specifically, but it does play a crucial role in how the public perceive the industrial complexes presented by policy makers and interest organizations when talking about the development of the startup communities.

Shift of focus from industrial complexes to coworking spaces
The certain shift of focus, from corporate to collective ideology that is very present on the global scene, is also very present in the history of the two main government-financed interest companies for business development in the Oslo area. Or to be precise, in the foreclosure of Oslo Teknopol IKS (established 2002) and the establishing of Oslo Business Region AS in 2011.

In the mindset of what an industrial complex or cluster strategy would imply, Oslo Teknopol was an inter-municipal and project managing company between Oslo municipality and Akershus county. Their emphasis was to generate beneficial cluster projects in sector-based market such as in maritime, oil and gas, Life Science and IT etc. These cluster projects were envisioned as to be initiated, managed and owned by Oslo Teknopol in cooperation with the municipalities that owned Oslo Teknopol. However, the co-op proved too difficult to carry out. Knut Halvorsen, the managing director of Oslo Teknopol (Aftenposten 4), claimed in 2011 that the Akershus county officials and the government of Norway have resisted any cooperation and opposed to the inter-municipal initiative from the very beginning. The very same county that initiated Oslo Teknopol. In 2008 Innovation Norway[3] pulled their funding and backed out of the Oslo Teknopol initiative. The internal feud became a public fact, after an unfavorable Oxford report was released and 50 million NOK did not produce any results and the owners of Oslo Teknopol demanded a report on the internal issues between Oslo Teknopol and Akershus county officials. Arnhild Danielsen, the county director of Akershus county, in 2011 that a better model for a company handling business development was in demand (Kommunal rapport 2010).

The cluster mindset of exercising projects on a regional or even national level proved to be too much of an undertaking, as Danielsen expressed interest to transfer the transfer the tasks and operations of Teknopol to a new and more modern business model, hence backing up the collective ideology, as a means to find a new way to support business and commerce in the Oslo area. This resulted in the Oslo Business Region which is owned by Oslo municipality alone, which focuses more on entrepreneurship and the startup front. Instead of owning and controlling projects on a regional scale, Oslo Business Region collaborates with the current trend of business development, which is the startup-related coworking spaces. Here comes the big change of ideology: instead of generating and create big clusters, the focus is instead on accommodating the established business communities, or to be more precise, startup communities. Oslo Business Region[4] have a narrower scope on entrepreneurship and believe it is easier to make an impact to make a difference on the field of entrepreneurship and start only, instead of turning the wheels of the major cornerstone industries where many other players and factors are in play. This event show a firm sign of the cluster strategy and major industrial complexes' decadence and the impertinence of individual entrepreneurship and smaller entities.

Norsk Data - the highest valued PC in the world '89 was located in Økern.
Does Norway have anything equivalent to the corporate, yet culturally influential tech firms, such as IBM, Hewlett & Packard, Microsoft or Apple, including the corporate culture and entrepreneurial spirit that came with them? After the great PC crack in 84' which hit the U.S. PC manufacturers hardest, IBM would mention how a minicomputer manufacturing firm at Økern in Oslo could do so well in the face of global adversity, keeping a stable growth and increased profitability. IBM was referring to Norsk Data, the highest valued PC manufacturing firm in the world in '89, right before its collapse in '91 (Reve & Sasson 2012: 150). However, the collapse gave Norway a solid IT basis because the competence, culture and intellectual property lived on through Norwegian- or Oslo based spin-offs, startups and software developments (Dolphin, Telenor etc.). It is equally interesting to read about the origins of Norsk Data; how it indirectly forced a reluctant synergy between the private and public technological sector, united global trends, and made its own strides in ushering IT development, very often through a few individuals.

Venture capital on Norwegian soil
When the entrepreneurs and founders of Norsk Data, computer engineer Lars Monrad-Krohn, Rolf Skår and Per Bjørge established the firm in 67', they did so on the basis of their affiliation with the Norwegian Defence Research Establishment (FFI) of post WWII, causing an unlikely migration of 15 persons altogether from FFI to Norsk Data; from a public industrial park to a private startup firm (Steine 1992: 11-22). 67'was also the year that oil was discovered in Norwegian soil. The public sector heavily dominated the industrialization of Norway and private entrepreneurial ventures were not the norm (Regjeringen 2016). All in all, it was the founders' amassed personal experiences and affiliations that made Norsk Data's intellectual property exceptional in influencing future tech spin-offs. First off, the founders were not able to generate venture capital in the conventional way. In a context where only one third was available on the Norwegian market, they did so through a board member's father in-law and Monrad-Krohn's mother, amounting a modest 194.000 NOK. Again, we see indirectly how parents play a crucial role in changing the trajectory in the tech industry, such as

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3 Innovation Norway is a state-owned company and a national development bank for Norwegian business development.

4 Facts is based on an interview with Fredrik Winther February 2016.

Terman's father with his chronic tuberculosis or Shockley's mother living in the sunny side of San Francisco.

Focus on the civilian market
In relation to how the nonconformists in Silicon Valley made their fortunes by looking at potentials in the civilian market, the case of Norway differs a bit. There was a mutual agreement between Norsk Data and the government that the private owned company should handle the civilian market, meanwhile the public owned tech institutions would handle the military market. We know now that the short end of the stick resulting them in breaking the agreement in an attempt to gain monopoly on the PC manufacturing market etc. In 71' however, Norsk Data gained monopoly on installing their NORD-1 (minicomputer) in virtually every institution, university and university college on Norwegian soil, making them highly influential in how academia would process technology and education years to come. How this came to be is still unknown to this day, but it is assumed that political pressure from Norsk Data was crucial in securing the deal (Steine

From FFI to Norsk Data 1967. The image show the members of Sifferlabben, a research team at FFI. The marked dots also show the migration of the intellectual property of the government to the private enterprise.
Credit: Tor Olav Steine.

1992: 22-30). There was also a migration of research- and MIT-based intellectual property to Oslo that is worth mentioning. One of the founding members of Norsk Data, Monrad-Krohn migrated from government-financed research to Norsk Data. He also brought back important intellectual property to Norsk Data from MIT during his stay between 62-64. Another founding member Skår, successfully lobbied for a coworker to migrate from the world famous MIT to Norsk Data and acquiring competence in American timesharing systems which ultimately was critical to Norsk Data's securing the open bid on CERN's upgrade on their computers in 72' (Steine 1992: 26-31) which firmly put Norsk Data on the map and the deepest corners of Norway, as a major player in the global PC industry.

Parallels to Boston Highway 128 and Silicon Valley
In a timeframe of 5 years, Norsk Data managed to fend off government-run initiatives in the tech market dominated by the public sector, synthesize global trends and acquire foreign intellectual property as their own, creating a strong authentic basis for technological entrepreneurship and innovation, native to the local markets of Oslo and Norway. It is therefore peculiar when industrial complexes in Oslo or cluster mindset such as Oslo Teknopol suggest that the Norwegian IT culture are a direct descendant of global trends and events. Also, these facts even reveal that Oslo had the same tendencies as Silicon Valley in both of their formative years in the 60s. Therefore, history reveals in fact that Oslo is not replicating Silicon Valley as portrayed in media, but that it in fact is a simulation of the same conditions.

It may be uncalled for to underplay MIT's importance in the global tech market in this section. However, only the less favorable parts of MIT's track record are depicted in this section, as it is to convey manifestation of the controlled government institution, whereas Silicon Valley as an autonomous and neoliberalist institution. In many ways, this draw parallels to cluster development, as opposed to the coworking concept. Ultimately we have to ask, what is the importance of Norsk Data to the Oslo scene, as how the tech Silicon Valley culture is important to San Francisco? As mentioned in the beginning, the collapse of Norsk Data gave Norway a solid IT basis because the competence, culture and intellectual property lived on through Norwegian- or Oslo based spin-offs, startups and software developments (Dolphin, Telenor etc.). It again draws strong parallels to how the collapse of Shockley Semiconductors paved the way for the Silicon Valley culture of shared knowledge. Alas, we arrive on the subject and the main question: what are the roots of the entrepreneurial culture and startup trend? If we look aside from Shockley Semiconductor and Norsk Data's shortcomings for not readjusting themselves towards new tech advancements and trends. The fact is that the collapses of highly established and influential companies in the Silicon Valley and Oslo context do generate an engrained culture at the specific location where it happens. Shockley's shortcomings created a hunger in his disciples, an entrepreneurial mindset to innovate truly marking the rise of startups after the spin-off Fairchild semiconductor fell apart. However, Norsk Data's shortcomings and collapse was not a result of an opportunistic and entrepreneurial mindset, but did in fact generate a strong IT basis for Norway, or in this case Oslo, to lean upon for future IT companies and the current trend of startup companies.

The first government in the world to groom a generation for entrepreneurship
There is another fact of interest which is seldom mentioned when talking about the roots of Norwegian entrepreneurship. Although the government was depicted as a great adversary to private enterprises in the Norsk Data section, they have later had a hand in encouraging the entrepreneurial spirit in the Norwegian society. Kunnskapsløftet, which was a 2004 nationwide reform to strengthen the basic education for elementary, secondary, and high school, introduced major changes and requirements in the general curriculum. Aside from improved skills in writing and calculation, oral skills and digital tools became an integral part of all subjects. To the dismay of Norwegian counties, in 2007 the minister of education, Øystein Djupedal, equipped high school pupils on 2nd and 3rd grade with free laptops for educational purposes at

the county's expense (Digi). With Kunnskapsløftet, Norway also became the first nation in the world to implement entrepreneurship to the general curriculum on a national scale. Entrepreneurship became one of the focus points of the new reform. Evaluating the results, government officials revealed a certain trend: a major increase and interest in entrepreneurial courses and tasks, especially in elementary and primary schools (Kunnskapsdepartementet 2009: 7). Entrepreneurship and enterprise development became a separate course at high school level, teaching young pupils not only the ethical, environmental and socio-economical aspects of starting their own company, but also how to create sound financial and business plans in compliance with the Norwegian law (Utdanningsdirektoratet læreplankode ENT1-01).
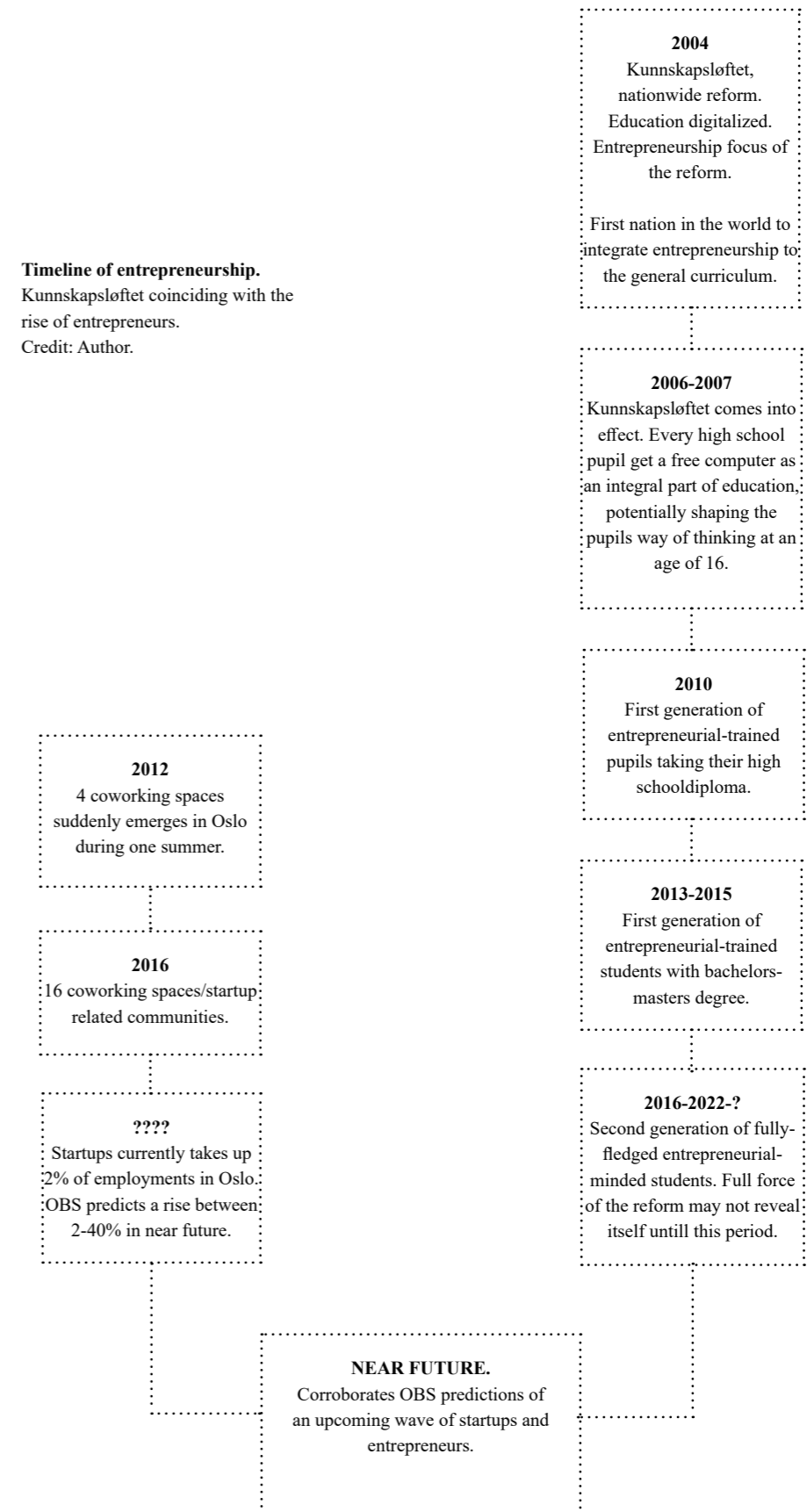
Is there a correlation between the reform and the change in the working culture in Norway? As stated earlier in this chapter, Oslo Business Region and ICT Norway have noted a major turnover in the Norwegian working culture and ethics the last 2-3 years, between 2012-15: skilled labor find it more appealing to work in coworking spaces and smaller startups opposed to major corporate firms and headquarters – workers migrate more frequently than ever. Kunnskapsløftet was enacted in 2004 and it did not come into full effect until 2006-07, which means that the first generation groomed for entrepreneurship and innovation did not receive their high school diploma until the spring of 2010, which also means the earliest fully fledged students with a bachelor's or master's degree would not appear on the working market until 2013-15. This coincides with the occurrence of startup communities and coworking spaces in Oslo and the certain shift in the working culture in Norway – the kind of shift which Winther from Oslo Business Region and Syversen from ICT Norway talk about. If one takes into account at least a year or two as buffer or break between high school and higher education and the 2nd generation from elementary school, the full force of the reform may not reveal itself until 2016-2022 or maybe later. It would then confirm Winter's predictions of a major wave of startups and entrepreneurship in Oslo.

Relevance of a startup community in Oslo

According to a research conducted by the University of Southern California's Marshall school of Business in 2008, Norway came in second, among 31 nations and after Japan, at utilizing new technology and innovations the quickest. It takes only 5,7 years from new technology is released on the market until it is considered mainstream, it takes Japan 5,4 years. According to George Tellis, a professor in marketing from the university behind the research, says this mainly reflects two things: an established culture to understand and adapt to new trends, and secondly, an economy that can sustain and attain new technology amongst its users (NRK news article 2008).[5]

This means a startup front in Oslo will have a very advanced but small consumer base right in their backyard. Basically the cycle of testing and failing and improving can go much faster with such an advanced and small consumer base and the consequences of failure is much smaller when the production also is for a small consumer base, a feature reserved only to Scandinavian countries.

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5 Another aspect helping to shape the Norwegian technophiliac culture, was the 00's commodities boom. This caused prices of physical commodities to decline, most notably different metals used in electronics causing flat screens, laptops and smartphones to become basic commodities peaking in the years of 2008-09, around the same time of this research.

Timeline of entrepreneurship.
Kunnskapsløftet coinciding with the rise of entrepreneurs.
Credit: Author.

2004
Kunnskapsløftet, nationwide reform. Education digitalized. Entrepreneurship focus of the reform.

First nation in the world to integrate entrepreneurship to the general curriculum.

2006-2007
Kunnskapsløftet comes into effect. Every high school pupil get a free computer as an integral part of education, potentially shaping the pupils way of thinking at an age of 16.

2010
First generation of entrepreneurial-trained pupils taking their high schooldiploma.

2012
4 coworking spaces suddenly emerges in Oslo during one summer.

2013-2015
First generation of entrepreneurial-trained students with bachelors-masters degree.

2016
16 coworking spaces/startup related communities.

2016-2022-?
Second generation of fully-fledged entrepreneurial-minded students. Full force of the reform may not reveal itself untill this period.

????
Startups currently takes up 2% of employments in Oslo. OBS predicts a rise between 2-40% in near future.

NEAR FUTURE.
Corroborates OBS predictions of an upcoming wave of startups and entrepreneurs.

4.0 CASE STUDIES

4.1 INTRODUCTION

In 2012 Oslo went from 0 to 4 IT and startup-related coworking spaces during the summer vacation (Aftenposten 3). Closer examination of interest organizations for Norwegian startups such as Oslo Business Region and Startup Norway, reveals that as of 2016, 17 in total have been established in Oslo area within a timeframe of 4 years, although 6 of them belongs to the semi-corporate coworking franchise Evolve, in accordance with the 2010 global hybridization and the capitalized version of coworking.

This chapter investigates the different aspects of 3 Oslo-based and startup-related coworking spaces (MESH, StartupLab, The Simula Garage) which convey a specter or a history of development of the coworking concept. Meanwhile the 4th (Tøyen Startup Village) represents the current tendencies in the planning of coworking spaces, and more in the direction of an urban development strategy. Before the presentation of the 3 case studies, a revision of Moriset's work is necessary to carefully explain the current state of coworking spaces.

List of Oslo startup front

List of official coworking spaces existing in Oslo, the info has been obtained through their own websites and through interest organizations such as Oslo Business Region and Startup Norway:

- 657, creative- and consultancy-oriented collaborative. Fredensborgveien 24D, St. Hanshaugen. Established 2012.
- BI Cowork, basic entrepreneurial coworking space. Nydalsveien 37, Nydalen. Established 2014.
- Bitraf, hackerspace and makerspace. Pløens Gate 4, Gamle Oslo. Established 2012.
- Evolve, major Oslo based franchise with 6 locations and with the entire specter of coworking- basic coworking, startup community, freelance etc. Usually not listed among bench marking organizations and not considered a coworking space by interest organizations due to its corporate nature and business model. Established 2005-2013.
- House of Nerds, inconclusive on what the profile of their coworking space is. Huge emphasis on the gaming event space for children. Lørenveien 38. Established 2013.
- MESH, basic coworking space, creative- and consultancy-oriented collaborative and startup community. Tordenskiolds Gate 3 & 6. Established 2012.
- Oslo International Hub (formerly known as Gründernes Hus), international image, but basic coworking space, incubator and startup community. Oscars Gate 27. Established 2012-2014
- Sentralen, creative collaborative and socio-entrepreneurial oriented collaborative, makerspace. They are promoting themselves as heavy on cultural production, with amenities and hybridization such as event spaces, café, stage etc. Øvre Slottsgate 3, Gamle Oslo. Established 2016.
- Simula Garage, image of altruism with profile of startup community and basic coworking space.

- SoCentral, pilot project, which resulted in Sentralen, look at their description. Skippergata 22, Gamle Oslo. Established 2013.
- StartupLab, Tech-savvy, elitist. Profile: incubator, startup community, basic coworking space,
- Tøyen Startup Village, an umbrella organization for several startup communities and coworking spaces in Tøyen. Socio-entrepreneurial collaborative, startup communities, basic coworking spaces etc. Currently dabbles in alternate operations of coworking spaces, without actually operating from one. Planned establishments 2016.
- TUben, socio-entrepreneurial collaborative, based and built around an independent and socio-entrepreneurial organization called Tøyen Unlimited. Established 2016.
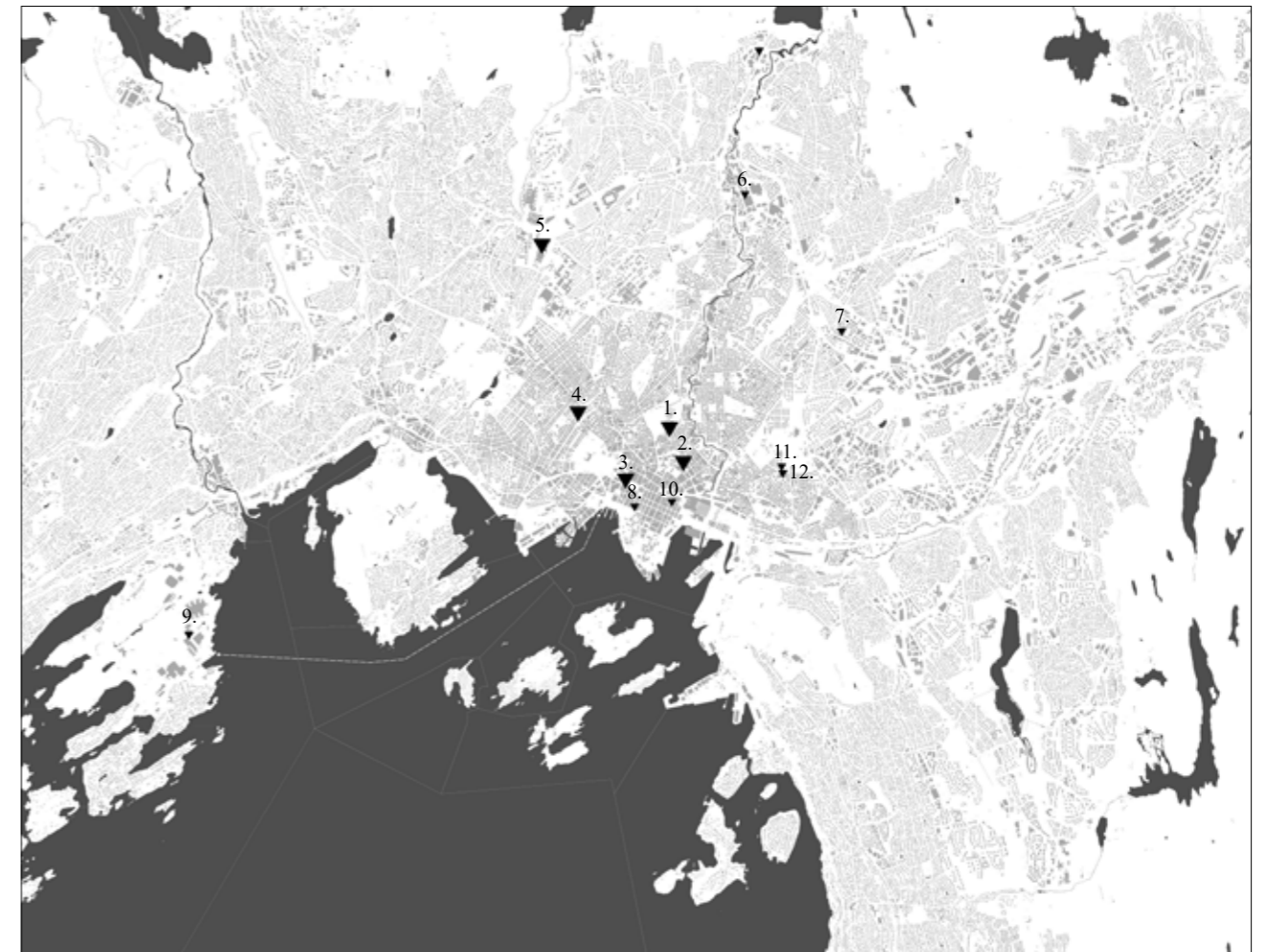
Coworking spaces 1:100.000

Sudden rise of coworking 2012:	**The rest:**
1. 657, 2012.	6. BI cowork, 2014.
2. Bitraf, 2012.	7. House of Nerds, 2013.
3. MESH, 2012.	8. Sentralen, 2016.
4. Oslo International Hub, 2012-2014.	9. The Simula Garage 2014
5. StartupLab, 2012	10. SoCentral, 2013.
	11. Tøyen Startup Village, 2016.
	12. TUben, 2016.

The selected case studies are:

MESH (2012).

StartupLab (2012).

Simula Garage (2014).

How the interviews were conducted

The community managers (although under different monikers) at each of the startup-related coworking spaces are:

- Sondre Li Hauger, community manager at MESH.
- Kjetil Holmefjord, incubator manager at StartupLab.
- Jonas Archer, Project coordinator at Simula Garage.
- Fredrik Syversen, director for business development at ICT Norway and the key developer for the brand Tøyen Startup Village.

The information has been gathered through interviews with interest organizations for both IT and startups/ entrepreneurship in Oslo, such as ICT Norway and Oslo Business Region. For the case studies Simula Garage, StartupLab and MESH, both community managers and entrepreneurs at the coworking spaces have been interviewed. They have also been asked to sketch out a map of the floorplan and urban context their daily life at the office, where they sit, eat, relax, hang out etc. The depiction by the entrepreneurs does not give a complete picture, since the selection of them was based on day-time visits and those very busy were either not available or not in office. What it does provide is an insight of how the workspaces are perceived by a short selection of entrepreneurs. Many hours have also been spent observing these spaces, how the members interact, and respond to each other within the coworking concept. All the entrepreneurs interviewed also had one thing in common, none of them actually had any experience with traditional office job or at any corporate firm.

Sondre Li Hauger
Community manager
MESH

Kjetil Holmefjord
Incubator manager
StartupLab

Jonas Archer
Project coordinator
The Simula Garage
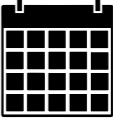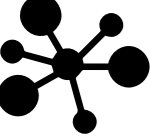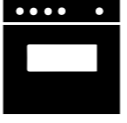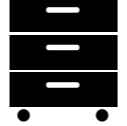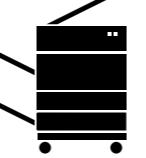
Fredrik Syversen
Director of Business development
Tøyen Startup Village,
ICT Norway

Fredrik Winther
Managing director
Oslo Business Region

StartupLab
2012

MESH
2012

Tøyen Startup Village
2016

The Simula Garage
2014

Case studies, 1:100.000

GENERICS AND SPECIFICS OF COWORKING SPACES.

CORE ELEMENTS	VIRTUES	PROFILE	AMENITIES	HYBRIDIZATION	ALTERNATE OPERATIONS
COWORKING SPACE A place or facility where people of different employment share office space and amenities. Also a place to meet, socialize, collaborate etc.	**TECHNOPHILIAC** Tech-savvy, technological obsession. The ubiquity of technology makes it relevant in every aspect of coworking concepts.	**BASIC COWORKING** Flexible or fixed desk, basic facility where independent workers sit together.	**WIFI** Important for the lone eagles, the ubiquity of IT in daily operations makes WIFI the outmost priority.	**CORPORATE COWORKING** When major firms and corporations start a coworking space together, an attempt to generate and test new ideas.	**EVENT MANAGEMENT** Participates and manages public and major events.
A COMMUNITY The keepers of social and working culture, intellectual property etc. There is no coworking without its people, the community.	**INTERNATIONAL** Open to global trends, foreign impulses etc.	**INCUBATOR** Result-oriented and facilitates for small but growing companies. Generally with accelerator programs, investors etc.	**DESK** It may be fixed or flexible, whatever suits the daily operations of the lone eagle best. The desk ultimately represents different memberships.	**ENCLOSED OFFICE SPACE** To cater growing or bigger companies. Also to maintain other interests within the coworking space.	**BRANDING** Treats coworking as a brand, merchandise and company.
COMMUNITY MANAGER The all-seeing eye. Decides who stays and leave, keeps tabs, curates and cultivates the space etc. Also deals with HR or human capital.	**CORPORATE** Capitalistic and result-oriented mindset. Main goal is to succeed on the market.	**MAKERSPACE** or hackerspace. A mixture of coworking, workshop, machine shops, studios. etc. where people ranging from hackers to designers can share knowledge and build stuff.	**LOUNGE** Function as the third place in coworking spaces. An alternate place for relaxation, work or informal meetings.	**MIXED-USE SPACE** Auditorium, theatre, stage, scene, event space, networking etc. Also mixed between private and public use.	**URBAN DEVELOPMENT** Participator in urban and smart city development and discussions.
ADMINISTRATIVE UNIT Technical support, legal advice, human relations, public relations etc.	**COLLECTIVE** Community builders. Great supporter of shared economy, knowledge sharing, social events, networking, mingling.	**STARTUP COMMUNITY** Focus on repeatable and scalable business model. Growth and innovation as main goals, bound to leave. Temporary state.	**MEETING ROOM** Dual role: for the sake and image of professional appearances.	**RESTAURANT** Managed as a seperate unit to the coworking space. Has dual function as the third place. Becomes a part of the urban fabric.	**PUBLIC RELATIONS** Deals with media, press and marketing etc.
MEMBERSHIPS Defines rank, accessibility, agenda and activity of the members. Is only given by the administrative unit or community manager.	**ELITIST** Competitive mindset. The belief of possessing intrinsic qualities, intellect or experience greater than others.	**CREATIVE COLLABORATIVE** Workers with background in arts and design often in relation with consultancy.	**KITCHEN** Food, coffee, water etc. Usually preferred over the regular cantina. A place for informal meetings.	**CAFÉ** Managed as a seperate unit to the coworking space. Has dual function as the third place. Becomes a part of the urban fabric.	
LONE EAGLE Knowledge workers, freelancers, skilled labor who can live and work from anywhere, made possible by tech-advances.	**ALTRUISTIC** Philantropic and humanitarian mindset. Acts on the behalf of the greater good for society. Concerns about the welfare of companies and not personal gain.	**CONSULTANCY-ORIENTED COLLABORATIVE** Consultants who offer services and advice to other companies. Considered the stark contrast to startups.	**FURNITURE AS MEDIATOR** Sometimes on wheels, works as spatial seperators instead of walls in the context of open office- landscapes.	**BAR/PUB** Managed as a seperate unit to the coworking space. Has dual function as the third place. Becomes a part of the urban fabric, also at night time.	
SERENDIPITY PRODUCTION The production of the events by chance, informal meetings and random encounters leading fortunate happenstance or pleasant surprise.	**PATRONAGE** Patrons of cultural production and supports it in any way possible.	**SOCIO-ENTREPRENEURIAL COLLABORATIVE** Local entrepreneurship to increase social life for the less fortunate people, immigrants, welfare etc.	**PRINTER** One of the important amenities from the traditional workspace, where the cost of owning one was high. Its current importance can be debated.		
THIRD PLACE A place for informal gatherings of individuals beyond the realm of home and work. Irreplaceable in the production of the urban fabric.		**OTHERS** Other profession-specialized collaboratives, that have not yet to be coined or invented.	**RECEPTION** Important if coworking space is part of a bigger institution or brand. Dual function as the voice and physical presence of coworking.		
			TABLE TENNIS Exist in almost every coworking space. Its importance can be debated. Other recreational games include pool, chess etc.		

4.2 GENERICS AND SPECIFICS OF COWORKING SPACES
In Moriset's research paper from 2013, "Building new places of the creative economy" he provides a comprehensive insight into the genesis of coworking spaces and the complexity of hybridization. However, the Norwegian case studies reveals that Moriset's data falls short in describing their current and contemporary state. Based on the interviews, observations, study of physical layout, it is important to convey how the concept coworking has evolved so rapidly the past years. The table, Generics and specifics of coworking spaces makes an attempt of categorizing the entire specter of coworking as of May 2016. This is to make the readers of this thesis aware of every possible aspect of the coworking concept today, from core elements to alternate operations. It is also for the reader to understand lingo of the startup trend, and how policy makers and developers proceed in the discussion of coworking spaces, or to be more precise, the current trend of startup-related coworking spaces. The next segments 4.2-4.6 explains how some established concepts differs in the context of coworking. There are also some new concepts within the coworking concept that needs a further description. These descriptions may be more colored by the emphasis on the most popular variety of coworking these days, the startup-related coworking spaces.

4.3 CORE ELEMENTS
Coworking space and the community
The definition of coworking spaces is as mentioned before, very generic. Moriset's description of a facility where people from different employment share office space and amenities may imply that every members of the community are equals. However, in the context of contemporary coworking, there is a hierarchy between different lone eagles, types of serendipity production and the degree of how the coworking space function as a third place.

Community manager and the administrative unit
If a community is defined by its members, then the administrative unit is the very definition of the community. The success of the community seems to lie in the management of the community, where the community manager of the administrative unit plays the most vital role. A community manager is the equivalent of a mayor in a city, he/she makes sure that the needs of every member is satisfied, and to use the full potential of each of the community's members.

The concept of community is a careful and eclectic selection of entrepreneurs, made by the community manager and the administrative unit. Their main objective to cultivate or curate certain cultures within the coworking space that fits their notion of what a coworking space should be. The reasons for doing so may vary, from harboring only advanced startups, to help out the ones that are most vulnerable or profit the most from the coworking space. The community manager and the administrative takes rent and no equity in the companies they house.

Membership
A membership usually implies that a you are free to choose between the options that an institution or group have to offer. However, in the context of coworking, it is not only something you choose, but the membership

and the kind of membership will also be assigned to you by the community manager and the administrative unit at the specific coworking space. Access can even be denied based on your business model, size and scope of your startup company, personality, ideology, or even solely based on your reluctance to share etc. A basic membership for example, gives access to the entire facility, but those with that membership with a basic membership with access to the community (directed to major companies who wants to keep tabs on promising startups). Taken all the memberships in consideration, there are four main memberships:

• Basic membership.
• Flexible desk, or commonly known as clean desk. The rules of conduct around flexible desks are that nobody can claim these desks as their own.
• Fixed desk,
• Enclosed office space, or commonly known as an office.

4.4 VIRTUES AND CRITERIA FOR ADMITTANCE
Every community in a coworking space is built on a foundation of core virtues or values. The virtues apply both to the administrative unit itself and the members at the given coworking space. It is a question about the co-existence of like-minded people, working in close proximity to each other. This is important in relation to the criteria for admittance. According to Winther from Oslo Business Region, the coworking spaces that struggles the most are the ones with the least criteria for the people they invite into the community, and mentions House of Nerds in Økern as an example. This is an important aspect in acquiring the much coveted or specific traits and cultures of a coworking space such as synergy, shared knowledge, working culture, field of interests or common interests etc.

4.5 PROFILE
A profile is basically a coworking space plus an additional area of focus or a focus on a specific group of professionals. The additional area of focus changes how the coworking spaces are planned, perceived and what kind of cultures it has. Some of the profiles are self-explanatory, yet there 2 profiles and 1 model that are startup-related, in which needs closer attention:

• An incubator, or more commonly known as a business incubator, focuses on promising startup companies. In addition to this, the incubator provides professional and corporate help, management training, accelerator programs etc. aimed at increasing the success rate of startup companies. These coworking spaces provide an extensive network and connection to corporations, companies, investors, funding organizations etc. which are supposed to benefit its members.
• An accelerator program, or more commonly known as seed or startup accelerators is a cohort-based program which focuses on highly competitive startup companies. It is not mentioned as a profile in relation to coworking, because their focus is not on the concept of community, but on return of investment, which means they are highly competitive and highly selective. These programs invest in exchange for equity and take no rent. The startups must "graduate" by a given deadline, usually after 3 months, which makes the accelerator program a highly temporary model. The final examination

day usually culminates in a demo day, or pitch event where they meet investors and present. These accelerator programs are important to mention, since it is often mentioned in media as the key aspect that is missing on the Oslo startup front. Although Incubator may have a variety that may resemble an incubator, they not take any equity and have no graduation day.

• Startup community, is a coworking space focusing on only startup companies, but with a focus on the community aspect, where the incubator and accelerator program does not. The variety and differences of startup companies within these communities are therefore important, not the premise of success rate or return of investment. Since the entire concept of startup to become a bigger company, their stay in a startup community is temporary as they are destined to move on.

4.6 HYBRIDIZATION

Coworking is undeniably exposed to dynamic changes and the vagueness of programmatic purpose opens up for coworking hybridization, such as event space, pub, café, lounge etc. One perspective of programmatic hybrids in coworking, is that innovation and entrepreneurship may be denoted from center stage. On the contrary, it can also potentially give coworking a higher relevance in the urban fabric by inviting the average citizen into the same environment as the entrepreneurs (ex. MESH, Tøyen Startup Village). According to Deskmag[1] the contemporary workspaces for standard desk jobs usually resides at office, home, or even the local coffee shop. The growing tendency of lone eagles has caused a demand for workspaces that answer this current trend, which is the hybridization of coworking spaces, where elements such as mixed-use space, restaurants, bars, cafés becomes very important to coworking. There is one aspect of the hybridization that is of interest, which is the corporate coworking. The concept is not present in Norway yet, but marks a merging of corporate and collective ideology. It is not to save any real estate costs, or to provide space for expansion or to provide a remote work option, but to generate and test new innovative ideas in the same tradition as how real startup companies in coworking spaces handles their ideas and projects.

4.7 ALTERNATE OPERATIONS

The alternate operations mark a new wave of activities that the coworking concept can adopt and carry out due to its current appeal and popularity. These operations do not impact the performance of the coworking space itself directly, but increases the importance and influence of the coworking concepts by partaking in discussions on urban life and development.

Deskmag is widely considered the first and foremost online magazine about coworking, its people and spaces.

4.8 CASE STUDY: MESH

Introduction

MESH was established in April 2012, and became the first coworking space in Oslo. It is a private initiative and has no direct connection to any research institutions in the area. It was established by Audun Ueland and Anders Mjåset, two twenty-something promising entrepreneurs with a great track record in the startup front with startups such as Prampack, Toppstudenten etc. during their studies at the Norwegian University of Science and Technology (NTNU) in Trondheim. After travelling the world and taking notes, they decided to establish themselves in Kvadraturen, an area mainly dominated by office-tenants. This was possible through leasing the building owned by Ole Petter Gilbo, which gave Ueland and Mjåset free reins to explore the possibilities of coworking. Aside from running his business as an investor, he is the proprietor of some other locations in Kvadraturen housing galleries, art school, publishing etc. He is also the board member at some of Oslo's most prominent E.R.'s, pharmacies and other R&D-related companies' in Norway. Since then, MESH has gone from simple beginnings with a coworking space in parts of the 3rd floor at Tordenskiolds gate 3 to gradually taking over the entire 3rd and 4th floor and currently taking over the entire 4 story apartment building. As of the summer of 2015, MESH expanded to the 2nd and 8th floor of the adjacent building with Oslo Areal as landlord. The case study MESH will be described only through Tordenskiolds gate 3, as the majority of MESH's activity is located there. It is worth noticing that Tordenskiolds gate 6 houses companies of considerable size, some are even leasing 2 units of enclosed offices.

Management

MESH consists of two teams, the administrative unit for coworking space and the event team for events. The agenda of these two create a dynamic serving both the coworking space and the café/bar/restaurant/event space, blurring the lines between private and public to semi-private and semi-public. The dual management has generated spaces with double roles, such as the work lounge functioning as the third place and coworking space from 8:00-17:00, after hours transforming into an event/mingling area. Although the building is owned by Gilbo, the brand MESH is owned by Ueland, Mjåset and partners. MESH has to make ends meet as they answer to Gilbo as their landlord. Hauger, the community manager reveals that MESH is financed mainly through the event management, and not on the rent income of the entrepreneurs. Therefore, going in surplus is the outmost priority for MESH.

MESH T3

MESH T6

Central Oslo 1:15.000
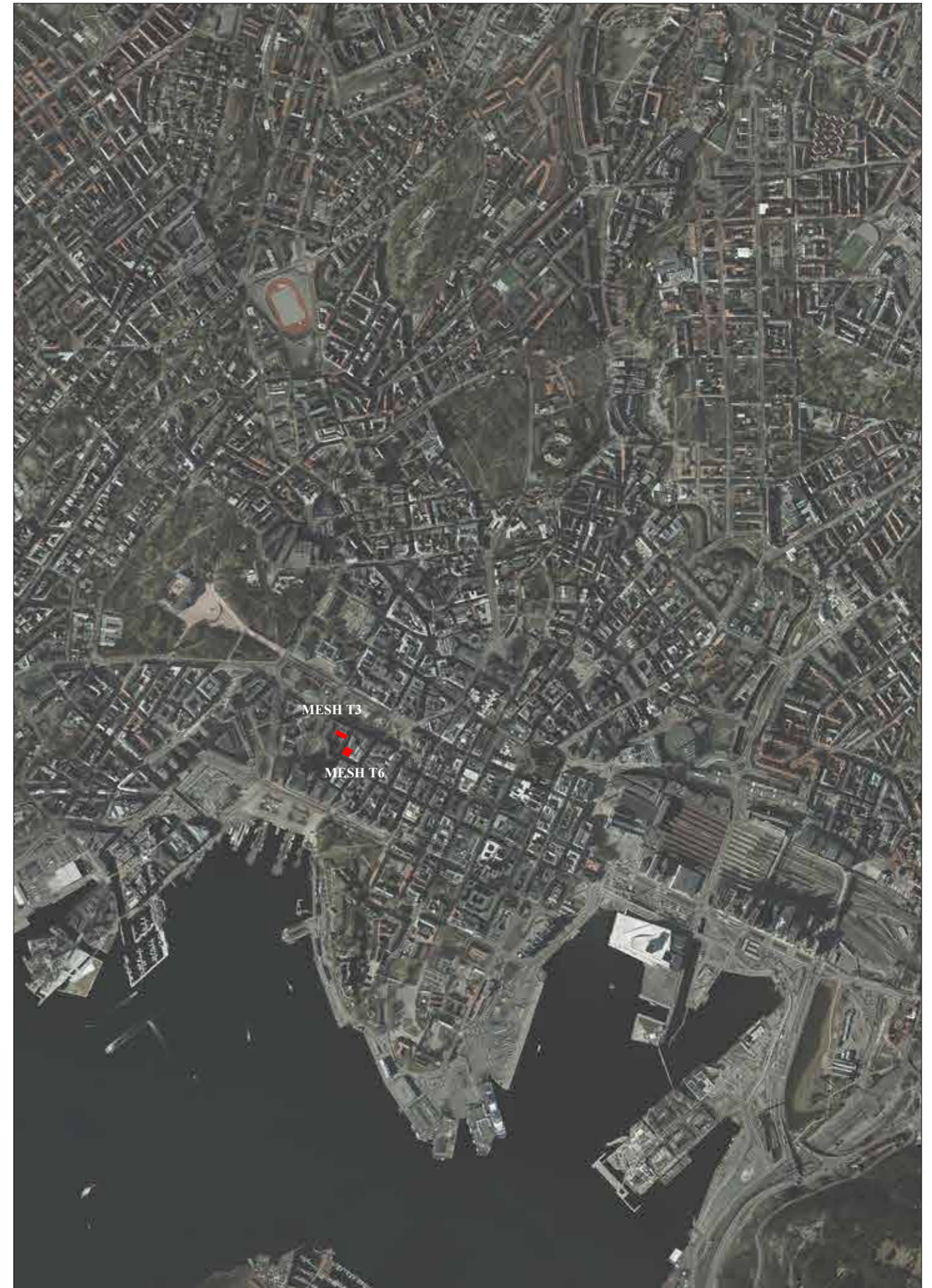
The buildings MESH manages, is the entire four story apartment building at Tordenskiolds gate 3 and the 2nd and 8th floor across the street at Tordenskiolds gate 6. Their partners are Selmer and Telenor, a strange union of a celebrated lawyer firm and a telecommunications company who offers support to the members of MESH. They are usually present at the weekly Monday breakfasts where the partners and new arrivals present their companies and ideas, very similar to what one would call a pitch event on the startup front.

The rules of conduct are just as much defined by the members as they are defined by the community manager. Hauger is very open to creative input on how to manage the space and treats this process more as an open source management. The members can modify their own workspace, simple things such as hanging up pictures and more extensive matters such as painting walls or re-organizing memberships or workspaces, as long as it makes sense to the administrative unit to do so and the interventions are beneficial to the community. MESH tries to connect their members and their expertise to each other, introducing beneficial unions in-house. This is where their business support ends. Although MESH would be gladly to introduce their members to suitable contacts within their network, they do not tell members what to do or where to go with their business. This is where MESH cooperate with StartupLab whether they are a better fit to handle accelerator-oriented requests, because MESH do not have the same incubator profile as StartupLab, nor are they interested in telling their members what to do with their business. The membership fees per month at MESH are as following:

Community: Free.
Work Lounge: 790 NOK.
Flexible and fixed desk space: 2190-3190 NOK.
Office space (enclosed office space): 7000 – 20.000 NOK.

MESH introduces new membership concepts that are worth noticing, such as the community membership, which is basically a product of hybridization where the common citizen is invited into the backyard and sometimes other parts of the 1st floor of MESH, even though it is only the common spaces. The work lounge membership is an invention by MESH. They have created the work lounge membership for travelling businessmen whose desk are empty most of the time (explained in the physical layout segment). This is mainly attributed to their awareness of assigning inactive members to the community. Inactive in terms of how much activity, life and presence they generate in the facility. The administrative unit is not interested in people occupying MESH without feeding back to the social life here or people leaving their desk empty.

There is no maximum timeframe for staying at MESH, but according to Hauger, the companies stay on for approx. 18 months. Although the members sign a contract for their membership, they are also advised to keep an open mind regarding changing up desks and the rearrangements of office spaces. This is not only to enhance the dynamic of change and new relations, but also to make space for new arrivals.

The event team gets approx. 1500 event requests a year and manages about 600, both private and public, resulting in days with multiple events. The events are divided in 3 categories:

• Self-initiated events, by MESH.
• Niche events that are theme-based, where both members of MESH and public will benefit and meet one and each other.
• Conventional commercial events, where MESH still caters the food, tech etc.

Some of the self-initiated events are organized to lower the threshold for local interaction and provide synergies between the companies in the area, such as the famous Floor party. The event team requires that each floor in the two buildings create pre-parties, or commonly call on themes related to their business and companies. This is to inhibit a typical corporate working culture where people only work and go home. The management of the last category has also caused the guests at the events to come back 2-3 days later for a casual coffee.

They also aim to connect with existing coworking spaces and communities on a global level. Their future ambitions and management of MESH will have a focus the expansion of MESH across the entire Scandinavia, hence the slogan, MESH the Nordic community. According to Hauger, their next move will probably be to expand with location in Norway, and they are currently looking into a specific site in Molde.

Image, profile and criteria
MESH's image or one-liner is to function as a platform for entrepreneurs and startups. Although MESH do have some altruistic virtues and ideologies on supporting and facilitate entrepreneurship, and offers free printer service, coffee, meeting rooms etc. out of their own pocket.
Their event management should be profitable, as it is in fact, is a private-run initiative, or tenants themselves. Profit is a necessity and outmost priority for MESH's business model and survival as they also have to answer to their more corporate landlords and the Oslo startup front.

They have one crucial criterion for admission, aside for looking at the past success and levity each company brings with them. It is the candidate's willingness to share an idea, or their willingness to feed the shared knowledge culture. This is an inherent attitude MESH is looking for in every company. When working with innovation, secrecy is a big issue. However, at MESH the criterion is to establish a dynamic community of networking, shared knowledge and intellectual property. This is also what many members consider as MESH main asset.

MESH do clearly state that their main profile is to be a startup community. Their other aim is to facilitate a more open-ended profile and include a wide range and broad specter of knowledge workers that are usually considered as the opposite, such as startup community and consultancy collaborative etc. however, observations at MESH reveal that the majority of their members now are coders and tech workers etc.

Physical layout

MESH as of now, consist of a coworking space with 28 flexible and 6 fixed desks, 11 enclosed office spaces, 5 meeting rooms and a mixed-use space. Up until the summer of 2015, MESH consisted of 5 core programs, office- and coworking space, a café, event space, nightclub and a makerspace with access to workshops (wood, 3d printing). MESH 2.0 as the Oslo startup front calls it, consist now of their 3 core programs (nightclub and makerspace excluded). One of MESH's key management aspects, is their willingness to evolve, to test and fail and check the limitations and potentials of coworking. There are about 250-300 members frequenting MESH at all times, divided amongst 90 startups/companies. Many of the bigger firms are placed in their secondary location across the street. etc. making it the biggest coworking space or startup community in Oslo.

What is distinct about MESH, is not only the emphasis on the common spaces, but also the dynamic and evolving nature of its physical layout and programmatic, architectural and interior changes. The interior in the common spaces at MESH changes at least 2-3 times a week, sometimes on a daily basis. Sofas may disappear for a day or two and suddenly resurfacing on another floor or a complete extra set of furniture which may be replaced. The explanation of this phenomenon is simple; MESH stores an extra set of furniture in the basement. This is something the administrative unit and the event team emphasize as important, to try out spatial concepts, to test it, sometimes fail and readjust.

As none of the administrative unit are actually trained architects, the modifications they have made at MESH is both peculiar and interesting. The randomness of a walled in windows, doors leading to mid-air of the Backyard or even a sculpture of solid granite resting on two metal beams above the stairwell, a WC next to the kitchen, 1m2 rooms etc. The variation and flexibility of spaces has also been mentioned by the members of MESH to have kept their interest in exploring the different spaces and work in different conditions. MESH has somewhat generated an architecture fitting the ideology behind coworking space, the core element of serendipity production, spaces that makes the user wanting to explore the curiosities and wonders of the facility, creating new groupings and random working environments every day.

Urban implications

Does MESH benefit from its urban context? According to the literature review, there is a conventional wisdom that industrial complexes is defined by a union of research, education, commerce and industry. MESH has only the commerce to rest on. The metropolitan urbanity and qualities of MESH seems to outweigh the fact that it is without any connection to research institution, university or schools, or at least the image of it as some of the other case studies seems to benefit from. This is in regards to that the administrative unit at MESH has been successful in generating a great deal of buzz through events and word of mouth. Their popularity may even have paved the way for other coworking spaces not only in Kvadraturen, but Oslo in total. Bitraf and Sentralen which opened in 3rd of March 2016, are some of the notable examples in Kvadraturen. Although there are many coworking spaces in close proximity of MESH, Hauger do admit that the coordinating between them could have been better. MESH's closest coworking collaborator is StartupLab. Despite a missing coordination between the coworking spaces, the entrepreneurs

do frequent the coworking spaces in close proximity. Members contribute this to when being a part of the coworking culture, it automatically creates an awareness of the other coworking spaces nearby.

Two of MESH's memberships are a direct result of its urbanity, such as the community and work lounge membership. The guests using the free-of-charge community membership in the Backyard is a mix of students, freelancer, office workers nearby, parents with a stroller and random people passing by. The serendipitous nature of MESH would not have been possible if it was more secluded (ex. Fornebu) to the urban fabric or part of a homogeneous urban development (ex. Gaustadbekkdalen). The work lounge is a direct result of a demand for an established working environment and meeting rooms central in Oslo by travelling businessmen, freelancers and those with secluded workspaces that make it hard to meet with clients and conduct business.

The metropolitan context also seems to bring with it not only business-related benefits, but also recreational. There is a walking distance to many clients, popular cafés, nightclubs or Sunday trips to the park. In the summer, many of them even go to the harbor or docks outside the city hall during their lunch break. MESH is very much part of their everyday life as it is their work life in the city.

Working culture

As mentioned, the profile of MESH includes a wide range and broad specter of entrepreneurs, but the majority of the community works in the tech and IT industry. What repercussions does this have for the working culture? The community seems unaffected by this fact. Although it has been observed that IT and tech workers have deeper technical discussions and bond much easier, the entrepreneurs from different vocations and the technicians here meet halfway, talking about aspects from both fields that are relatable. People connect easily, despite professional boundaries. The wide range and broad specter also forces the members to be more precise in their description of their professional activities, improving the way they communicate their project. This may have a direct link to MESH's criterion of the inherent attitude of shared knowledge in each of the members admitted.

Different memberships do imply where some members are allowed and not allowed to work. Such as the flexible are allowed to work in the coworking area with flexible desks on the 4th floor, while the ones with an enclosed office space are not allowed entry. It seems the variation of spaces has created such a strong urge in entrepreneurs of all memberships frequently moves around and work different places. Sometimes work is done in the kitchen, on the sofa, in the gallery or even those with an enclosed office space on a flexible desk, although only when it is empty up on the 4th floor.

The members seem very aware of the competence and the skills that can be found in their working environment. Although all the information is on Slack, the members contribute the culture of using each other to the low-key events, making it easier to take contact later on when professional issues emerge. As mentioned the work lounge is meant for travelling businessmen which is in town for a couple of hours or days and in need of an established culture or business environment. It can also be viewed upon as a private

third place for members with flexible desks. In a way the work lounge creates a meta environment at MESH, a working culture within a working culture.

Social culture

The social culture seems to be a direct result of MESH's main criterion of willingness to share. In another way, the criterion imposed is also an eclectic way of choosing tolerant and free-spirited personalities. The reasons for why the members chose MESH, was not directly linked to the professional community, but because of the vibrant and social nature. There is an attitude here, maybe due to the fact that people did not come for professional purposes only, they also came to MESH because of the social limitations of entrepreneurial work brings to it. The lone eagle could also be the equivalent to lone people, stripped of established corporate communities. The members at MESH seem to have come bond and interact with others. They seek eye contact, smile and greet when they see an unfamiliar face. Although MESH is the biggest coworking community in Oslo with its 300 members, there is a sense of a village mentality where everybody knows everybody and helps each other out.

It has to be mentioned that the prices in the Backyard is quite steep, making the kitchen one of the tightest spots for social interaction during lunch hours. Whether it is intentional or not, the entrepreneurs say the kitchen is too small in comparison to the 300 members at MESH.

The iconography of events does change how the members perceive MESH as a vibrant place, some entrepreneurs explains its effects on the energy and atmosphere in the working environment, even though they do not attend the events. Small things such as the Monday breakfast, Wednesday lunch or Friday beer, or bigger launch parties or corporate events it creates parallel social environments that exists alongside each other.

1st floor

2nd floor

3rd floor

4th floor

Memberships
- □ basic membership (community)
- □ worklounge
- ■ flexible desk (clean desk)
- ▨ fixed desk
- ▨ enclosed office space (office)
- ■ administrative unit
- ■ meeting room

Work - Pleasure
- ▨ pleasure
- ■ work
- ▨ work/pleasure

Private - Common - Public
- □ public
- ▨ common
- ■ private
- ▨ private/public
- ▨ private/common

Spatial analysis 1:1000

Central Oslo 1:15.000
From the perspective of the members.
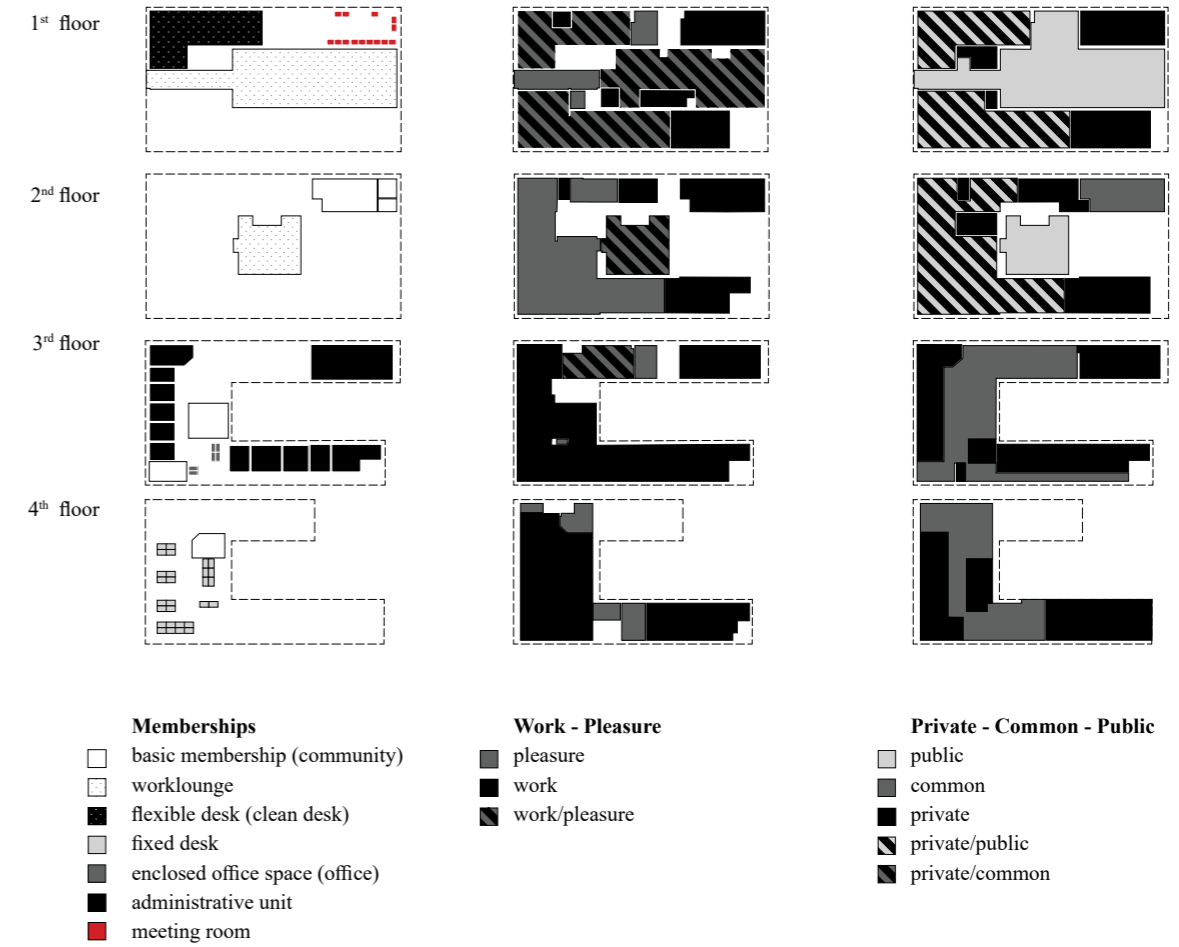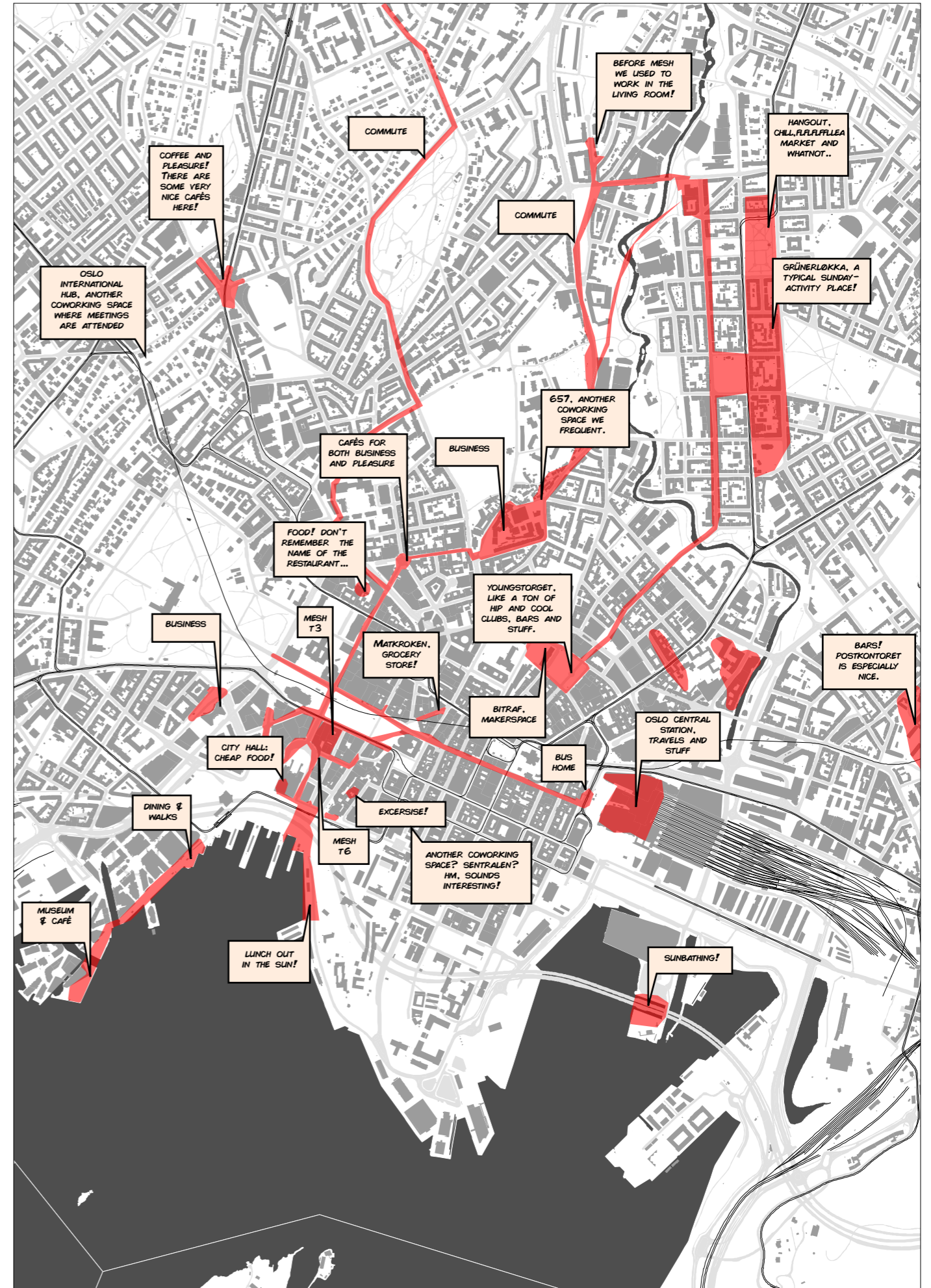
MESH, Tordenskiolds gate 3, scale 1: 250
Axonometry.
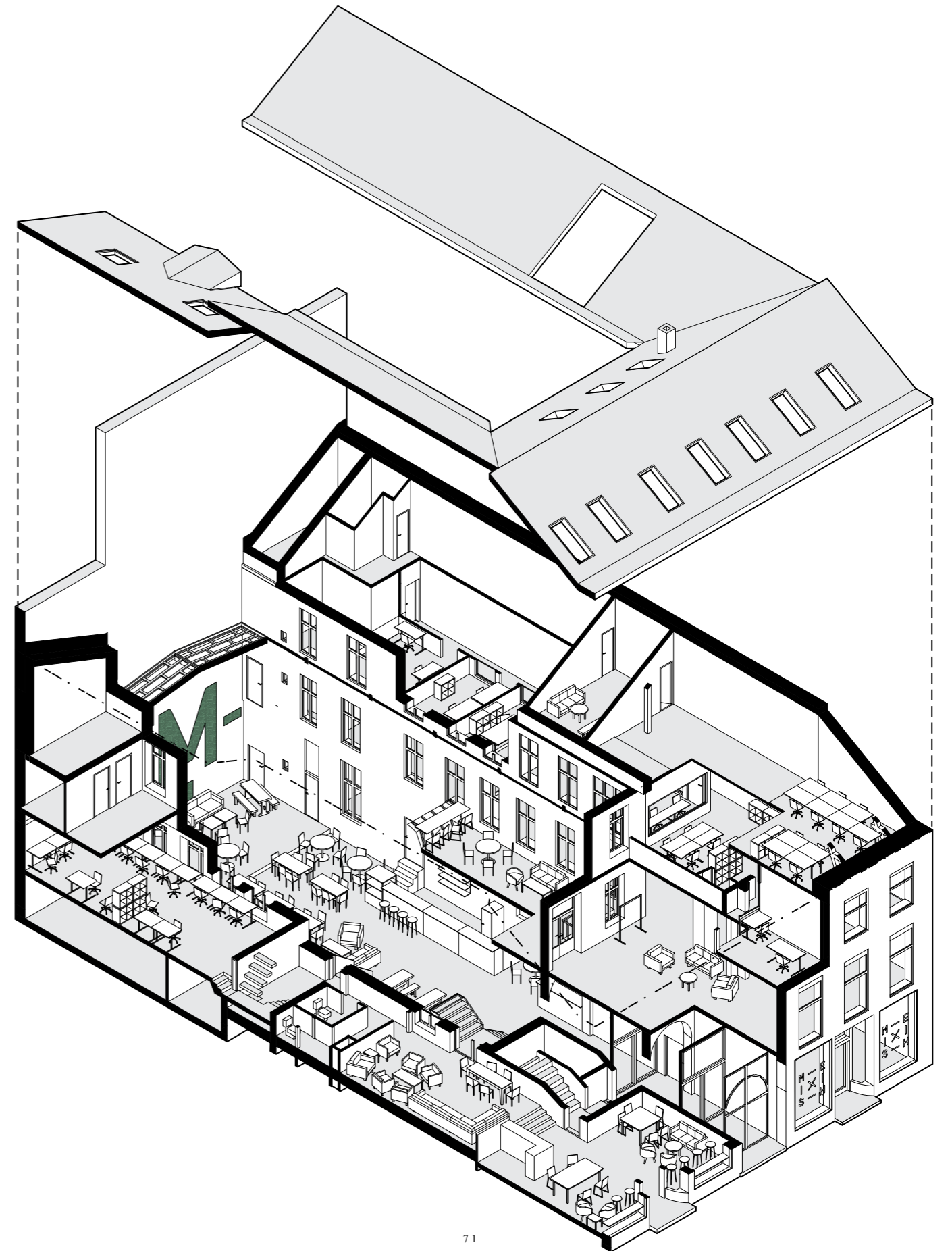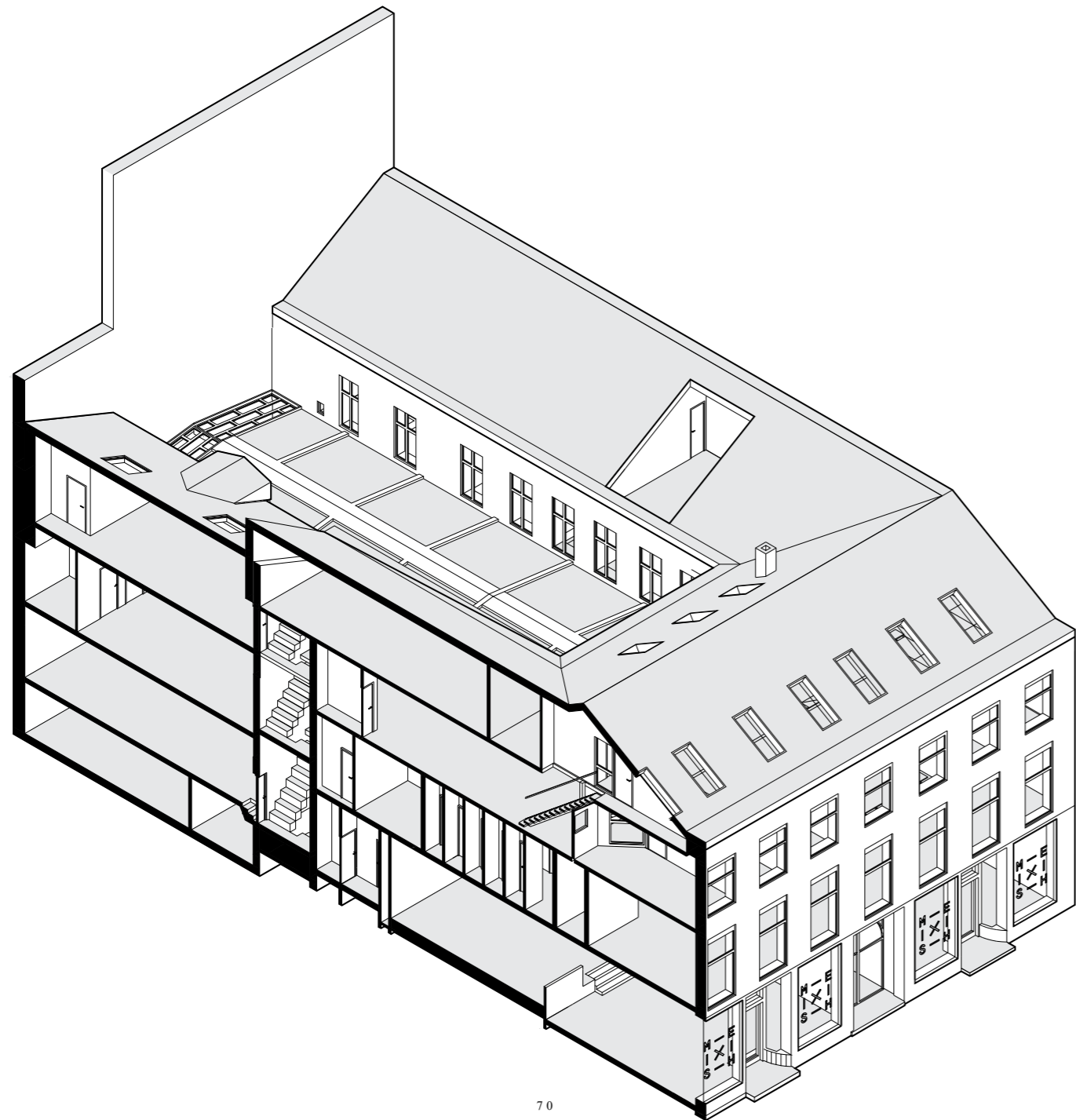
MESH, Tordenskiolds gate 3, scale 1: 200
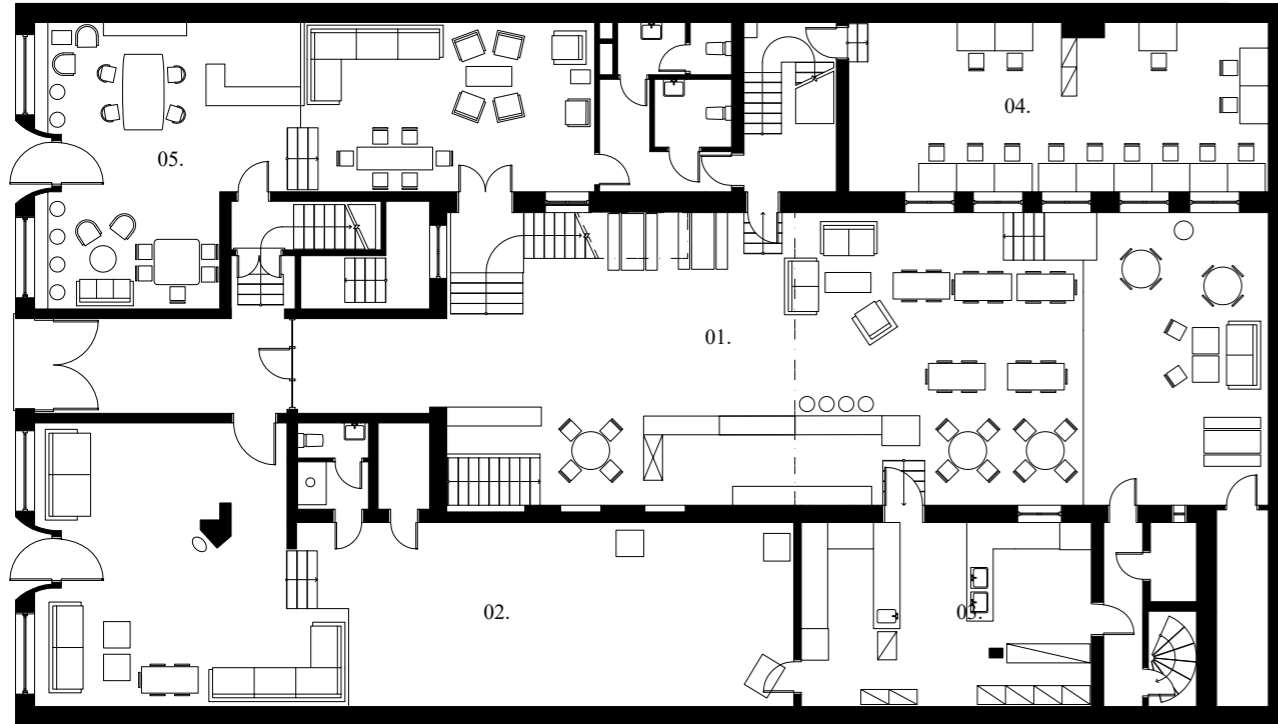
1ʳˢᵗ Floor. 1. backyard, 2. gallery, 3. kitchen, 4. administrative unit, 5. work lounge.

2ⁿᵈ Floor. 6. mezzanine, 7. lounge, 8. bar, 9. storage, 10. meeting room.
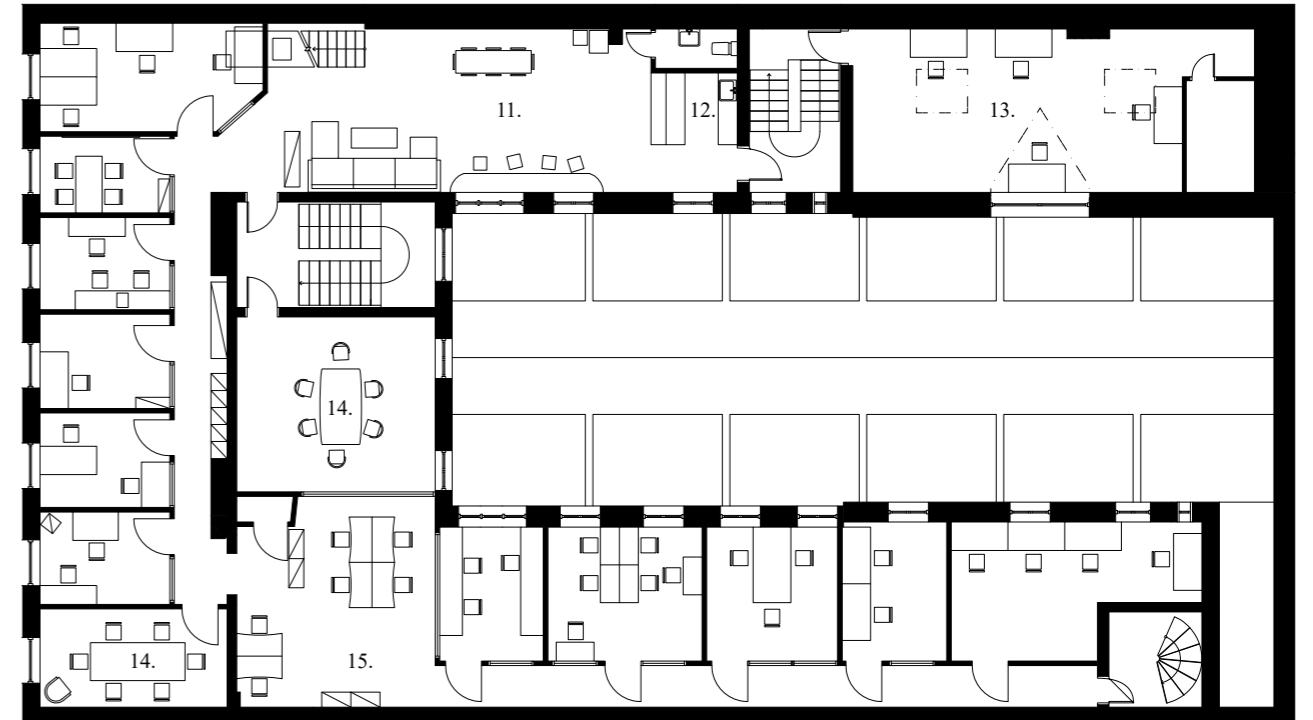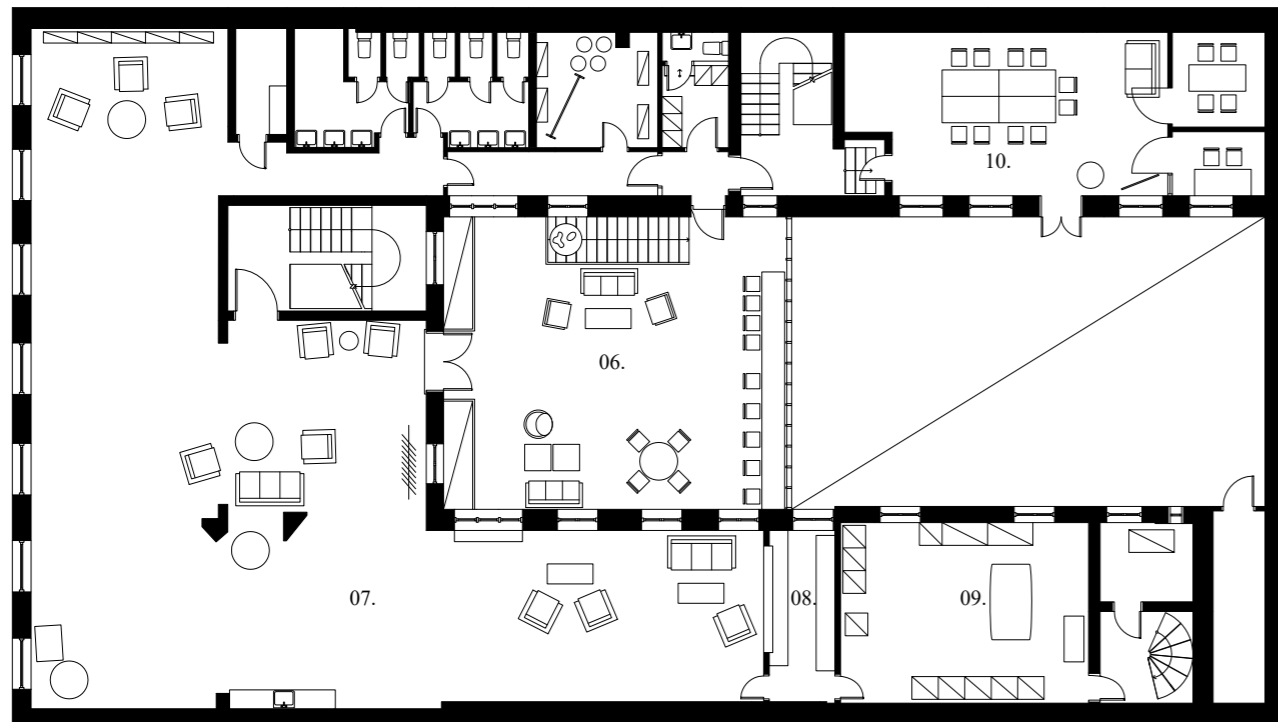
3ʳᵈ Floor. 11. dining, 12. kitchen, 13. enclosed office space, 14. meeting room, 15. coworking area (fixed desk).

4ᵗʰ Floor. 17. coworking area (flexible desk), 18. meeting room, 19.loft, 20. technical room, 21. terrace, 22. storage.

MESH, Tordenskiolds gate 3, scale 1: 200
From the perspective of the members.
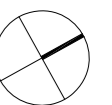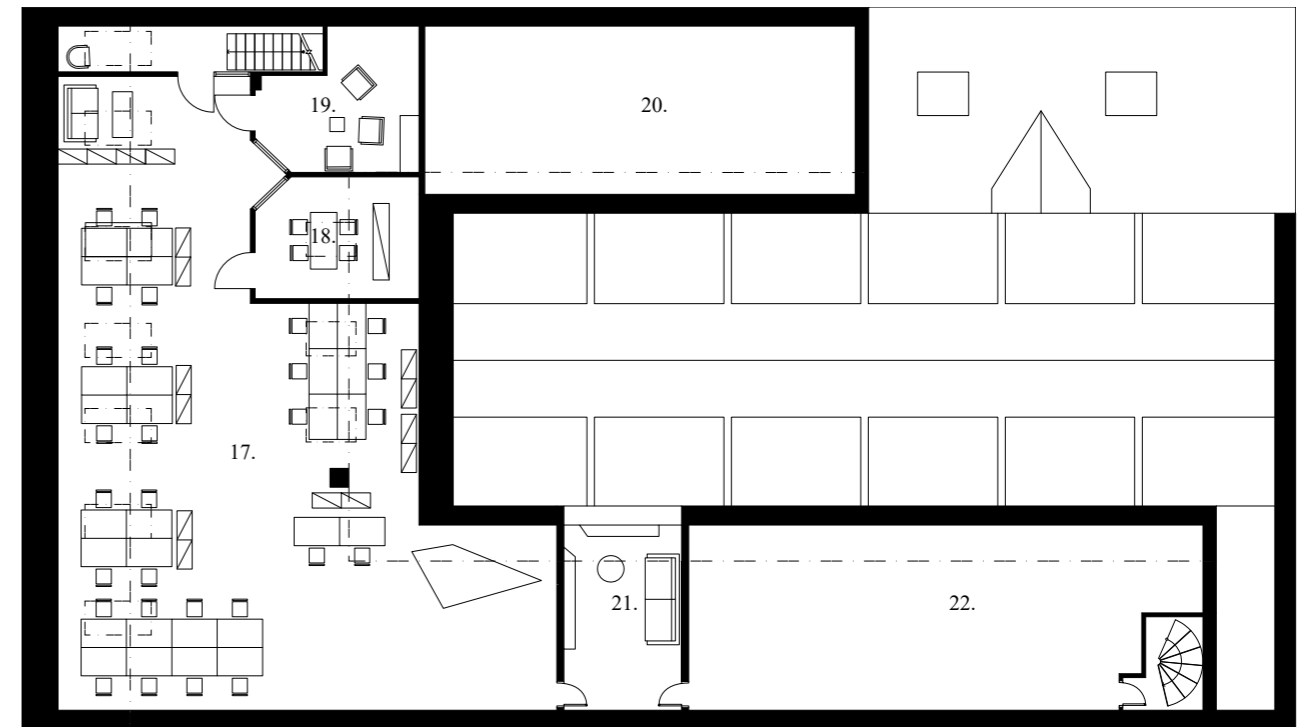
MESH, Tordenskiolds gate 6, scale 1: 200

2ⁿᵈ Floor
1. meeting room
2. coworking area, fixed desk
3. kitchen & dining
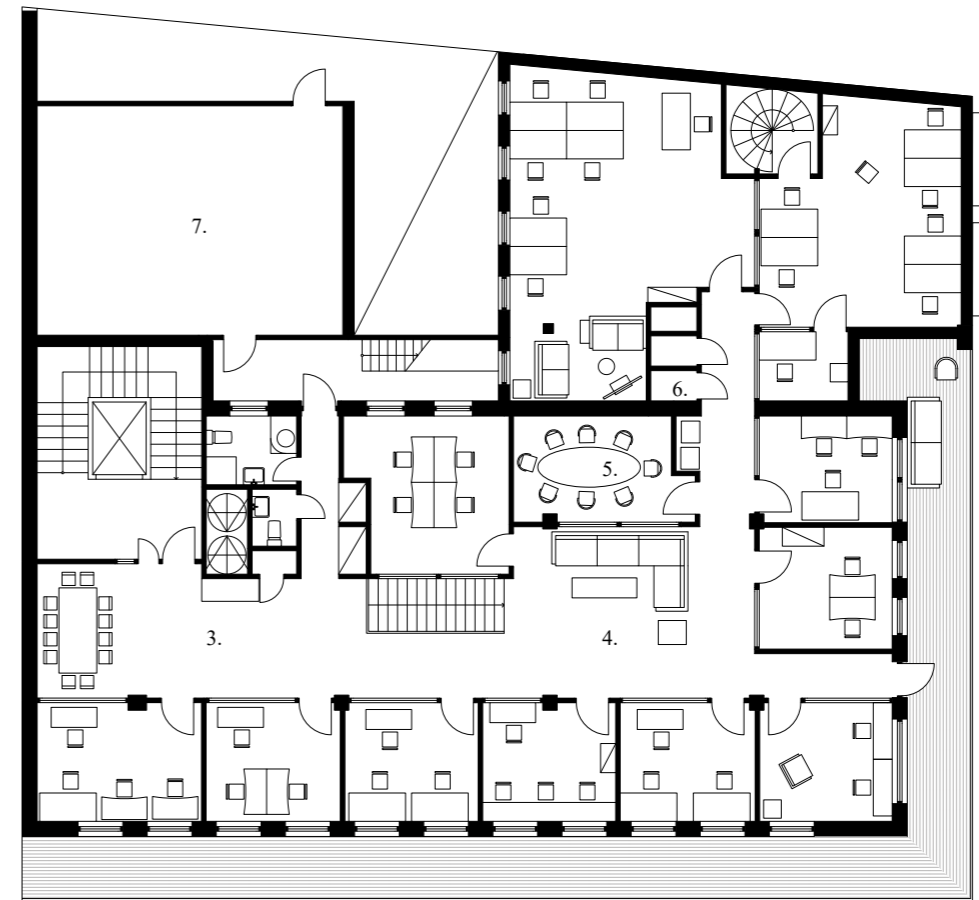
8ᵗʰ Floor
4. coffee & dining
5. meeting room
6. booth
7. technical room
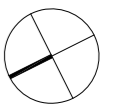
Tordenskiolds gate 3 (T3)
1. Main entrance
2. The backyard
3. Kitchen
4. work lounge
5. The event team carrying away the furniture
6. The community manager in a discussion with the chef about chorizo sausages
7. Backyard with the M logo
8. Storage room with the ping pong table folded away

Tordenskiolds gate 6 (T6)
1. Enclosed office space 1
2. Enclosed office space 2
3. Meeting room
4. Enclosed office space 3
5. The common space on the 8th floor
6. The view from the top balcony
7. Serendipity in the hallway
8. Enclosed office space 4
9. Meeting room 2, storage room

1.

2.

3.

4.
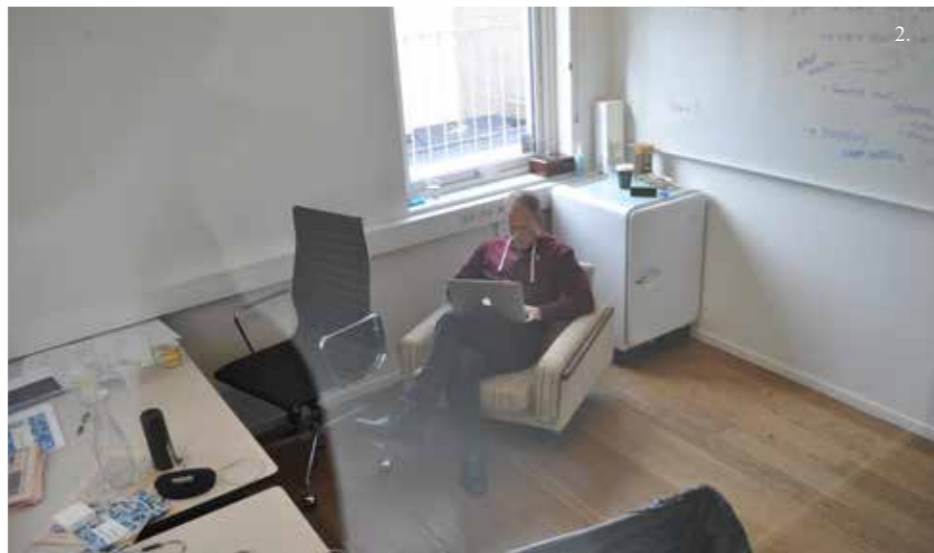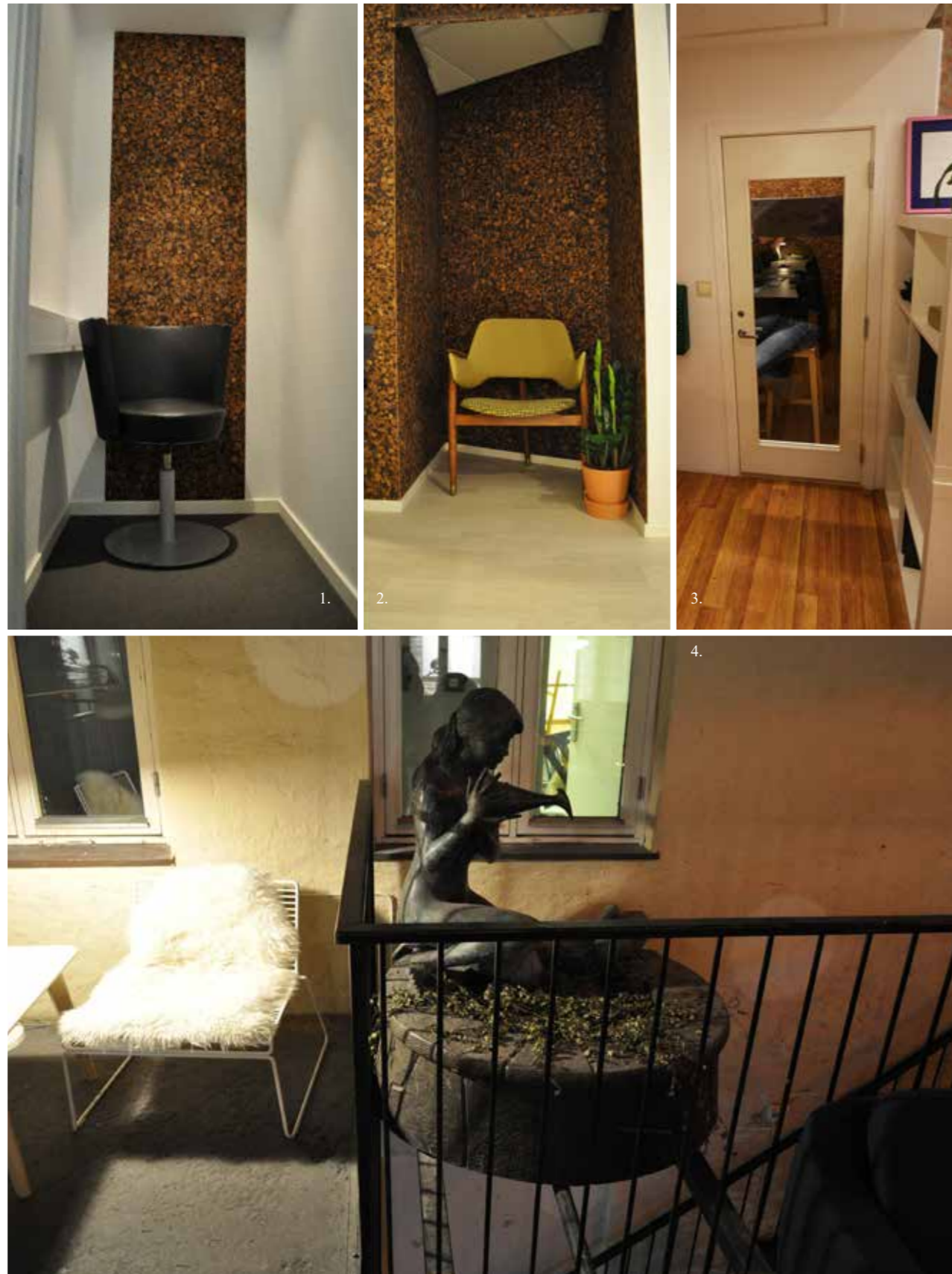
Oddities of MESH:

1. 1m^2 relaxation booth
2. 1m^2 sitting spot
3. 1m^2 relaxation booth
4. A statue of solid rock hovering above the stairwell
5. Loft, with a sitting group
6. Coffee area with a napkin dispenser on the door
7. Hammock

5.

6.

7.

8.
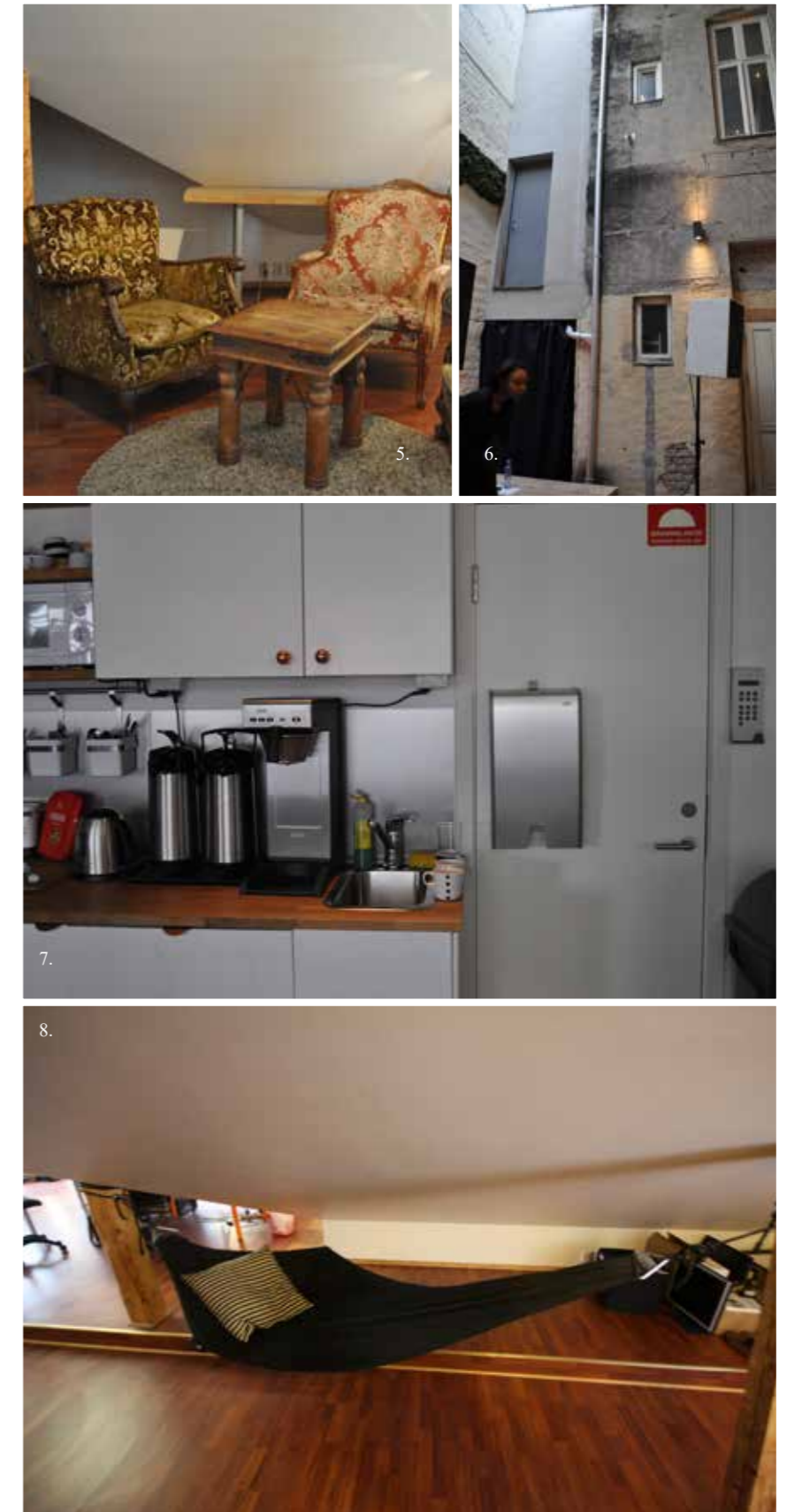
4.9 CASE STUDY - STARTUPLAB

Introduction

StartupLab was established in 2012 as a coworking space meant to capitalize and commercialize the intellectual property existing in close proximity of the research, Gaustadbekkdalen and the University of Oslo. It is located in the building named Oslo Science Park, or more commonly known as Forskningsparken in Norwegian. Forskningsparken is also used as a brand for the entire Gaustadbekkdalen area, hence the metro station being named Forskningsparken. Oslo Science Park brand is owned and funded by Oslotech, which includes StartupLab. Oslo Tech independent organization meant to stimulate business growth in Oslo.

The history of the building, branding and the surrounding development strategies are of interest here. the term science park is treated more as a brand and not an industrial complex, the building (established in 1986) was meant to mimic the synergies described in the literature about the science park. At the time, the building housed four relatively big companies that basically co-existed with no interaction. The StartupLab was envisioned as an effort to address this issue within Oslo Science Park, a community that has lasted for almost 3 decades.

To understand the complexities of StartupLab's location and it is important to mention the different development strategies Oslo Science Park is part of (Johnstad 2003: 5, 47), which has lasted for almost a century with the acquisition of the Blindern site for educational purposes. From micro to macro, the different strategies are:

- Oslo Science Park, or Forskningsparken, the brand of a building and Gaustadbekkdalen.
- Gaustadbekkdalen, an area with the co-location of commerce, research and education in IT and the soon-to-be Life Science Center expected to finish in 2022.
- The University of Oslo, or Blindern campus, the bigger education and research context.
- Oslo Science City, a major co-location of University, University Colleges, hospitals, organizations etc. within a 1,5 km radius of the University, which represents 33% of the research activity in Norway. All of these actors were meant to benefit from 3 synergistic axes.

Management

The administrative unit, or the so called team consists of 7 members, ranging from incubator manager (equivalent to community manager), PR- representative, data analyst, office manager, investor manager etc. The team do also offer legal and business advice to corporate counseling. The administrative unit has an impressive track record and extensive experience of both startups and major companies such as Telenor, Opera software, WiMP etc.

Oslo Science City 1:30.000
Intended synergy:
1. Blindern, Gaustadbekk Valley, Gaustad - Is an attempt to merge IT, biotech, medicine, health and commercialization of the research and innovation generated.
2. Blindern, Marienlyst, Majorstuen, Borgen - is an attempt to merge ethics, teology, beliefs, music, culture and is tested through NRK, commercial media corporate.
3. Blindern, Ullevål, Adamstuen, Lovisenberg - Is an attempt to merge and create an internationally recognized research and competence in medicine. 66% of the researchers is in this vicinity.
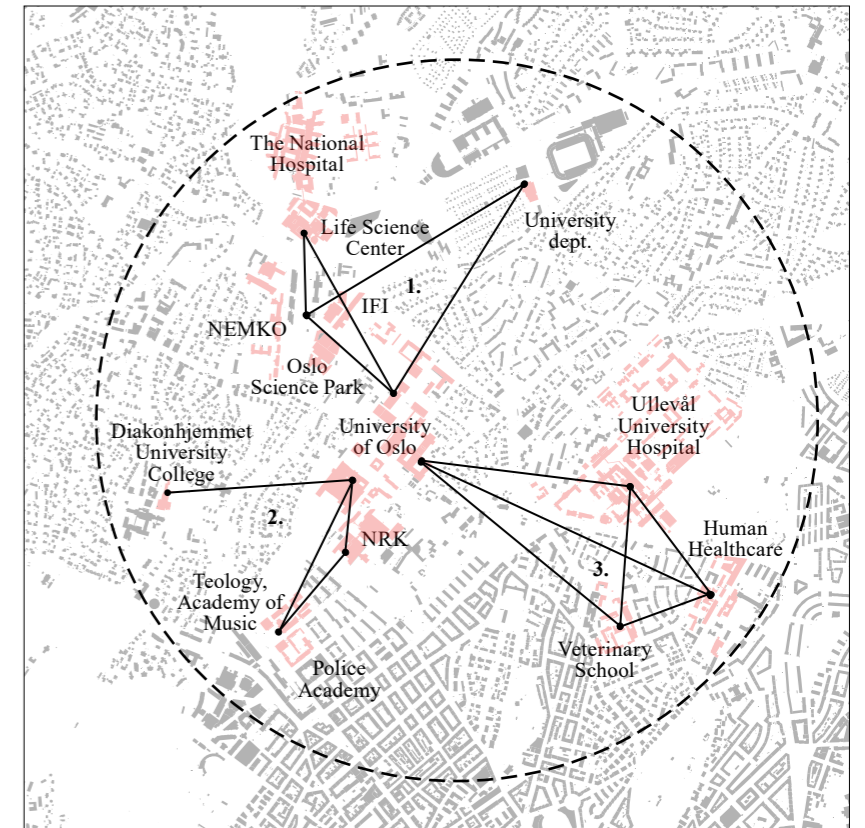
The management of memberships is of interest to study. Depending on the company's size, activity, compatibility and scope, the entrepreneurs are assigned, by Holmefjord the community manager, to various memberships based on these factors. Sometimes, Holmefjord eliminates some of the candidates applying for a membership if their ideals do not match StartupLab's profile. The criteria for entrance may sound simple, the startups must be IT and tech-related with scalable business model and product. The hard part comes in the rigorous and strict admission process based on StartupLab's virtues. Only the ones with the strongest business model and best team combination gets a membership. For example, a company consisting of only 4 coders is a weak business model. Consultancy companies are also not welcome in these types of communities, as they only provide service and does not innovate.

The space is managed through 4 different memberships, as mentioned which limits and enables the use of the facility. The memberships are listed as this:

- Basic membership: price not listed.
- Clean desk (flexible desk): 1790,- NOK. 16 desks.
- Open office (fixed desk): 2390,- NOK. 90 desks.
- Private office (enclosed office space): 5720,- NOK. 12 units, with approx. 2-4 entrepreneurs in each.

It is interesting though, to look at the background of those with basic membership, which include some major companies such as representatives from Telenor. It is assumed they hold their meetings at StartupLab to keep tabs on promising startups. Innovation Noway, an interest organization for entrepreneurship and innovation, is also a member at StartupLab, but only with a clean desk membership. A representative usually sits at the flexible desks to give advice and of course, to represent.

The members' average lease is between 12-18 months without any maximum timeframe. Although startups are encouraged to stay, especially the growing ones, StartupLab's rules of conduct do send mixed signals. Firstly, the startups are required to show results and success, one could imagine the repercussions if they do not fill the requirements. Secondly, the members are not allowed to hang up pictures or modify the workspace. StartupLab do not encourage permanence as the walls are wiped clean, desks on wheels. This is also the reality of dealing with startups, one has to get accustomed to dynamic changes, in which StartupLab do try to facilitate through their management and rules of conduct.

StartupLab's main attractor however, is their affiliation to the Founders Fund. This has been mentioned by many members as one of the decisive reasons for choosing StartupLab instead of other coworking spaces. Founders Fund is a group of both top tier investors and successful in-house entrepreneurs, that occasionally sits and wanders the "halls" of StartupLab. Founder Fund's extended network that StartupLab potentially can benefit from, include some of the world's leading technology companies, such as Google, Amazon, Netflix, Facebook and LinkedIn etc. All these factors comprised, places StartupLab as one of Norway's most advanced startup community and the only one in Oslo with a fully-fledged accelerator program. StartupLab also have connections the Catalyst, an accelerator program in Silicon Valley. It is not mentioned if this

Gaustadbekkdalen

StartupLab

Univesity of Oslo
Blindern campus

University of Oslo 1:15.000
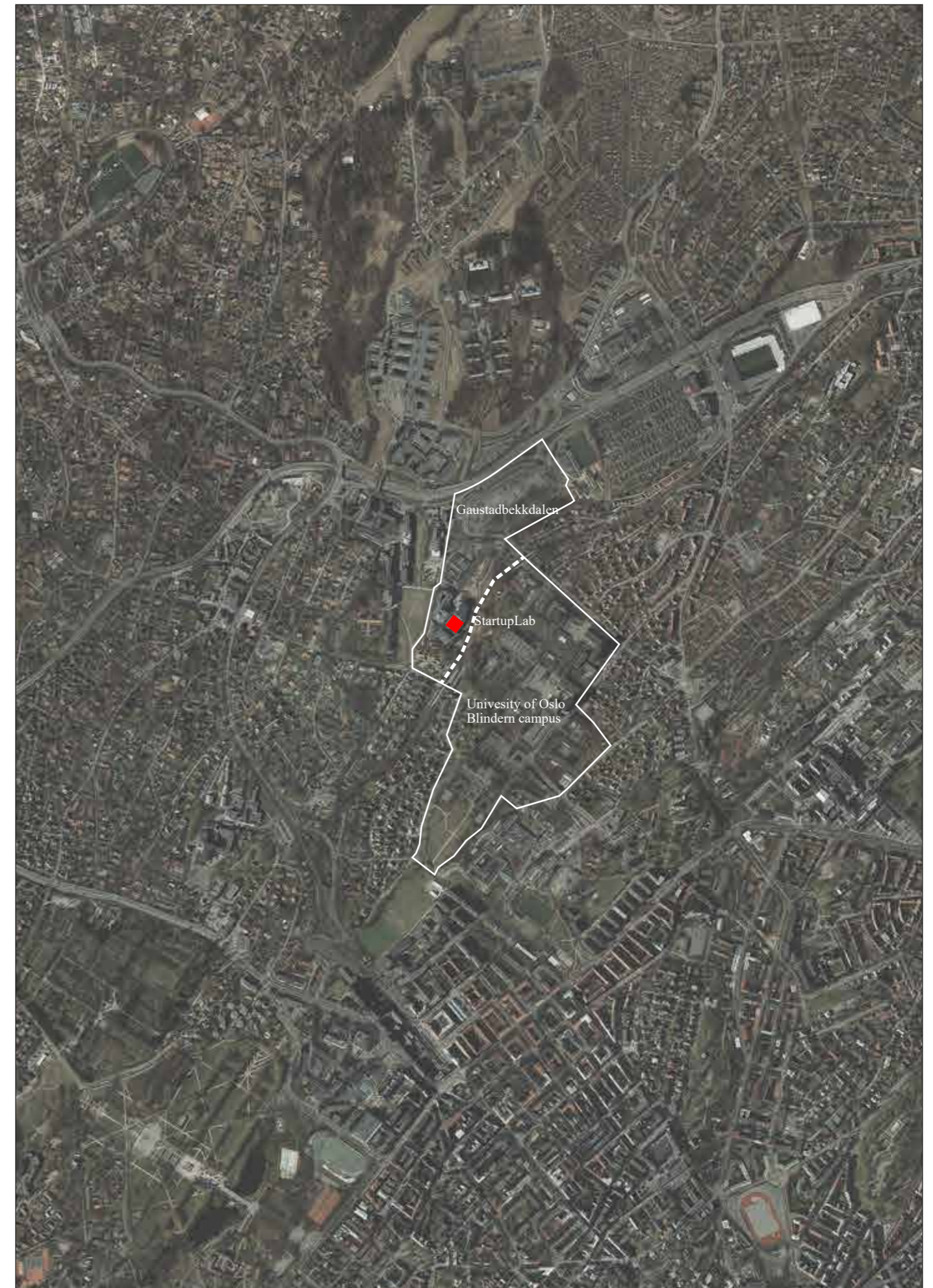
connection is based on Holmefjord's extensive experience and stay in San Francisco. It is a service to support growing startups with best possible resources in the world, to meet a more specific consumer base and get world-class advice etc. by sending startups to the Silicon Valley cluster and startup communities.

StartupLab host a number of events, but is mainly known for two very professional events called JoinaStartup and MeetCorporate. The first is meant as an open and recruiting event for the future generation of entrepreneurs. The latter is an event where members of StartupLab and figures from the corporate world is invited to mingle, share ideas and network. Other than these two StartupLab has their annual winter and summer parties and regular pitching events.

The future ambition and management of StartupLab will revolve around improving the community, and to a bigger degree include and involve the researchers and students on campus to be a bigger part of StartupLab. This is something Holmefjord mentions, may be lacking a bit at StartupLab.

Image and profile
The image of StartupLab is tech-savvy, highly competitive and research-based startups, also contributed to their context of heavy research in the fields of IT, bio tech, life sciences etc. in Gaustadbekkdalen. These factors automatically make StartupLab a niche coworking space giving them a strong profile without defining one. They have currently basic coworking, incubator (one of the few in Oslo), startup community as profile.
Their philosophical stances are mainly based around technophiliac, corporate and elitist virtues. As mentioned, parts of this may stem from the management and affiliations the place has to top tier investors and world class communities. Although StartupLab has a very corporate and elitist mindset, they are currently operating on deficit, in a way, they invest in the prestige of having the image of elitism and professionality.

Physical layout
The amenities at StartupLab range from fixed and flexible desks, enclosed office spaces, 6 transparent meeting rooms, mixed-used space/the atrium, kitchen, lounge etc. The facility is open 24/7. The space is divided between 65 companies with 160 members in total, with an average of 60-80 members frequenting StartupLab at all times. Based on these numbers, the percentage of how they sit boils down to this:

56% on fixed desks.
33% in enclosed office space, based on 53 desks inside the offices.
11% on flexible desks. Taken into account more members on the 16 clean desks available.

Although StartupLab provide a high number of enclosed office spaces for growing startups, the numbers above are clear on one thing: 67% of the entrepreneurs at StartupLab sits in the coworking space. This means that Holmefjord, the community manager, has a big task of organizing and managing the seating according to who can benefit most from each other and occasionally separate or potentially co-locate the ones competing, depending if competitiveness can create a positive dynamic or not. This is done mainly through Holmefjord keeping close tabs on who is doing what

and when and a physical intervention where he asks one of the party to either join up or move away. Quite big facility actually. The majority that sits in the coworking area however, are very scattered.

Every desk, shelf, dresser and the specific hanger/sofa mediator at StartupLab are on wheels, supposedly to signify the dynamic nature of startups, which is contemporality. Talking to Holmefjord, it is implied that the main purpose of the physical layout in the coworking area is an ever-changing working environment of entrepreneurs bonding across companies and forming new alliances pushing desks together. As most of the desks in the coworking area are fixed, the members do not move around. Two visits two months apart revealed that the physical layout of the furniture had stayed the same. The entrepreneurs corroborate this and observing little to no changes in the furnishing during their tenure at StartupLab, which ranged from 2 weeks to 18 months. It seems that the administrative unit have found their most efficient physical layout.

The meeting rooms at StartupLab are important and central. The translucent or glassed meeting rooms do generate peculiar situations at StartupLab, both in terms of physicality and management but especially in terms of handling the concept of serendipity production. One interesting aspect is the moment when one entrepreneur is in a meeting and one waiting outside for the meeting room. There is a moment of eye contact implicating a greeting or small talk is necessary before the transaction of the room can be completed. The glass walls therefore have a direct role in the serendipity production at StartupLab.
Every member of StartupLab are also able to keep tabs of what is going on in other companies and to the extent of exploiting the transparency. For instance, when a startup company at StartupLab had a meeting with the Olympic champion and alpine ski racer Aksel Lund Svindal, some of opposing entrepreneurs were able to calculate the exact moment when the meeting was over and casually or "coincidentally" run into Svindal, replicating or faking serendipity.

There is also peculiar situation of the old-fashioned booking system. To book a meeting room, the entrepreneur has to write his/her name on a whiteboard on the glass wall outside the chosen meeting room. This forces the members in dire need of a meeting room to show up even earlier, making a competition out of booking meeting rooms. To put even more strain on the situation, there is also the aspect of fixed desk members using it as a quiet zone away from the noisy and busy coworking space.

The atrium is a mixed-use space and is often cited as the most appreciated spaces in the facility. The atrium, consist of a major bench centerpiece with irregular sitting groups with green pillows creating a variety of sitting spots. It also has a couple of trees planted in it, with a ceiling height and exposed stairwell leading up to the 4th floor and a view of the sky, leading to an entrepreneur dubbed it, "the urban jungle". It is the space that works as a mediator to the serious tone in the coworking space of StartupLab. The members do not only mention the pragmatic use of the space, but also its aesthetic values of the atrium, the major source of daylight, as opposed the nauseating artificial lighting in the coworking space.
Urban implications
The location is well-connected in the urban fabric, to both metro and tram and ring road 3. The

administrative unit believes it to be a contributing factor to startups of merit choosing StartupLab. As mentioned, StartupLab is a part of several complex development strategies, from science park (Gaustadbekkdalen and Blindern campus development, not Oslo Science Park itself), to the botched science city scheme (Johnstad 2003: 47). As mentioned in the introduction, StartupLab is a coworking space meant to capitalize and commercialize the intellectual property existing in close proximity of the place. There is one essential question to be asked, has StartupLab managed extract the benefits of its context of heavy research, education and commerce?

In a way, yes. StartupLab attracts highly skilled and promising entrepreneurs from all over Norway. Only 25% of the startups at StartupLab has ties to Blindern or Gaustadbekkdalen. The rest stems from all over Norway, most notably from the Norwegian University of Science and Technology (NTNU). Some of this can be attributed to StartupLab's strong image and profile, their elitist and corporate virtues, management skills and affiliations. It might also be speculated if the complexities of its urban context, the image that it is a part of a major research community, part of a campus and the future home of Scandinavia's biggest research facility in Life Sciences with location in Gaustadbekkdalen, contribute to its effectiveness as StartupLab.

Holmefjord admits that StartupLab is a very introvert community, the members do not speak or interact with other faculties, companies or in other meeting grounds on campus or in the area, such as Fredrikke, the common cafeteria for the entire campus. He has observed that the members of StartupLab do not use the amenities the campus has to offer, not Fredrikke or even the cafeteria in the Oslo Science Park. If the members do, they usually bring their food back in here. The members at StartupLab do corroborate Holmefjord's statements. The only urban amenities used are the local grocery store, the library, and the local student pub.

This relates back to one of the most sought after and enduring traits in the 21st century industrial complexes, the true autonomy which StartupLab has achieved. In this case, StartupLab is so autonomous, it is almost self-sufficient and a secluded entity to its urban context. It may appear so that StartupLab peddles more on the image of being in a heavy research context, than actually gaining anything from it. During the interview rounds, the reason why the entrepreneurs chose StartupLab was not because of its physical context or urban location, but because of their affiliation with Founder's Fund, and preconceived idea of a major cluster of education and research, mainly attributed to the image of the campus at Blindern.

Working culture
Many members consider the working culture, or the expertise and professionalism, the biggest asset at StartupLab. Apart from StartupLab's affiliation with Founders Fund, other major companies such as Telenor have a basic membership at StartupLab as mentioned in the management segment. It is to have an overview of promising startups and talents. A startup community, especially an elitist one such as StartupLab do dictate some exciting circumstances, as one member mentions for instance, is the rewarding and interesting talks he with his peers, when every single one in the working environment is either their own bosses, senior managers etc. the discussions are more fruitful, especially in an elitist startup community such as StartupLab.

There is an unmistaken tone over the StartupLab, a sense of professionalism and seriousness, with long work hours and so busy the entrepreneurs between them forget about each other. As mentioned, the majority of StartupLab's members that sits in the coworking area, generating some peculiar situations and a mentality of concentration and work mode. Many people in a tight place also brings with it an increased volume. This has led to many using of noise-cancelling headsets in the coworking area, especially the coders. It is considered a faux pas interrupting somebody with headsets on. For example, there was an instance where two neighboring startups, where one had a technical problem and the other with the technical solution to the problem. As focused as many members at StartupLab are, It was only after when the company came back from Boston looking for a solution that they found out their neighbor had the answer all the time. They are currently cooperating on the project.

There is another question of interest in this segment: are the researchers a contributing or integral part of the working culture at StartupLab? As it is intended with any cluster or science park strategy? It is important to question StartupLab's stance on the idealism behind the symbiosis between researcher and entrepreneur, since it in fact was StartupLab's first intentions when it was established. As described in the literature review, it is a well sought after symbiosis any industrial complex would like to possess, StartupLab included. There is today few to none researchers sitting in the coworking space.

Holmefjord who has observed this as a recurring trend, tries to give his personal explanation to why this is so. He believes that researchers and entrepreneurs are in fact, two different breeds. Researchers are a huge asset to any institution, when he or she reach the point when it is marketable, they either develop it even more or research on something else, that is the essence of a researcher. So for a researcher to waste his/her expertise in marketing and finance would be a waste of resources and vice versa. It has yet to be proven right or wrong.

Social culture
However, being a part of an elitist and top division startup community can sometimes be at the expense of a social culture. This has caused a divide of space in the sub consciousness of the members at StartupLab. Relaxation, mingling, casual chit chats, informal meetings, networking etc. does not happen at the desk in the coworking area, but when brewing coffee in the kitchen. As mentioned in the physical layout segment, the atrium works a blurred space between work mode and recreational mode, a space to do both, free from any unwritten rules. The noise-cancelling headsets is often mentioned creating an isolated working environment in the working environment itself. Holmefjord has observed these headsets being used in order to focus more on the work and for a competitive and market oriented society they are also a good sign, however for the social life they have a negative impact. The mental state that the coworking area imposes has caused many of the members to seek the common areas for refuge and contemplation, such as the kitchen and the atrium. The events ease up to hectic work life at StartupLab.
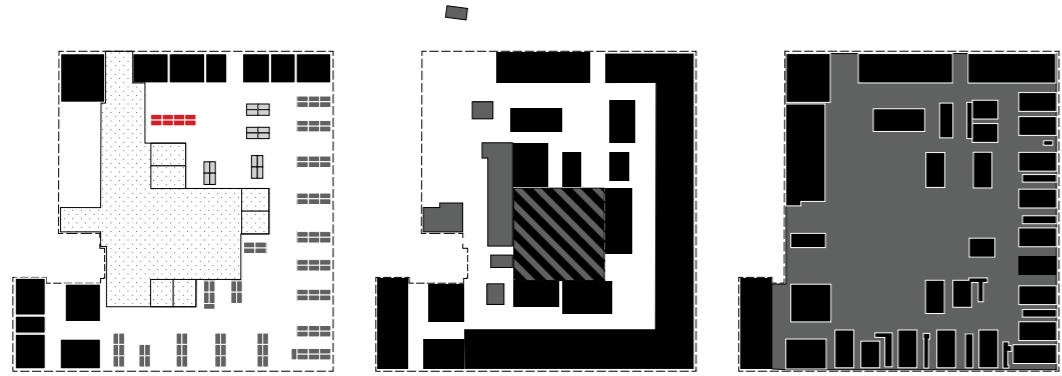
Memberships

- ☐ basic membership (community)
- ■ worklounge
- ▨ flexible desk (clean desk)
- ▨ fixed desk
- ■ enclosed office space (office)
- ■ administrative unit
- ☐ meeting room

Work - Pleasure

- ▨ pleasure
- ■ work
- ▨ work/pleasure

Private - Common - Public

- ☐ public
- ▨ common
- ■ private
- ▨ private/public
- ▨ private/common

Spatial analysis 1:1000

StartupLab

Fredrikke

STUDENT PUB AKA. ALCOHOL!

OUR BACKDOOR LEADS TO BLINDERN METRO! PEOPLE ASSUME FORSKNINGSPARKEN METRO IS CLOSER!

BUNNPRIS, CHEAP FOOD FROM THE GROCERY STORE!

University of Oslo 1:15.000
From the perspective of the members.
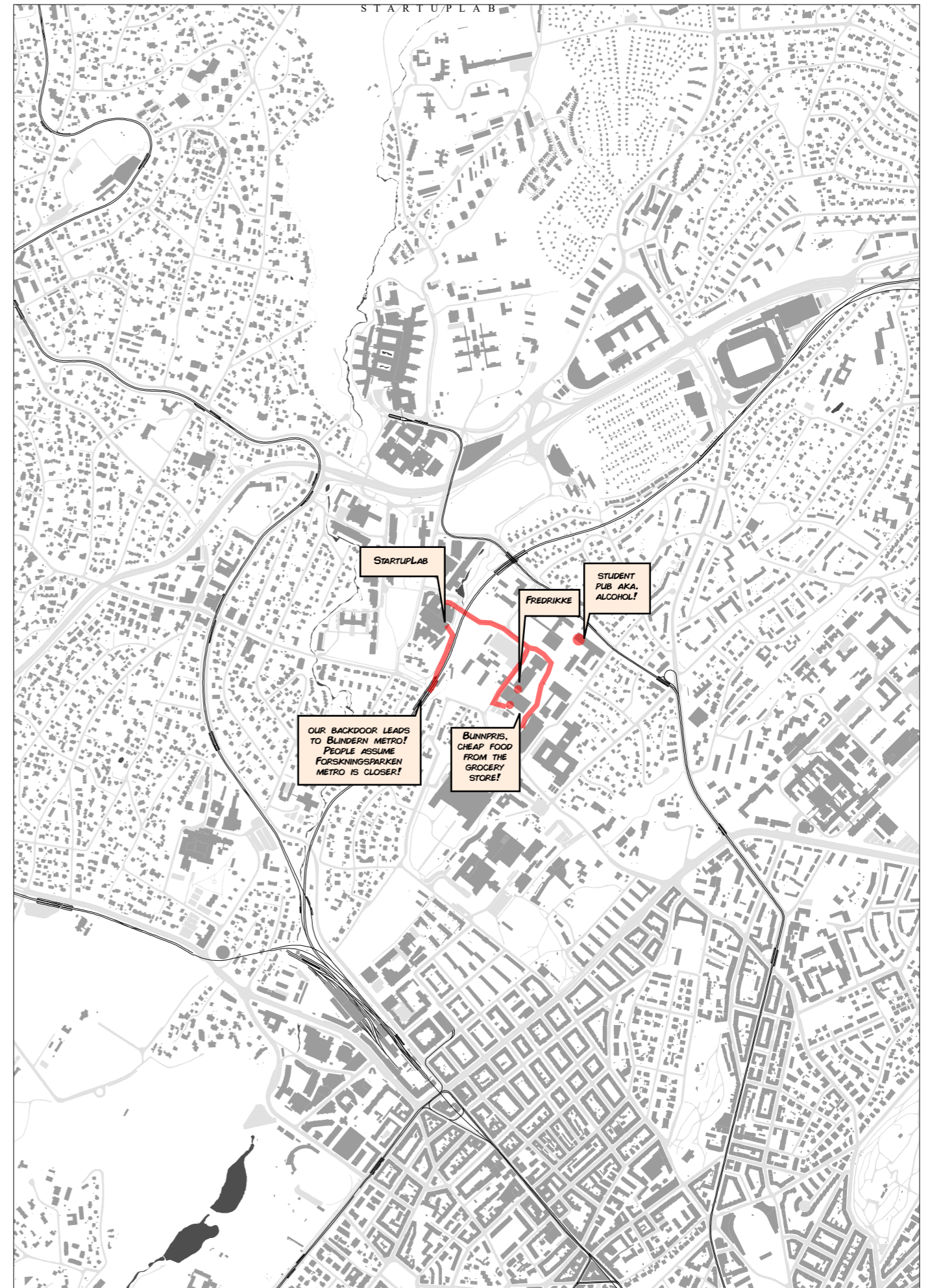
StartupLab, Gaustadalléen 21, scale 1: 250
Axonometry
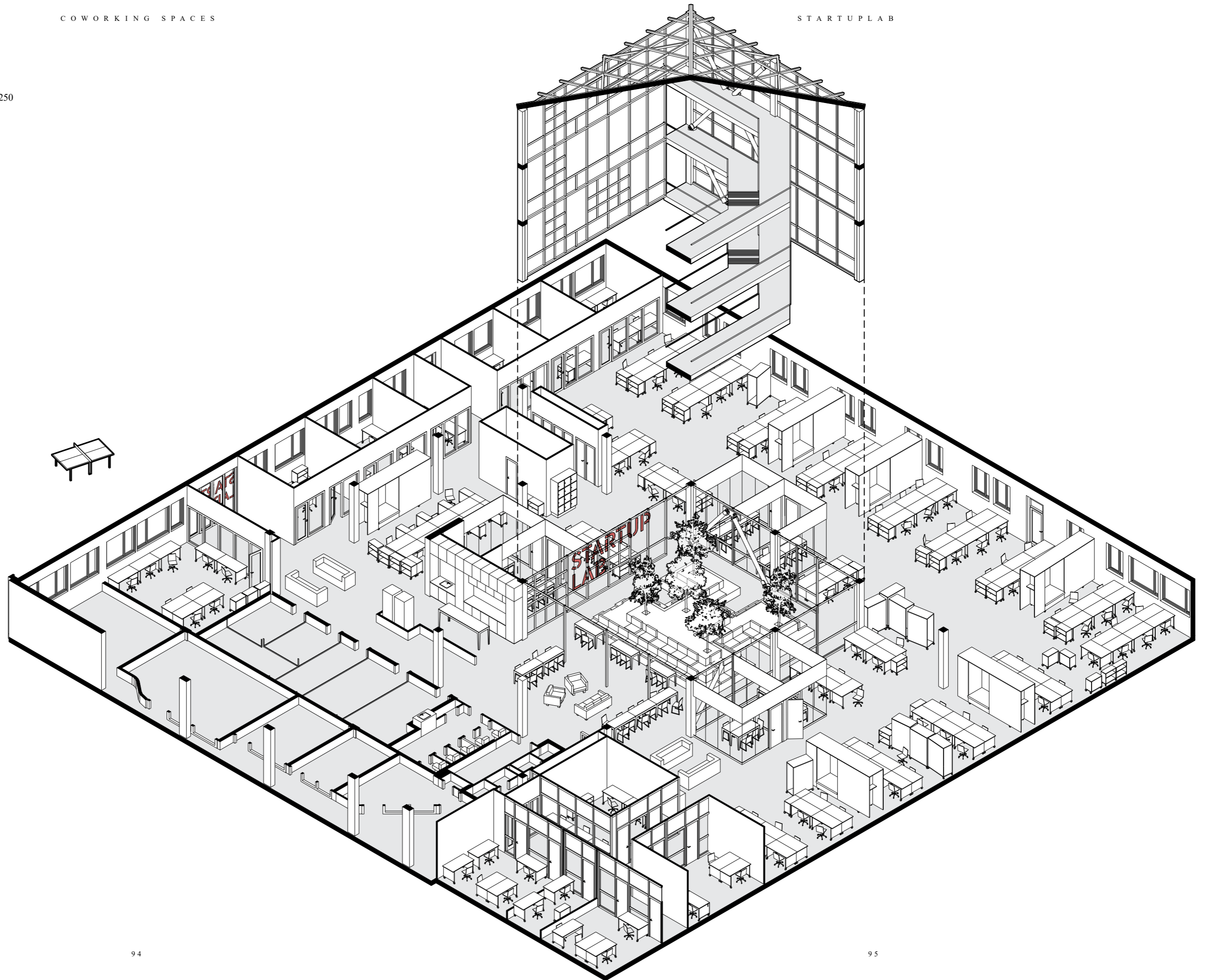
StartupLab, Gaustadalléen 21, scale 1: 200
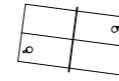
4th Floor
1. coworking area
2. flexible desks
3. kitchen
4. servers
5. technical room
6. meeting room
7. atrium
8. administrative unit

StartupLab, Gaustadalléen 21, scale 1: 200
From the perspective of the members.
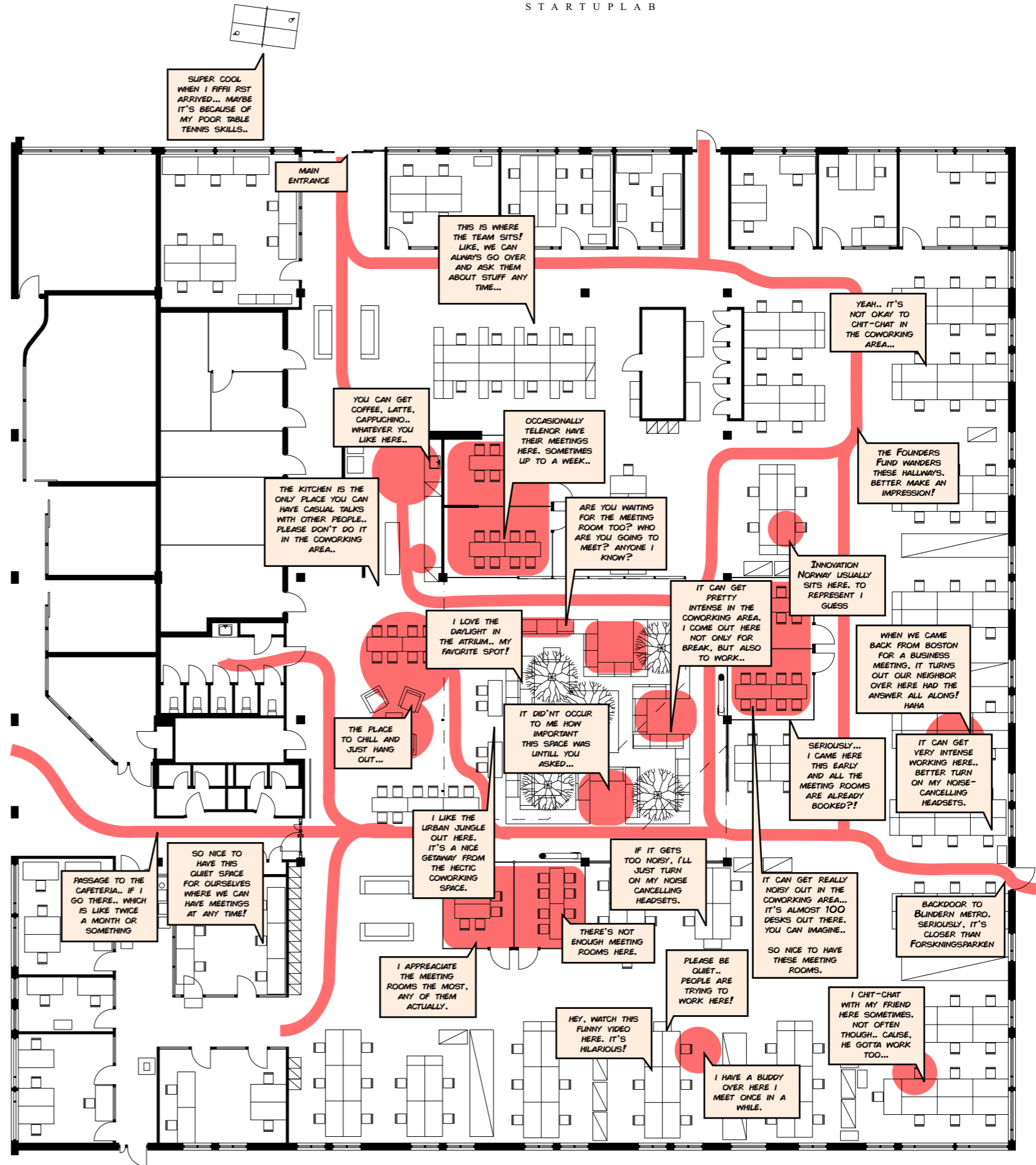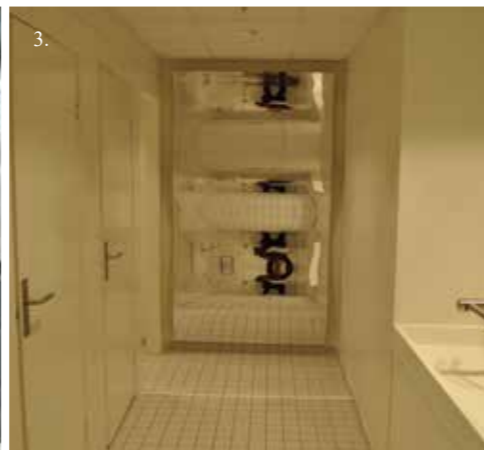
1. Oslo Science Park (Forskningsparken) with the IT department on the right
2. Entrance to StartupLab and the ping pong table
3. Toilet with peculiar mirror
4. Transparent meeting rooms
5. Kitcen area with natural daylight from the atrium

1. The atrium
2. Enclosed office space
3. Coworking area
4. Common space looking into the atrium

4.10 CASE STUDY - THE SIMULA GARAGE

Introduction

The Simula Garage was established in 2012, as a startup-related coworking space meant to create a symbiosis between the researcher and the entrepreneur, by literally placing the entrepreneurs in the center of the renowned Simula Research Laboratory. The Simula Garage is indirectly owned by the Ministry of Education and Research (Kunnskapsdepartementet), who again run the Laboratory, an autonomous non-profit research organization. Simula itself have ties and affiliations in relation with some courses with the University of Oslo. To avoid any confusion, the Simula Research Laboratory will be referred to the Laboratory, while the Simula Garage will be referred to simply as the Garage. Simula will be used as a term for both communities.

considered to be a research facility of international excellence (Reve & Sasson 2012: p.323). It has also been evaluated by the Norwegian government as the best research lab in the country (Simula homepage) within the fields of networks, distributed systems, scientific computing and software engineering. First, it is of importance to understand the complex development of Simula's context. Simula is located in Fornebu, a peninsular area bordering western parts of Oslo and became the topic of further development when it was determined that the Oslo Airport was to be relocated to Gardemoen in 1992. Fornebu became a hot topic for urban development, leading to the government issuing 3 guidelines for Fornebu:

- The main goal should be residential densification.
- The beach and other parts should be secured for recreational use.
- Business and commerce should be limited to existing built area.

In 1993 Fred. Olsen & co. initiated a successful campaign for a high-tech cluster strategy with the relocation of Telenor headquarters as the centerpiece, backed up by government funding. So when the Laboratory was established in 2001 it was envisioned part of this strategy scheme. 2001 was also the year the IT bubble burst, causing every investor to back out of the cluster development in Fornebu. As a result, Laboratory became the sole research facility of Fornebu. Fornebu's fate was sealed in 2004 when an unfavorable Oxford report was published, leading to the government to cut off funds entirely to what was supposed to be a beneficial union of research, education and commerce.
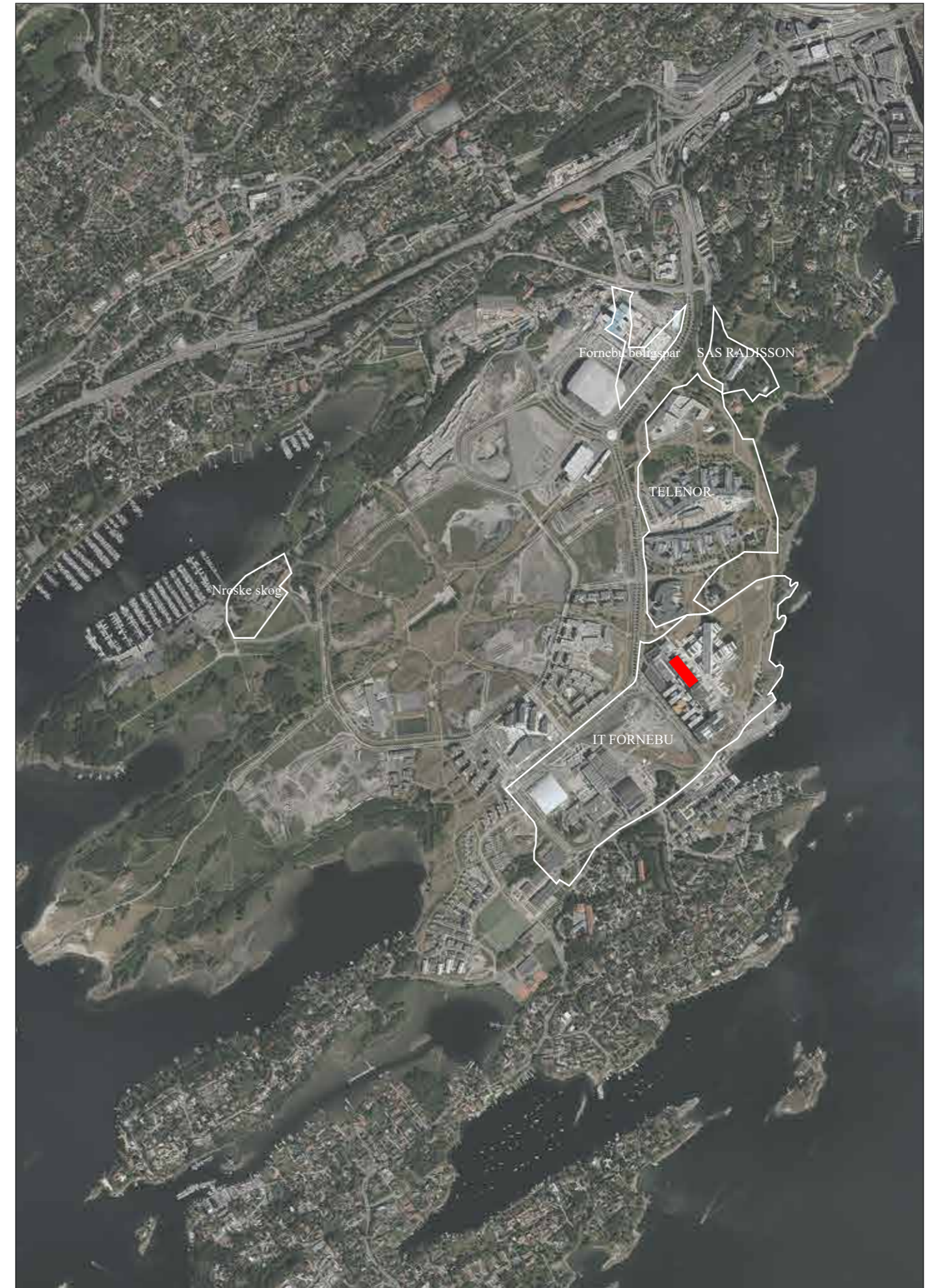
The main land owners in Fornebu 1:15.000

Management

The administrative unit of the Garage consists of 2 people and Jonas Archer the project coordinator (equivalent to the tasks of the community manager). The administrative team is also the same one for the Simula Research Laboratory. This also decreases the administrative cost of running the Garage.

The coworking space is managed through only one type of membership, clean desks (free desks), encouraging its members to roam freely between desks and form new relations every day. Observations reveal that the members prefer to have fixed desks and proceed in the coworking space as such. This dynamic is mainly challenged by the leasing agreement, where the members' maximum lease of the coworking space is 1 year. The members are all signed in January each year. The membership fee is completely free-of-charge, no strings attached and is generally a unique quality in the context of startup-related coworking spaces. The Garage is currently 1 of 2 coworking spaces in Oslo which offers free services, the other being TUben which opened 6th of April 2016. The member/startup ratio of 20/40 frequenting the facilities. To follow up on their no-strings-attached policy the administrative unit do not meddle with how much time their members stay in office or what kind of business model they have. The Garage wants to give their members free reins to pursue whatever entrepreneurial ideas they have.

Simula is mainly a research facility do not house any incubator functions within. It is therefore of interest to mention Simula's close ties to the VRI[2] program. It is the Research Council of Norway's main initiative targeted towards research and innovation at the regional level in Norway. Each single startup can apply for a grant of 250.000 NOK to acquire and finance the salaries of researchers, develop and redeveloping products, services and processes that the startup may need (Simula homepage 2). It is mentioned by the community manager and the members as an important source of income the members take us of to acquire funding, as the Garage has no direct affiliations with investors etc.

The Garage's future ambition is to create more success stories out-of-the-garage (a reference to Jobs), or successful generations who have ties to Simula, so the future entrepreneurs and members here can benefit from. Also, to revise the management of memberships of signing on the entire community in January, meaning all the members will be moving out the same time due to the one-year rule. To put it bluntly, any working culture amassed has to start all over again. Archer notes that he will spread the signing dates throughout the year, so to retain some sort of continuity of social and working culture.

Image, profile and criteria

The Garage's image is to serve the greater good without any personal gains, a safe haven for vulnerable ideas and to support the idea of Norwegian entrepreneurship and to take the research Simula is sitting on out into the market. The main point the Garage tries to make, is that it is only through hard and earnest work that innovation happens. The Garage has technophiliac and altruistic virtues and their profile is mainly basic coworking and startup community.

2 written with upper cases and not an acronym), as explained on the Research Council's homepage: *"The VRI program is the Research Council's main initiative targeted toward research and innovation at the regional level in Norway. The primary objective of the VRI program is to promote innovation, knowledge development and value creation through regional collaboration and a strengthened R&D effort within and for the regions".*

They are doing this by supporting only early IT-related startups and entrepreneurship, and offer a platform between researchers and entrepreneurs. More established startups will have to seek refuge at other startup communities or coworking spaces. The Garage pride themselves with an image of a place where serious work is done far away from the distractions of a startup community or a coworking space and the city. Their profile is a basic coworking space and a startup community. Without the typical characteristics of buzz, events and administrative interventions, it is very similar to the archetypical coworking spaces Moriset is describing.

The criteria for being allowed into this community is not strict, but specific. It must be IT related in the broadest sense, either it be hardware, software, apps, services etc. Another criterion is no consulting firms or established companies with real revenue. Their main target group is vulnerable and early startups without financial backing. The administrative unit do not add any criteria of personality or potential financial gains etc. As seen in MESH being wary of how active some members are, it is very present at the Garage that not all members frequent the coworking space. Some treats their startup as a part time job or even weekends-jobs only,

There are some core members that frequent the coworking space the most and have become friendly with each other. Meanwhile the rest that spend their afternoons, weekends and treat their startup company as part time job, have no relations those working at daytime. Some of the entrepreneurs note that even when their hours' overlap, the two factions feels like strangers to each other. Some events dedicated to this issue would have been beneficial.

Physical layout

The amenities that is dedicated solely to the Garage is a coworking space, lounge/workspace, 2 meeting rooms and Adam's office (part of the administrative unit). Archer the community manager sits in the middle of the coworking area. There are 20 flexible desks in the coworking area and 5 in the lounge. The rest of the amenities is provided by the Laboratory since the two share the facility, such as toilet, printer room, auditorium (Storstua, or the big living room), table tennis, pool, common area with coffee and fruit (Pusterom, or the breathing space), IT help, printers etc. The Laboratory is located on the 4th floor in the old airport terminal, now run by Technopolis who manages corporate office spaces in the building.

It is important to question the main characteristic of the Garage's free-of-charge business model and what kind of limitations does this set on the physical layout. The coworking space itself is not the prime square meters of the Laboratory or any other places in Fornebu for that matter. The Garage is placed in the residual and excess spaces of the research facility. It is placed underneath a skylight without in an open space, most likely kept open in order to give some daylight to the enclosed, or glassed Laboratory office spaces at the core of the facility. In the beginning the members went out more often, but have now gotten used to the windowless coworking area.

The coworking area also cuts off the walkways of 2 researcher-based offices, while keeping the walkways free for their own meeting rooms on the adjacent side. This can automatically create some tensions as the

coworking area are literally in the way of the office space and vice versa. The lounge which is mainly used by the members of the Garage, is sometimes also used by the researchers there. Although envisioned as an open office landscape, every piece of furniture (most are on wheels) such white boards, shelves, cabinets and banners has been used as blinds and walls to separate the workspace. The entire facility and planning of the physical layout is of such a low-key and random character; the entire setup can be taken down within a day. The best seats in coworking area are often cited as the ones that are sheltered. Although most of the furniture are on wheels, there have been little to no changes between February and late April.

Urban implications
The urban amenities Fornebu have to offer is a shopping mall, recreational parks, a 12-minute ferry trip leading to central Oslo during rush hours, residential, a restaurant, major headquarters with designed outdoor spaces etc. Yet, the only high-light the members mention is the grocery shop Kiwi as the place they frequent the most, located in the same building at Technopolis.

In the context of urbanity, it is important to question Simula's relation to the botched cluster development strategy: what benefits does the Garage reap from being in close proximity and amongst giants such as Evry, Statoil, Telenor, Aker Solutions etc.? Does IT Fornebu's outdoor and indoor area of the headquarters function as a meeting ground for the different professionals? Although not a fully-fledged cluster, did the members use the urban setting intended as such? Does IT Fornebu generate synergies or any serendipity production? The members mention little to no contact amongst other professionals in the urban setting. Archer mentions that Telenor used to send a representative over to the Garage before his time. The entrepreneurs confirm the same. Both members and Archer mention that it is far too inconvenient to go to their neighboring building Statoil for example, without a reason or to mingle. On the other hand, the urban seclusion and isolation seems to have worked in favor of the profile and image of the Garage. All the members interviewed favored the urban seclusion and image of earnest and hard work at the Garage instead of the super-competitive and tech-savvy StartupLab or MESH where events and networking is part of the daily life. This may reflect the view of the entrepreneurs, urbanity simply does not matter, and may in fact, be a distraction to their work.

Working culture
The important aspect of Simula's working culture is the intended symbiosis between the researcher and the entrepreneur, since the entire premise of the Garage is built around this fact. Although the VRI program has generated 8 collaborations, it is still an artificial symbiosis, since the VRI funding is being used to bankroll expertise. Or to put it bluntly, to buy off a symbiosis between researcher and entrepreneur. According to the members and the community manager, this is not an autonomous occurrence as they have seen little to no symbiosis between the two factions. As the community manager Archer himself has connect people with common interests, which requires that he keep tabs on all the business activities at the Garage at all times, and also in relation each of the researchers' individual expertise etc. As mentioned, the Garage do not meddle with the startup's business model and try to let them be as autonomous as possible.

There is also the aspect whether shared knowledge and discussions play a vital role in the working culture. Some entrepreneurs' states that the intellectual property stays within each startup. Even though the Garage is a homogenous technophiliac startup-related coworking space, the IT operations of each company are so specialized it is hard to imitate in deep technical discussions and a shared knowledge culture. It is mentioned that it is not the deep technical discussions the members benefit most from, but the act of communicating an idea to others. The members are forced to rethink, reformulate and make that idea of their startup clearer.

The altruistic virtues and free reins of business activities and image of earnest work, and that in itself is the sum of success. These values do pose an interesting working culture in the context of coworking where networking and socializing is of importance. The Garage is completely without distractions of events, buzz and networking, and the atmosphere at Simula gives a sense of professionality and seriousness where events and parties are considered as shallow in comparison to the development of the startup company. Some even mention that the social coffee breaks and games of table tennis were very distracting. Or as Archer puts it: "the real work lies in many hours hard and earnest work, not out at cocktail parties talking to investors". It also houses a working culture where it is okay to waste 6 months, where it is possible to test, fail and readjust accordingly so. Some of the entrepreneurs that were formerly members of StartupLab, say they likened the Garage over StartupLab.

Social culture
Because the Garage's unconditional criteria of entrance and no focus on events, mingling and networking, this does affect the social culture. Unconditional is meant as in relation to personality, ambition and the state of the company that are granted entrance.

The ones that frequent the coworking space the same time, that are around the same age, with same type of startup and ideology get along better. But the other ones who may be studying or doing a school project, or proceed with their startup as a part time job will to a certain degree, alienate themselves from social culture at the Garage.

As stated in the physical layout segment, the Garage is an artificial implementation into the working environment of the Laboratory, without any roots in entrepreneurship in the daily operations of Simula. in an attempt to create a symbiosis between these two, the administrative unit may have created a divide instead. It may have created a social hierarchy at Simula, where there are researchers who actually feed into the knowledge pool of Simula, and the entrepreneurs who are there for personal gains. Therefore, two different creative or social classes, with different purposes and agendas.

Mmberships
- basic membership (community)
- worklounge
- flexible desk (clean desk)
- fixed desk
- enclosed office space (office)
- administrative unit
- meeting room

Work - Pleasure
- pleasure
- work
- work/pleasure

Pivate - Common - Public
- public
- common
- private
- private/public
- private/common

Spatial analysis 1:1000

LYSAKER STATION. BUS-TRAIN TRANSFER. FINAL DESTINATION TO GET HOME, AS NONE OF US LIVE IN FORNEBU!

FORCED TO TAKE A TRIP AROUND STATOIL HQ.. WILL NEVER HAPPEN AGAIN

VOLLEYBALL!

THE BUS STOP IS HERE SOMEWHERE. GOTTA GET HOME AFTER LONG HOURS AT SIMULA!

SWEET BATHING SPOT! DISCOVERED IT WHEN I WAS WORKING AT FORNEBU

THE SHOPPING MALL. BOUGHT A CABLE HERE.. ONCE..

FERRY BACK TO THE CITY! TAKES LIKE 15 MINUTES!

THE SIMULA GARAGE

KIWI, CHEAP FOOD FROM THE GROCERY STORE
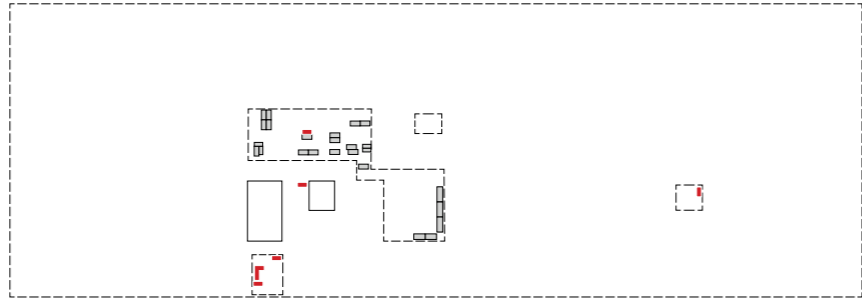
Fornebu 1:15.000
From the perspective of the members.

The Simula Garage, Martin Linges vei 25, scale 1: 250
Axonometry
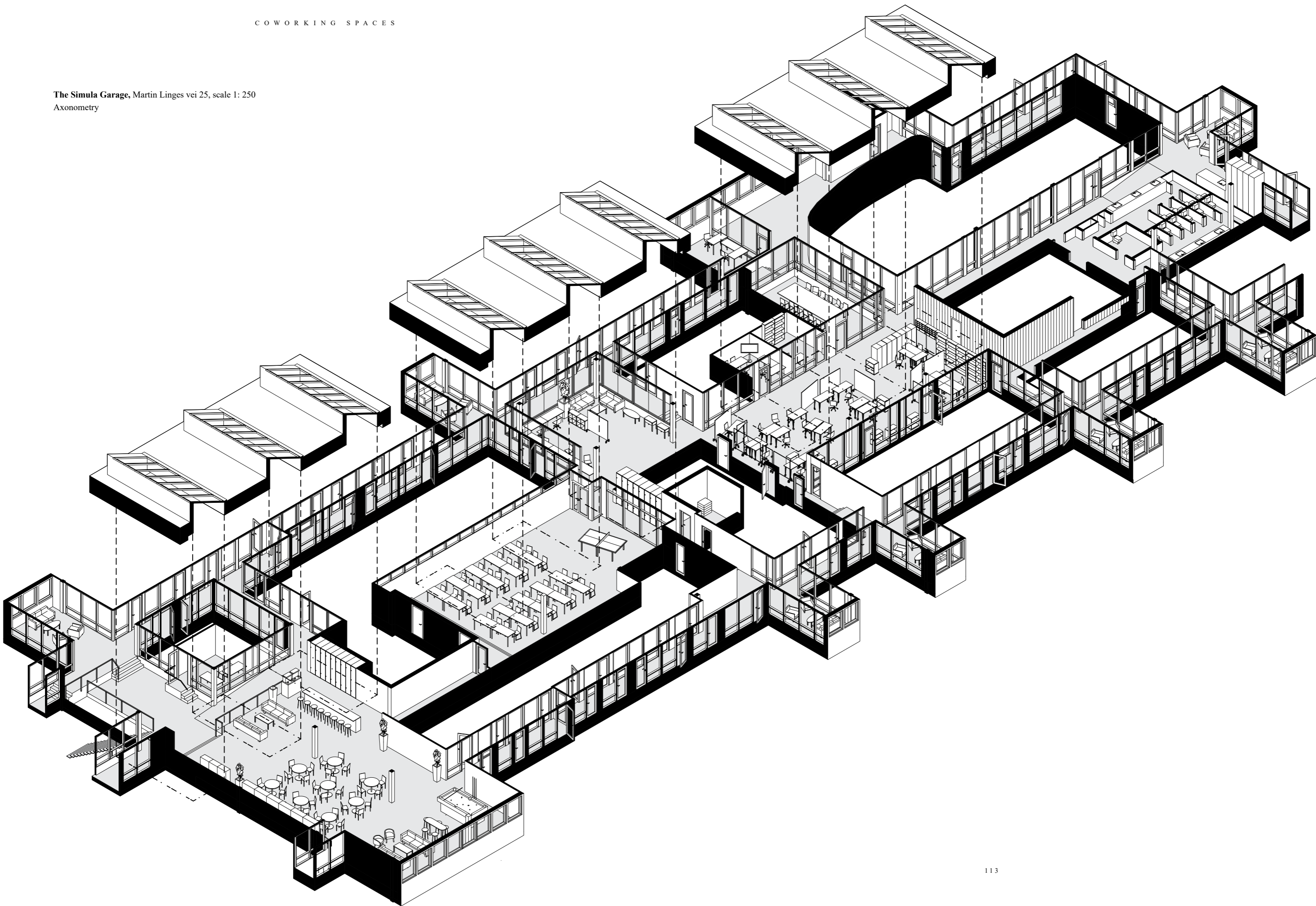
The Simula Garage, Martin Linges vei 25, scale 1: 200

4th Floor
1. Coworking area
2. Lounge
3. Storstua, auditorium
4. Pusterom, common area
5. the community manager's desk
6. meeting room
7. Adam from the administrative unit
8. IT department
9. printer room
10. kitchen/coffee machine

01.

02.

03.

04.

05.

06.

07.

08.

09.

10.

11.

04.
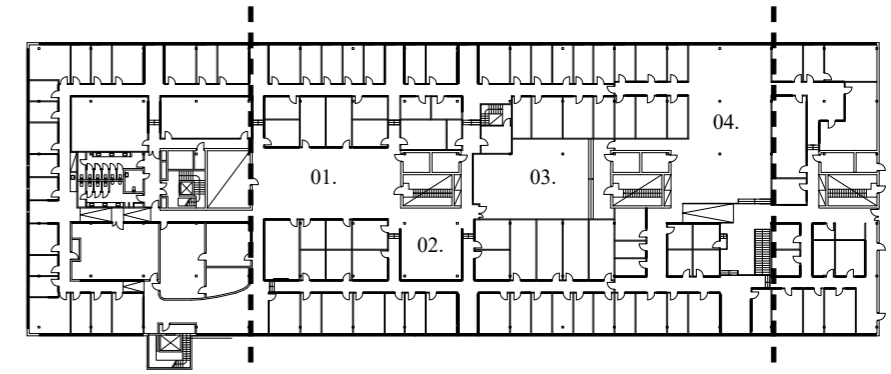
The Simula Garage, Martin Linges vei 25, scale 1: 200
From the perspective of the members.
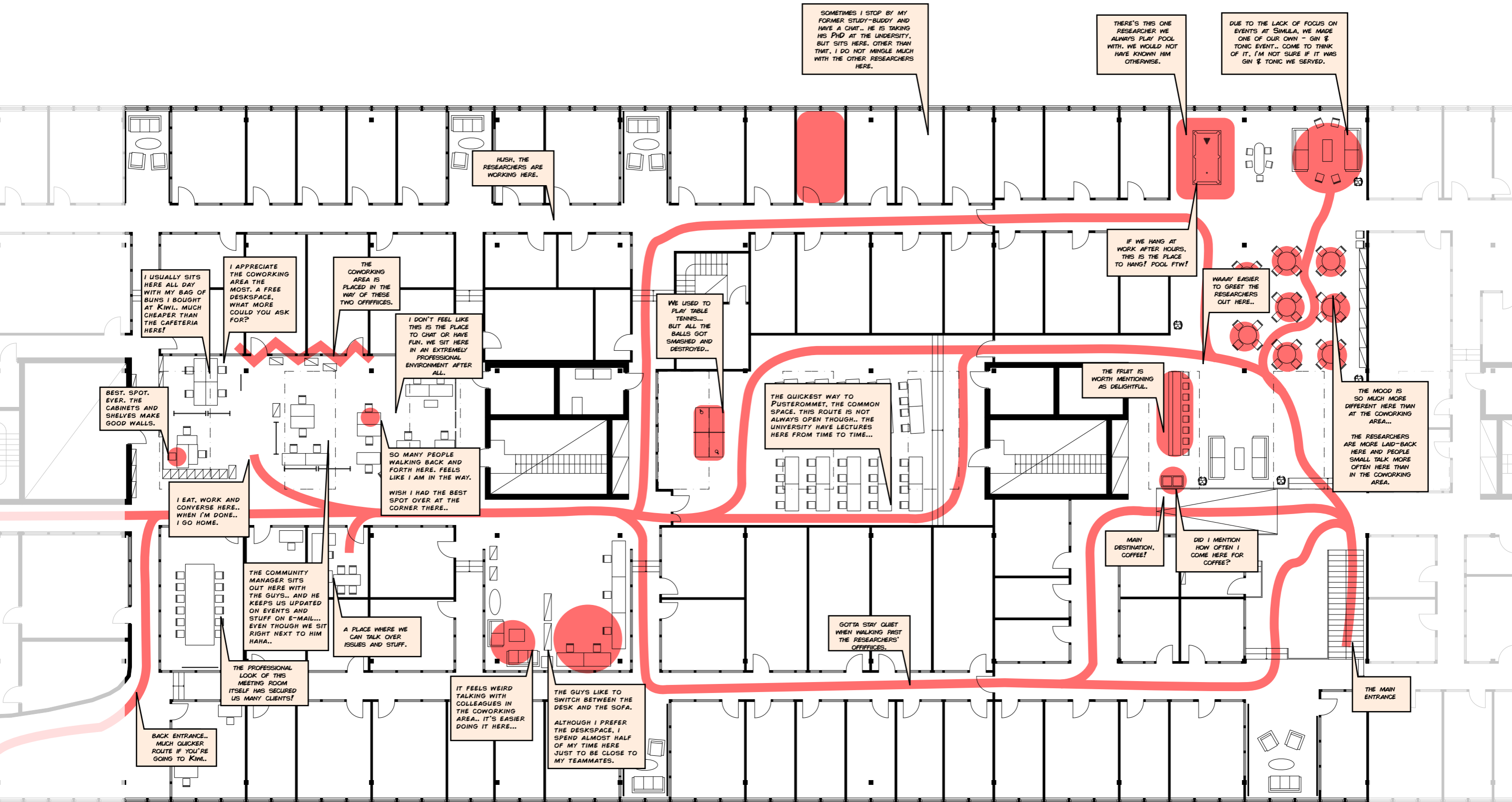
1.

2.

3.

4.
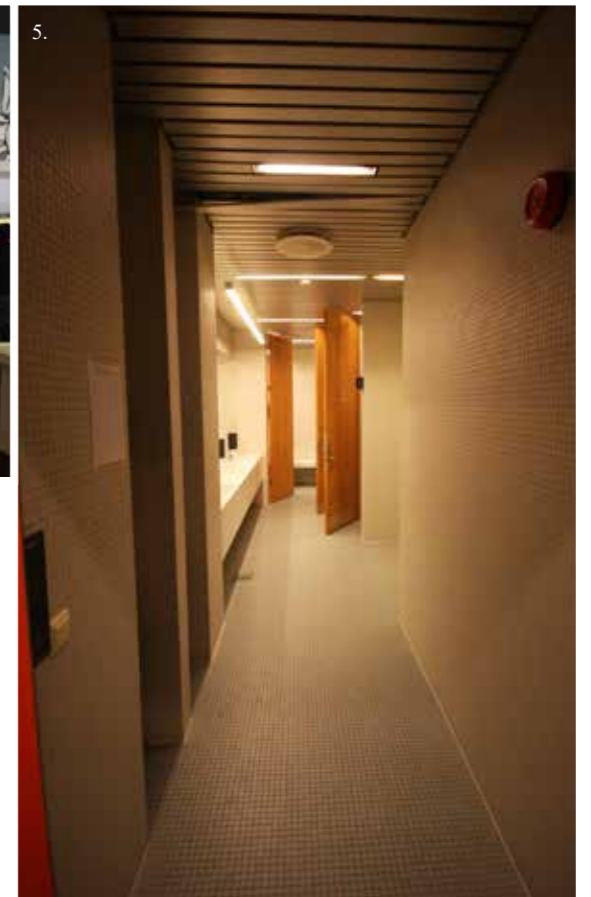
5.

1. Technopolis, seen from the Statoil HQ plot. The grocery store can be seen on the left corner of Technopolis
2. Simula, the entrance on 3rd floor leading to the 4th where the facility is
3. Pusterommet, or the common space
4. Common cafeteria for the entire Technopolis. The members of the Simula Garage is encouraged to eat here through discounts
5. Newly renovated toilets for the entire Simula community

1. The lounge
2. Hallway seen from Pusterommet to the other end
3. Coworking area
4. Storstua, or the auditorium

4.11 SPATIAL ANALYSIS

This spatial analysis will be discussed around three concepts important to how members and entrepreneurs actually perceive the physical layout at the individual coworking spaces, especially in relation to the management and working culture. In other words, the spatial curating performed by the administrative unit and how the members react to it. The three concepts are as following:

- Memberships.
- Work/pleasure.
- Private/common/public.

Memberships

From the outside, every coworking space may seem as any other generic open office landscape, in some cases, of even less quality than the conventional office space. The office space differs from coworking spaces in the curating of memberships, which greatly affects the use and perception of space. As mentioned in section 4.2, the conventional memberships of coworking spaces are usually divided between four main categories as following:

- Basic membership.
- Flexible desk.
- Fixed desk.
- Enclosed office space.

StartupLab and Simula Garage are conventional startup communities in regard to membership policies. StartupLab memberships convey the typical array of all four basic memberships, while Simula Garage only deals one kind of membership, which is the flexible desk. Both of these two case studies reveal the limitations of the flexible desk. We have to keep in mind that the flexible desk is the membership that relates most to the collective ideology of coworking. In many ways, it symbolizes the ever-changing, dynamics of a workspace leading to serendipity production. Although the flexible desk is the one that aligns most with the collective mentality of coworking and its dynamic changes, it also seems to be the least popular kind of membership. Simula Garage has only one type of flexible desk membership; the members proceed as if they were fixed desks. What is special with the Simula membership, is that the free-of-charge flexible desk membership also seem to affect how the members perceive their presence at the coworking space, as opposed to if they paid a rent; they might have a stronger sense of ownership to the Simula community. The physical layout of their desks seems also very random in comparison to MESH and StartupLab, where everything is aligned in columns.

MESH is currently the only case study that truly challenges conventional membership types of coworking. In accordance with structural changes in the economy, membership types change and blur. The programmatic changes at MESH the last four years can also be perceived as MESH being a testbed for hybridization, in search of the best possible hybrid. This has resulted in their free-of-charge community membership (basically

the use of a café/bar/restaurant/event space). This membership taps directly into the urban fabric, possibly generating an unprecedented amount of serendipity production between citizens and the paying members at MESH. Another invention of MESH is their work lounge membership, which allows the temporary work of travelling businessmen and global lone eagles to be a part of the MESH community. These two are decisive memberships changing the entire dynamic and also how MESH is perceived as a coworking space.

The aspect that is quite alarming though, is the high number of enclosed office spaces in MESH and StartupLab. MESH even has an extra facility across the street for major startups (some of them leasing even two separate enclosed office spaces), which house giants in the startup circuit such as Über and Kahoot etc. We have to ask, does the coworking space differ from any other workspace when the majority of its members are working in secluded spaces from each other? It differs because the members with the enclosed office spaces actually have dual ideologies embedded in this membership. Enclosed office space has strong connotations to the corporate mentality, but being in a coworking space means that one has a choice between corporate and collective ideology at any given time. Or to put it bluntly, if you need seclusion or if you want to join in the collective community, the choice is in your hands.
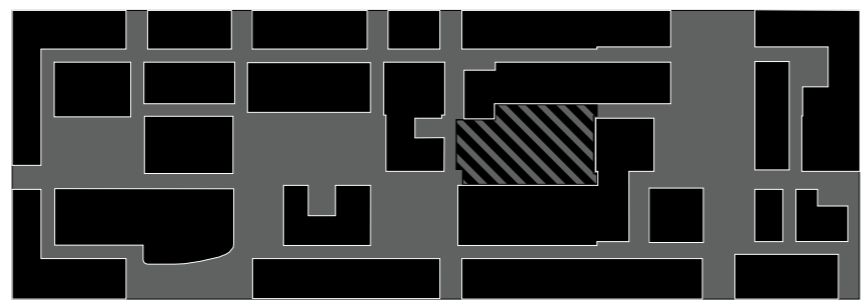
MESH   **StartupLab**

Memberships
- basic membership (community)
- worklounge
- flexible desk (clean desk)
- fixed desk
- enclosed office space (office)
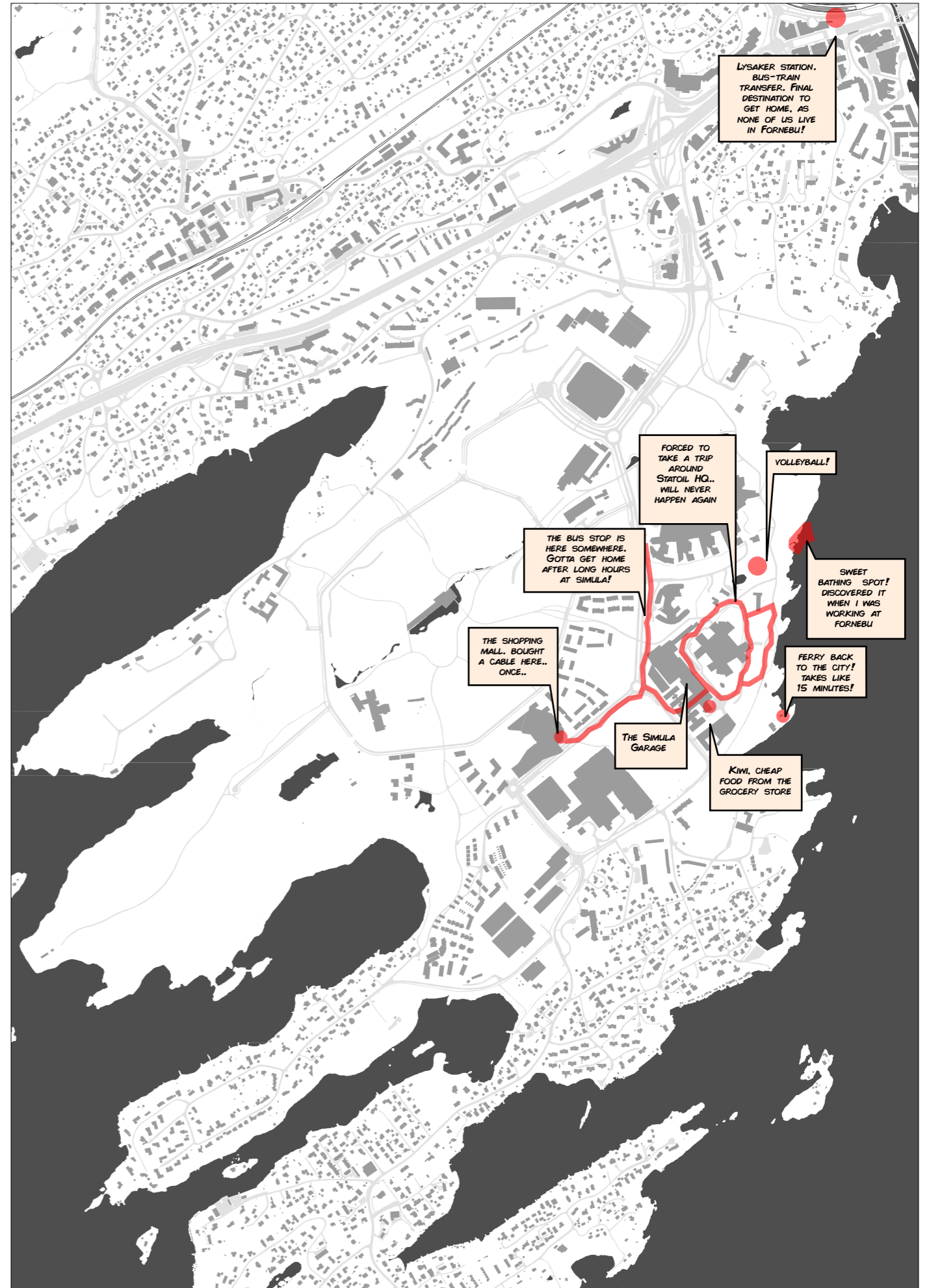- administrative unit
- meeting room

The Simula Garage

Spatial analysis 1:1000

A trivial fact: it is also interesting to see where the administrative unit sits in the coworking space. In MESH, which can be conceived as containing the most liberal mindset, this unit sits secluded in their own room, while the administrative unit of the elitist StartupLab sits in the open office landscape neighboring the fixed desk memberships, and the Simula Garage's the community manager, Jonas Archer, sits right in the middle of the coworking area.

Work – pleasure
One of the selling points of coworking spaces is the symbiosis or mix of pleasure and work, resulting in the concept of coworking. Although the line between work and pleasure is not physically marked, there are still unwritten rules to specific spaces, at the specific coworking spaces.

The perception is that work and pleasure in most cases do not mix. In the Simula Garage, where Pusterommet, the common area, is strictly for pleasure and the coworking area strictly for work. The members at Simula Garage also remarked that the extreme professional perception of the coworking area

made them socialize less out loud in the working areas and vice versa for the common area. For example, there have even been incidents where work in the common area has been reported to the community manager. The mental line between work and pleasure is also very present in StartupLab, even though the coworking area here is quite hectic and noisy; the coworking area is strictly for working. Any contact on a personal level in this space is generally considered a faux pas. As a result, the kitchen becomes a highly social place where people chitchat and talk on a personal basis. Therefore, the atrium proves as a highly important symbiosis between work and pleasure at StartupLab, it is a mediator between harsh working environment and the far-too-social kitchen area. Work and pleasure meets in the middle.
However, MESH seems to be the one making a serious attempt of blurring the lines, by frequently integrating spaces for pleasure in the most unlikely places, such as a small private booth next to the fixed desk area etc.

Private – common – public
Again, of all the case studies, MESH is the one that breaks new grounds in blurring the lines between private, common and public spaces. This is achieved through the curating or management of specific spaces.

MESH StartupLab

Work - Pleasure
- pleasure
- work
- work/pleasure

The Simula Garage

MESH StartupLab

Private - Common - Public
- public
- common
- private
- private/public
- private/common

The Simula Garage
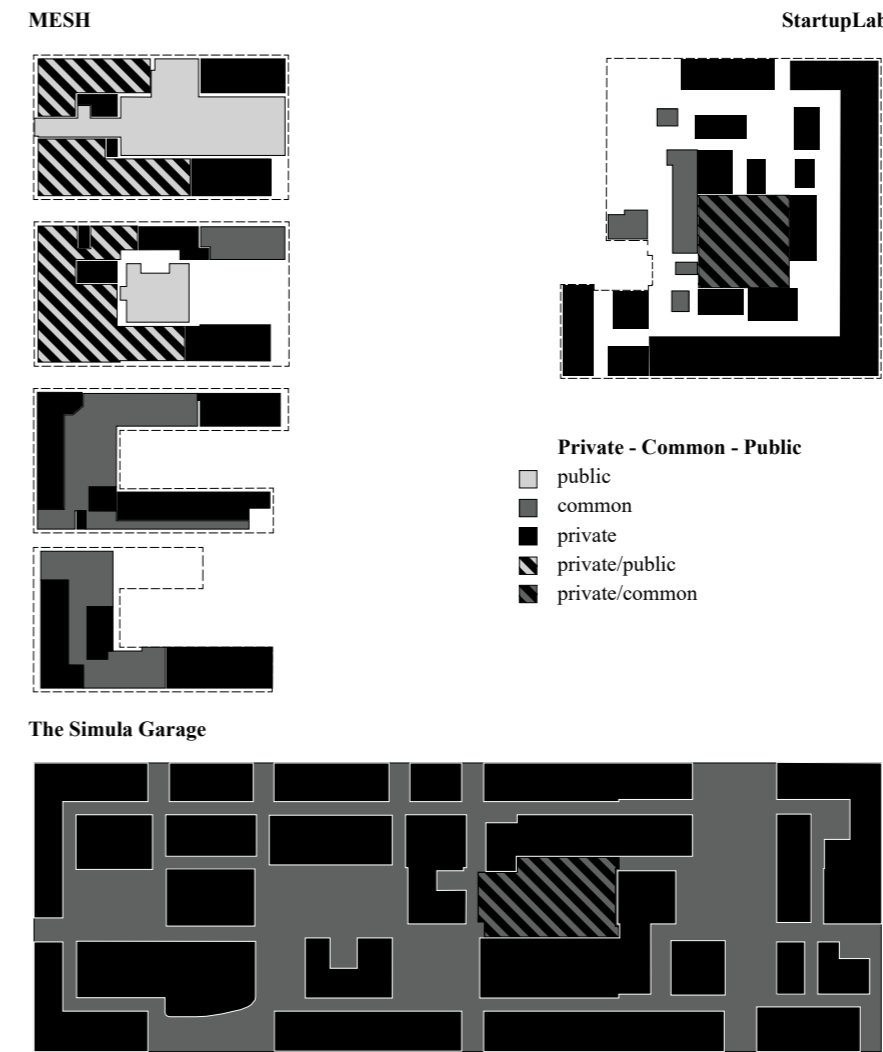
For example, is the work lounge open for MESH members between 08:00 – 17:00, and is transformed into event and mingling space after hours. The 1st and 2nd floor is a mix between private, public, semi-private and semi-public, which is quite a radical feature, yet it is in line with Moriset's observations of the current hybridization of coworking spaces. This is a feature not present in the other case studies. StartupLab has a clear separation between private and the common spaces, even though the entire space is an open office landscape. The desk space is very much a private entity. Whereas, the analysis of the Simula Garage reveals that the members are in fact working in a common space since the coworking area is located right in front of the entrance doors to two offices. This of course poses quite a friction in the expected researcher-entrepreneur symbiosis that the Simula community is supposed to have.

4.12 TØYEN STARTUP VILLAGE: THE FUTURE OF COWORKING SPACES?

What is Tøyen Startup Village?
Tøyen Startup Village (TSV) is a development strategy and a brand for a startup cluster in Tøyen, based on the local values of Tøyen district and hands-on experiences from Hackney, the world's second largest startup cluster, after Silicon Valley. The hands-on experience being Charles Armstrong of the social enterprise, The Trampery in Hackney. TSV was initiated by ICT Norway[3] in the summer of 2015, with Heidi Austlid and Fredrik Syversen at the helm. The facilities that ICT Norway have based their pitch on is owned by Entra. Tøyen itself is a residential area between Gamle Oslo and Grunerløkka city borough in Oslo. The area has 8264 citizens (12,8% of Oslo). Most of Tøyen's facilities is under 30-40% below the general price in Oslo (Brattbakk 2015: 7-8).

The initial proposal
What is the coworking properties of TSV and how does it mark a shift of development of the coworking concept? The initial pitch of TSV was a direct reference to the discussion of the lack of a unified startup front in Oslo. The proposal is to establish a multitude of tech-related startup communities in close proximity to each other, hence the term, a startup cluster. An important aspect to discuss is why the choice fell on Tøyen for a startup cluster, and not on Kvadraturen where there are tendencies of startup communities clustering. According to Fredrik Syversen, the director of business development at ICT Norway, the choice was simple. Tøyen is currently receiving an annual 50 million NOK from the state and the municipality to increase the urban life and social quality locally. It is also partly due to the relocation of the national landmark, Munch Museum, from Tøyen to Bjørvika. Meaning if TSV is a viable development strategy for Tøyen, portions of the sum would go to the development of TSV. There were many other initiatives in Tøyen before TSV trying to the better the urban quality and social aspects of the district, such as Tøyenløftet, Tøyenkampanjen, Tøyen Unlimited, Deichmanske libraries etc. These will be referred to as the local initiatives in the 4.11 section.

3 IKT-Norge is the interest group for the Norwegian ICT industry. We represent the full range of the spectrum from the major players down to small entrepreneurial companies.

The current proposal
Initial proposal was met with resistance by the locals and the different initiatives. Syversen notes that much of the resistance was attributed to the early rhetoric of TSV being the savior of Tøyen. Since then, TSV has redirected its marketing focus from savior to standing on the shoulders of giants very quickly. From a focus on only tech-based startup communities to include socio-entrepreneurial collaborative, in line with the profile and virtues of the existing initiatives in Tøyen. Which is to increase the cultural, social and commercial value of Tøyen. ICT Norway, the owner of the brand TSV and the local initiatives poses today a unified front for the development of Tøyen. It is a beneficial union, since the local initiatives have most of the support by the local residents, while ICT Norway is a much more vocal on the Oslo scene and in attracting regional interest. To increase the feasibility of the development strategy, ICT Norway has also hired Einar Kleppe Holthe of Fuglen to secure an expertise in developing TSV to become of cultural significance to Tøyen. Holthe is known for his anti-corporate business ideology and the development of many highly successful coffee shops in Oslo and abroad.

The socio-entrepreneurial or civic cluster
TSV may resemble Porters model of a cluster of interconnected firms, suppliers, related industries and specialized industries. But the union is mainly attributed to the combination of the startup community and the socio-entrepreneurial profile TSV has adopted by the local initiatives. The profile fits on every aspect the urban life of Tøyen, from the youth activity house accommodating knowledge workers, to the Deichmanske

youth library with a partial makerspace embedded in it, or even how Tøyen Unlimited[4] has taken the step from organization to coworking space, TUben etc. The local initiatives have been influenced by TSV as TSV has been influenced by them. Here the cluster as a mere observation differs. As Porter's model is very vague on which firms should interact locally, the case of TSV properly defines every player within the cluster, through a bottom-up approach and user involvement through public meetings and discussions on how to develop Tøyen. It is a cluster based on the foundation of existing local life, businesses and activities etc. TSV has become what Vivek Wadhwa the tech entrepreneur is criticizing the clusters for, which is a cluster based on increasing the knowledge of how to start a company, the focus on the people within the cluster, incentives from the government towards community making etc.

Branding and events

TSV markets itself as a popular umbrella organization for all the other Tøyen initiatives. What ICT Norway actually develops, is a coworking space for another enterprise to manage in Hagegata 22 and 23. ICT Norway themselves will only develop and manage a 200m2 reception/workbar in that same address, a public coworking coffee shop with a very visible reception as the physical presence of TSV as a brand. TSV's presence is mainly present in their digital footprint and public appearance. ICT Norway are increasing their popularity not only through different newspapers, but by hosting high-profiled events, such as the X Games 2016 in Tøyen, Oslo. This was in fact a cooperation between ICT Norway, Kahoot[5] and Oslo Business Region to also promote startups in Oslo. According to Syversen, this easy-to-follow startup and socio-entrepreneurial brand has led to other Oslo-based developers show interest and wanting to be part of the TSV brand, from Økern, Grønland, Hovinbyen etc. With the support of the local initiatives, this makes ICT Norway of TSV the key orchestrator of the Tøyen development. The popularity of TSV as a brand may indirectly put TSV in charge of overseeing all the development activities in the area since the policy makers and developers are willing to readjust and be part of the TSV development strategy.

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4 Tøyen Unlimited is an independent and socio-entrepreneurial organization to support local individuals with ideas on how to solve welfare issues on a local level.
5 Kahoot is widely considered as one of Norway's most successful startup companies.

X Games Tøyen 2016.
Hosted by TSV, Oslo Business Region and Kahoot.
Credit: TV2.

Transformation possibilities

TSV did start and engage in another discussion, which is the transformative possibilities that the coworking concept might be in possession of. In the initial proposal in the summer of 2015, ICT Norway who heads the TSV brand, pointed out the vacant facilities that Tøyen with transformative potentials for their startup cluster proposal, such as the towers at Tøyen civic center (Tøyensenteret), structures at the Botanical Garden, the original Munch Museum, Tøyen Nursing Home etc. (Teknisk Ukeblad). This discussion has received less and less focus in the current proposal. Yet it is an important discussion which will be mentioned in chapter 5 – discussions.

Development in which direction?

TSV enters complex aspects in the understanding of the coworking concept and urban discussions. The main questions are: What is the focus of TSV? Is it urban planning? Is it community development? Or is it to exploit an untapped source of innovation, the startup front, mainly IT companies? TSV is a complex development in Tøyen which relies heavily on pulling existing forces together into a common goal, either it be a better city district or a knowledge district, it is still in the best interest of Tøyen. TSV marks how the appeal of coworking can be a development tool for policy makers, through local qualities, user involvement to get the inhabitants and local initiatives on board with a radical proposal in comparison to renovating a library or developing an activity house. There is also the question of ICT Norway's true purpose, since it is in fact an interest organization for the Norwegian IT industry and is not directly invested in socio-entrepreneurial discussions. Another perspective can be that ICT Norway understand how the local forces are vital in the physical planning of startup clusters and the IT industry.
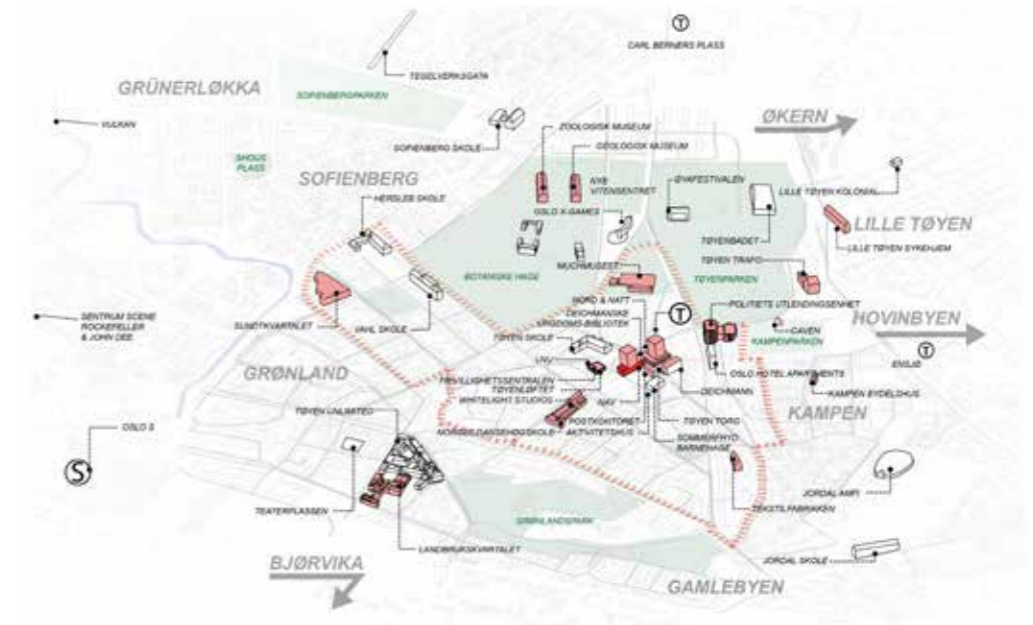
Site analysis of Tøyen.
ICT Norway has visualized the possibilities of a startup cluster in Tøyen.
Credit: Fuglen.

5.0 DISCUSSION

5.1 INTRODUCTION

The backdrop of the discussion

Industry 4.0, indicates a fragmentation of workspaces. Hypothetically, the fragmentation would imply that the common workspace as a physical unit would no longer exist, but it seems to be the opposite when observing coworking spaces. Many of current knowledge workers and representatives of the creative class favor less fancy coworking spaces instead of the facilities of headquarters and corporations. The professional and creative freedom of entrepreneurship and freelancing seems to outweigh any well accustomed preferences on workspaces. It has created a generation, or a free spirited creative class very tolerant about their working environment. To refer back to the context of this thesis, the Norwegian mindset of the current generation is also interesting to mention again. A survey revealed that 31% population between the age of 25-39 (SSB) are with higher education, they are the very age group that frequent the coworking spaces mentioned. A bigger part of this group will also be more entrepreneurial trained, as a direct result of Kunnskapsløftet reform mentioned in the backdrop & context chapter. All these factors generate a very special a creative class in the Norwegian context, especially in Oslo, where most of the majority of the market is located.

However, freelancing and the lone eagle trend also have its drawbacks. Which is the endangerment of a corporate culture, which is an integral aspect of established companies and corporations. It is something the lone eagle cannot possess when doing individual work. This is the social limitations of entrepreneurship and the destiny of lone eagles, often cited amongst various entrepreneurs during the interviews, which was the very reason for many of them to choose MESH. However, these factors lead us to the coworking concept and the overarching mantra of it, which is to safeguard the serendipity of human interaction at the work place, even if it means across different employment.

There is also the aspect of financial issues of fragmentation and entrepreneurship. One individual cannot support basic amenities by himself or herself, such as a meeting room, kitchen, supplies, printer cost etc. in which the shared economy of coworking can solve. This is especially apparent in the Simula Garage, where economy was the main reason for the entrepreneurs to relocate out on Fornebu. Although MESH and StartupLab is much more expensive, it is both a better option both financially and culturally, in relation to a working culture.

5.2 SPATIAL LAYOUT AND CONTEXT
The resilience of coworking as program, morphology and architecture

The empirical work on the case studies showed a peculiar spatial distribution. The least favored spaces within the facilities are actually transformed to be used for coworking or coworking-related activities. Let

IT-related businesses in Oslo.
Location of businesses with IT as a integral part of daily operations, 2000.
Credit: Oslo municipality.

us digress a bit and ask look at a noteworthy dilemma: what happens when you place an extremely tolerant program such as coworking next to the offices of a traditional research facility such as in the Simula Garage?

The complexities of hybridization described by Moriset, demonstrates how the coworking concept show strong signs of compatibility with other concepts and working environments. This means that the resilience and flexibility of coworking as a program can expand, contract, transform according to whatever physical changes necessary. The users seem to be more than willing to put aside well-accustomed preferences and even inhabit the least attractive spaces, increasing the efficiency of the facility or building. This is very present in the cases of both the Simula Garage and MESH.

The high-profiled and firm architecture often seen in science cities or science parks, is no longer high priority. What seems important is not firmly designed office environments but rather environments that open for mixed use, changing uses, and flexibility in their spatial layout and architectural expression. However, not in a streamlined kind of manner. A certain resistance in the physical and organizational environments, may even be regarded as negative but rather as enriching. Coworking also becomes very relevant in context

with the transformation of existing building masses, especially in Norway where 70% of the buildings are already built for the next 30 years. Coworking have exceptional transformative properties where no space is too small or irregular for coworking, but the users of these spaces are often very tolerant and open-minded to spaces, because of the aforementioned social limitations individual work brings to it.

The second coming: professionalization of coworking spaces

In this chapter, the cluster will be used as a common term to denote all kinds of 21st century industrial complexes from the literature review. More specific concepts, such as the science park and the science city, will be used and described accordingly to their definitions in the literature review. The appeal and resilience of the coworking spaces have sparked an interest by many policy makers and urban developers, drawing parallels to when the first successful clusters were observed and studied. A simple of quality of the coworking space is that it can exist within one facility. Therefore, it is relevant to discuss the physical layout in the interior when discussing coworking in relation to clusters. Aside from the hybridization Moriset is describing, there is also an ongoing professionalization in the development of coworking spaces. Coworking spaces are going from cheap office spaces and random people rounding up tables; serious planning, architectural design and user inclusion when designing these spaces.

In the context of clusters, the professionalization and the development of policies came at the loss of natural autonomy seen in clusters of Silicon Valley. In many cases, the professionalization of clusters became the downfall of its strategies. One can look at the serendipity and random factors that define the success of Silicon Valley in order to understand the complex nature of autonomy. How may the architectural planning of coworking differ from the same pattern other industrial complexes has followed? The professionalization of these spaces seem trying to avoid that. By engaging in user interaction, the developers and architects try to enhance what is naturally embedded in the place, and to carefully tailor a space according to the user's needs. In a way, autonomy is facilitated through the understanding of needs instead of overly designed facilities.

The iconography of coworking spaces

A workspace is interpreted based on the different meanings we assign to objects and furniture. The examples are a desk for work, a kitchen for food, barista machine for coffee, cafeteria for break etc. What dual meanings or connotations do we apply on the same objects and furniture within the coworking concept? What makes the same set of furniture and spaces differ from a regular workspace and the coworking space?

Let us start with a peculiar piece of furniture that exist in all of the case studies investigated in this thesis, the table tennis. None of the community managers could give an exact reason for why a table tennis exists in MESH, StartupLab, the Simula Garage. It has no more relevance than a foosball table or mahjong. One could speculate whether it is linked to the American infatuation with beer pong at frat parties, in the same way startups is an American trend. Then again, beer pong requires only balls and not the entire table. Yet it signifies something important to the coworking concept, which is flexibility, dynamic change and something foreign in a workplace, recreational pleasure.

This also transcends to the interpretation of desks, which in most cases has wheels and clean desk membership are to signify flexibility and dynamic change (ex. the Simula Garage and StartupLab). Yet, in both cases the desks did not move an inch in a period of two months when visited. It is quite contradictory though, that the members that have external computer screens and to some degree with laptops, are independent on fixed power outlets, which to a certain degree inhibits the flexibility of its wheels. Aside from professional appearances the meeting rooms brings with them, they also represent a serendipitous nature between the members and the ones visiting the coworking space. As mentioned in chapter 4 – case studies with the Aksel Lund Svindal incident.

To sum up in one word the aforementioned oddities found in the iconography of coworking, is that it is multi-faceted. Some are to convey a playful approach towards work (ex. ping pong table), others are to convey a dynamic culture of coworking (ex. wheels) and others actually borrow established iconographies of professionality from the corporate world, such as for the meeting room. The desk is still for work, yet in a very social environment such as coworking space. It seems the entire intention of coworking is to be the opposite of the corporate or traditional workspaces, such as the foreign ping pong table or the wheels underneath the desks. This is very apparent in Silicon Valley here the nonconformists taking a stance against corporate traditions. Yet, there are still conventions and barriers any workspace has in which even the ever-so-tolerant coworking concept cannot break, such as the professionality the corporate image brings with it, hence the appearances of a meeting room.

5.3 INDUSTRIAL COMPLEXES AND URBAN ENVIRONMENTS

The rightful heir to the title: 21st century industrial complex

In the works of Castells & Hall, *Technopoles of the World – The making of the 21st century industrial complexes*, they go to great lengths describing every possible industrial complex of their generation. It is therefore ironic that Castells & Hall refer to technopoles, science cities and parks as the 21st century industrial complexes when they are in fact 20th century creations (1950s). The authors are even indicating that these complexes may very well be a decadent development policy as early as in 1994, at the turn of the 21st century. This is also what all the other scholars agree on, Bagwell, Wadhwa, Anttiroiko etc. (except Porter). One could speculate that Castells & Hall are prematurely trying to establish a legacy for the next century, but either way it does not change the fact that their work is still highly relevant in understanding the current structural change in the economy affecting the contemporary society.

This leads us to the main question of this section, 16 years into the 21st century, what complex is the rightful heir to the title mentioned above? The empirical work in this thesis points at coworking spaces as the rightful 21st industrial complexes. The case studies such as MESH, StartupLab and the Simula Garage seems to answer what the all scholars are critical about of the concept of the 21st century industrial complex, which is the lack of autonomy, undefined meeting grounds etc. In comparison to the clusters, the coworking spaces are small enough to support a functioning synergy, the value chains and business models flexible enough to adapt any sudden change and trends overnight. Whereas the clusters, which in most cases have strong ties to

governments (ex. universities, research facilities etc.), are much slower machineries and change at a much slower rate. The fact is clear: new complexes are emerging, there is less focus on clusters, but more on what the arguments of every critic is pointing at; a focus on the people in the context of clusters, not the physical clusters itself. This group of people have many names, as mentioned in the literature review. Florida may call it the people climate or the creative class; Castells & Hall's innovative milieu; Moriset reintroduces established concepts such as the lone eagle. Either way, the sum of these people or the sum of how they interact is the definition synergy, not the co-location of facilities.

Even words with any connotations to "industry" and "industrial" seems to have less relevance, leading Miao, Benneworth & Phelps to coin the term 21st century knowledge complexes in 2015, in their revision of Castells & Hall's work: Technopoles of the World. We could also speculate that Industry 4.0 by all means could be renamed Knowledge 4.0 instead, as the word "knowledge" seems to be the fashionable expression when talking about technology, industries and complexes. Looking past what is currently fashionable, the word actually makes more sense in terms of describing industrial complexes, as it is the knowledge of that define the industrial complexes and new coworking strategy.

From now on in this thesis, these terms will be used to distinguish the old and the new, and not describe the same concept. It is also natural to do so, in the context where automation, immaterial production and computers have led to the extinction of any traditional industrial production of material goods in the contemporary workspace. The third and fourth industrial revolution have led the complexes to handle knowledge instead of industry, or to put it bluntly, from material production to immaterial production.

From major urban developments to micro-cities
In the translation from industrial complex to knowledge complex, there is also an undeniable absence of the urban dimension which must be addressed. As mentioned and clearly pointed out in the literature review, planned clusters are too slow machineries to handle innovation and do not adapt well to trends and sudden changes. This is what the tech entrepreneur Vivek Wadhwa is pointing out. He argues that there is too much focus on urban design and state-of-the-art facilities and not enough focus on the people within these urban designs and state-of-the-art facilities. Other scholars such as Bagwell, Siegel, Phan, Wright and Anttiroiko critique the lack of clarity in virtually every aspect of industrial complexes, from lack of clarity as a development policy, the social dynamics, as a business model, collaboration between public and private sectors etc.

The conclusions from all the scholars and those with critical views do lead us to the conclusion that it is the interaction between people that is the synergy, the social glue that binds together an industrial or knowledge complex. Therefore, we have to ask, when did urban design and major industrial complexes play such a pivotal role for a social culture across professions, vocations and facilities? There are actually no clear answers made by Porter on this question. What is clear though, is that the 20th century did generate a great quantity of intellectual knowledge and technology, which may have resulted in the literal translation of major industrial complexes and clusters.

Every argument against and for seems to be a match-made-in-heaven in favor of coworking spaces. This leads us again to the conclusion that a new complex is necessary, or to be more precise, the knowledge complex known as coworking spaces. The study of the downfall of Oslo Teknopol and the rise of Oslo Business Region in chapter 3 – backdrop & context, indicate this certain shift of focus, from industrial to knowledge complexes, from cluster to coworking mindset.

Winther clearly states: "rather than turning the wheels of big industries and forces as Oslo Teknopol did, it is easier to accommodate existing coworking spaces and communities". This automatically diverts the development from major urban development with Masterplans for the industrial complexes, to 'knowledge districts', manifested in the coworking ideology. In this view, StartupLab and Simula, they can be perceived as implementations of condensed and highly functional knowledge complexes in the context of major dysfunctional industrial complexes. StartupLab located in the context of an image of a science park and a science city, Gaustadbekkdalen. StartupLab is thus interesting as an example of new trends (coworking space) trying to salvage old relics. The Simula Garage is also interesting as its success rests on the secluded aspects of the site, which is the result of the failed cluster strategy of IT Fornebu.

As presented in all the case studies, entrepreneurs and innovators are both extremely lazy and efficient beings. The synergy and serendipity production, such as the work, relaxation, coffee breaks and socializing happens in the closest proximity possible. The complexity of urban spaces in science cities or science parks, or even in a multi-story facility contradicts a functioning synergy and the hectic life of an entrepreneur.

Lost in translation
Let us discuss the shift from clusters to coworking spaces which also relates to the shift of ideology. The change from corporate to collective ideology, is very present in the Oslo-based interest organizations for both industrial and knowledge complexes. Or to be more precise, the foreclosure of Oslo Teknopol and the establishing of Oslo Business Region in 2011 as mentioned in the context chapter. Although the case studies show strong signs of urban awareness, the establishing of coworking spaces instead of industrial complexes is still at the loss of the urban dimension. Let us examine the urban properties of each of the case studies.

- MESH, although it has generated a highly popular meeting ground within just facility, it stills contribute greatly to the urban fabric or the setting where the urban life is limited, such as Kvadraturen. In the case of MESH, it shows how successful a coworking space can be when used as an urban tool to generate culture where there are none.
- StartupLab, which is placed in the densest research location in the entire Norway[1], seems to feed more of the image of its urban context of education and research, than the actual proximity of research. According to the community manager there, Kjetil Holmefjord, approx. 25% have connections to the local context of the University of Oslo. StartupLab is otherwise a secluded community from its context and does not generate any urban life to the campus context.

1 33% of the nation's research activity is within 1,5 km radius of StartupLab.

- The Simula Garage, its success may lie in the core virtues of the coworking space, which is about altruistic values, removed from the urban fabric so the members of the coworking space can focus on their singular work. In regards to their own intentions, the Simula Garage is highly successful, but in regards to an urban and community discussion, it is a complete disaster to establish a community based on seclusion and isolation in the context of global headquarters and companies such as Telenor and Statoil.

With these facts in mind the cluster strategies seem to be a more appealing development strategy in regards to urbanity, as the industrial complexes, especially the science city show huge emphasis on architectural and urban design, often developed by renowned urban planners and architects. Even though there is no synergy between professionals, the "byproduct" is still a design of public spaces and parks. From the perspective of developers and policy makers the design aspect has a bigger and more visible appeal. Although without the focus on urban visibility, coworking spaces distinguishes the common grounds, synergy and community much more clearly. The success of coworking may also lie in how they have understood the shortcomings of industrial complexes by becoming a condensed version of them extracting only the essence and most important parts. All the scholars presented in the literature review agrees upon one aspect; the people involved has to be a main focus, not giving all attention to the co-location of facilities. The coworking concept deals with this aspect elegantly, by dedicating much more emphasis on the community within a facility, rather than focusing on the community across many facilities.

The coworking facility may become the urban fabric itself. Some are open to the public feeding directly to the urban fabric (ex. MESH, Tøyen Startup Village), while others are private, secluded and eclectic communities disregarding the urban fabric (ex. StartupLab, The Simula Garage). Therefore, the hybridization of coworking spaces will pose important questions of how to maximize urbanity and minimize the cost in doing so. To take it to a further extent, what happens when city districts gets an increased number of different coworking spaces maximizing the urbanity through hybridization, seen in Kvadraturen with MESH, Sentralen and Bitraf, or the coworking cluster Tøyen Startup Village? Then the close proximity of multiple coworking facilities, to a higher degree, will have the potential to affect the urban life in the given location.[2]

Then there is a question in what degree should these coworking spaces work together, both among coworking spaces themselves and together to create a better urban service? First the aspect of the coworking spaces in between. In Kvadraturen, MESH, Sentralen and Bitraf have certain roles. MESH as a common ground, Bitraf as the main makerspace, whereas Sentralen has marketed itself as the place for cultural production. In that order there are a presence where they cooperate by sending their members to the other spaces with the best expertise. Fredrik Winther of Oslo Business Region, is very adamant on where the coworking spaces should cooperate and where they should compete. He mentions the shared knowledge culture seen in Silicon Valley as very important, that the entrepreneurs in-between should meet up and swap information and share technical issues and solutions, either it be in each of the coworking spaces or in the city somewhere it does not matter. The coworking spaces should also cooperate on profiling Oslo as a startup community as a unified front and coworking place. This means, their presence in the urban life has to be clear, either it be public

2 This is very much implicated in the illustration published by ICT Norway on the Tøyen Startup Village proposal.

events, hybridization etc. However, in the liberal market of services they have to compete, in order to raise the quality of coworking spaces individually. This is in terms of attracting the best partnerships, investors, collaborators, judicial services etc. The competition will not have any negative repercussions on the city, since each of the coworking spaces will improve and become better team players in the long run.

The culture and community generator

The coworking concept may also have a dual role in urban planning, apart from tapping into the urban fabric through its limitations of four walls. The coworking space can potentially also generate culture in neighborhoods where there is less. MESH may be an example of this. However, this discussion relates even more closely to the newly established Sentralen, which is in close proximity of MESH. According to Per Mejlænder Brynning, the producer and PR representative at Sentralen, they have already seen a ripple effect in the neighborhood, where cool and hip establishments are settling right next to Sentralen, generating a diversity other than the heterogenic office tenants which is currently dominating Kvadraturen (example, the local barber who trims Brynning's beard).

Comparing similarities and differences between the two concepts of coworking and cluster regarding culture and community, one interesting fact is revealed. While the cluster clearly separates between research facility and meeting grounds within an industrial complex, coworking itself becomes the manifestation of both, inside a single facility. In other words, coworking successfully extracts the essence of industrial complexes and creates a viable development strategy (in the cheapest manner as possible) as well as being a facilitator for the synergy or serendipity production.

This means that coworking as a compartmentalized entity (in a positive and inclusive sense) not only can be retrofitted in any space, but potentially be implemented in any type of urban fabric and industrial complexes, potentially playing a role in a local urban development. This is where the conventional industrial complexes fall short, where the complexes were in fact the Masterplan, the entirety of an urban fabric. The industrial complex made no distinction between work and pleasure, facility and meeting or common ground. And as the industrial complexes grew bigger so did the complexity of a functional meeting ground within them. To reference back to Silicon Valley startup cluster or tech community, where work and pleasure was clearly compartmentalized in a functioning way. The work, from companies to startups resided in Stanford Industrial Park, the suburbs and garages of Menlo Park etc. The meeting or common ground was in fact a selection of peculiar restaurants the knowledge workers knew were frequented by the tech community. Hence, coworking as a compartmentalized symbiosis between work, pleasure and notion of community, in which can be retrofitted in any space may have a considerable importance of implementing culture and community generators in any given setting.

5.4 MANAGEMENT
Both Fredrik Winther from Oslo Business Region and the community managers of MESH and StartupLab uses the inconclusive description "to curate spaces", but what the community manager are in fact doing, is more than just mere curating square meters.

Community managers are able to not only cultivate and curate, but engineer communities he/she see fit the image and profile of the specific coworking space. This is partly attributed to the members the community manager let into their communities based on the criteria for entrance, but also the management of the afterlife in the coworking space. As mentioned this is an enhanced ability the community manager has because of the special timeframe he/she is operating in. The community manager use not only architecture, but members as building blocks to change the physical environment. Meaning he/she moves and pair people who fits each other the most, bot socially and ideologically. Or if the company are on the same stage where they actually compete. The community manager both curate and reclaim the space that is already assigned to members when suitable, for whatever reason that would benefit the society the most. This fact is not as dramatic as it sounds, as coworking spaces have a pre-condition that their members must be open to their workspace being moved and swapped around (ex. StartupLab and MESH). There is a constant flow of knowledge in these facilities, in which the industrial complexes have failed, and the community manager has the sole responsibility to somehow facilitate for shared knowledge mentality or the best community possible. The actions that the community manager carry out in relation to engineering communities, give us knowledge of how to deal with serendipity production and synergies, in a practical sense, rather than turning the wheels of major industries such as the scope of what a cluster may implicate. The entire business model and architecture of MESH is based on the entire idea of serendipity production. In other words, the community manager does not design architecture in the conventional sense with bricks and mortar, but design of the working and social culture within the architecture. And in the cheapest sense as possible.

Artificial autonomy
The sum of the community manager's efforts in curating a community is also the equivalent of cultivating an artificial autonomy among and across startup companies, or in other words a synergy. A functional community is the flow of knowledge, a strong working and social culture. This is a direct reference to the much sought after trait in industrial complexes. It is contradictory though, because as the case studies reveals, the community manager has to go at great lengths attaining such an autonomy. We have to analyze the factors and intervention the community manager has to make in creating a synergy amongst and across companies within a coworking space. It is factors such as:

• Ideological and personal compatibility, whether the personalities fit each other. The community manager may even exclude people and refuse entrance if their personalities does not the community.

• The state of each of the startups, can go both ways. If the companies are in two different states it can be hard to relate. If they are at the same state, they may relate to each other, or they will compete. In this case the community manager has to intervene and rearrange seats.

• Artificial selection. The entire notion of community lies in the mental state of its members. Members

who do not frequent the facility gets basic membership instead of a fixed desk. In worst-case scenario the members who are not willing to share and generate a good autonomous environment are also excluded.

MESH and StartupLab supports these claims that an autonomy actually requires a great deal of supervision and monitoring of the people within the facility. This backs up the argument by Wadhwa that the obsession should lie with the people and not in the clustering of facilities. But the argument seems incomplete when presented here it is not enough to redirect the focus from facilities to people. There must also be a focus on how to practice an artificial autonomy amongst the people in the community, to successfully generate a serendipity production based on placing people and not companies together.

Sustainability
If the core element and purity of coworking is a place where people of different employment share office spaces and workspace amenities, then the concept of hybridization is diluting the concept of coworking. Yet, it seems that the hybridization is an absolute necessity for the survival of the coworking concept. This is very apparent at MESH, where activities in the backyard both supports MESH socially and financially. Coworking as a concept is great, but not so as a business model. The financial gains of a cluster may be hard to measure, as there are both private and public initiatives involved, sometimes with stakeholders across regions. According to a survey by Deskmag in 2013, 60% of all coworking spaces registered were not profitable. Coworking spaces cannot live off the rent income on the lone eagles and is currently relying more and more on alternate revenue stream. So, by making a hybridization a necessity to the coworking concept, it also increases its sustainability in the urban context through hybridizations such as public amenities, sales of services etc. (Moriset 2013: 16-17).

Image and appearances
The earlier chapters and sections put much emphasis on urban implications, structural changes in the economy, Industry 4.0 and lone eagles increasing the popularity of coworking spaces. Although this thesis has made no mention about the subject of appearances, it is an underlying aspect, that the people involved with a coworking space must have a set of personal characteristics.

There is a big focus on the image and branding of coworking spaces, mainly spearheaded by the administrative unit at the given coworking spaces. This is very present in StartupLab, MESH, Sentralen, Tøyen Startup Village etc. Tøyen Startup Village has such a strong brand and it is in fact impossible to understand what kind of coworking space they are developing, by reading their published plans and development strategy. The commonality amongst the coworking spaces that gain the most media attention is that they all give a sense of both suave and sophisticated exuberance, yet also a youthful and hip personality.

My empirical findings lead me to the conclusion that the most successful coworking spaces are the ones with the most elaborated marketing strategies. These range from the name of the specific

coworking space, webpage design, age of the administrative unit, physical looks, showmanship and even the quality of the headshots taken of the administrative unit. There is one common denominator in all of the marketing strategies: the appearance of being cool and hip, or at least the image of it. Even the interest organization Oslo Business Region use unconventional ways of publicly communicating to the startup-related coworking spaces..

5.5 CLOSING REMARKS

Challenging the institution
A shift from material to immaterial production also means the traditional ways of organizing workspaces with a specific geographic location is no longer a necessity, as mentioned in the description of the Fourth Industrial Revolution, or Industry 4.0. To quote Moriset once more:

"*...IT has driven the institutional fragmentation and geographic splintering of value chains. A massive trend toward outsourcing (...) leads firms to become orchestrators rather than owners (...) well-defined entities of innovators and producers being replaced or complemented by myriad s of contributors.*" (Moriset 2013: 4)

Our technophiliac culture may cloud important discussions that should be brought to light. We need to research and discuss what spatial and cultural repercussions Industry 4.0 may have for architecture and urbanity. We do see tendencies such in Tøyen Deichmanske Library and Tøyen Unlimited etc. crossing the line from being an organization and library and adopting a coworking profile.

Let us speculate on the repercussions of Industry 4.0 and splintering of value chains. For example, let us look into the Massive Open Online Course trend (MOOC), which is the digitalization of education, where many schools are taking their knowledge base onto the internet – some for free, others taking a small fee. This trend has emerged as a massive trend since 2012. Notable Ivy League schools such as Yale, Princeton, Harvard, Stanford etc. have also joined in this trend. However, what is missing in this kind of education? It is the university culture that is missing, such as peer pressure, academic community etc. What if coworking spaces established a new profile such as an educational collaborative, where students that took courses online could meet, converse, and have the synergistic peer discussions one often have on a university? Would this not virtually enable any person to take a degree from Harvard from the slums of India taken into account that the person had access to a computer and a coworking study place? Let us extend this thought even further, as seen in Tøyen Unlimited, Deichmanske Library etc. What if one applies this logic further; would this break up established programs such as libraries, schools, universities, churches etc.? Will there be anything left such as a program-specific building? Will the future development of architecture focus much more on generic buildings and the integration of mixed-used buildings in the urban fabric?

The reinvention of coworking
Moriset is very strict on that coworking spaces should not be mistaken with flexible offices and various kinds of incubators and accelerators. He seems to contradict himself saying that coworking is part of an ever-

changing trend, but still claims strict boundaries of what coworking is not.

"*Coworking participates to (and results from) a global process of blurring the lines between old, well-defined categories, concepts, practices and objects in the political, social, economic and technological realms.*" (Moriset 2013: 17)

With Moriset's observations in mind, coworking spaces provides an incomplete business model, a useful tool, and brand urban developments (similar to science city as an image) The coworking concept needs to rise above its own definition and be reinterpreted in order to keep its relevance potent.

The legacy of coworking spaces – the community
The cross-sectional timeframe or the contemporary nature of this thesis does beg the question; what is the legacy of coworking spaces? What aspects of coworking makes it so enduring, not only for the contemporary society, but also for societies to come? What aspects of coworking transcends bricks and mortar, workspaces, cultures and zeitgeist?

The literature review, context, case studies and this entire chapter have one recurring theme, the community, or the ability to plan, design, affect, cultivate, curate, and even engineer urban, working communities. Every aspect of the fourth industrial revolution (Industry 4.0) and for technological achievements in telecommunications, the lone eagle mentality and blurring of industries dictate fragmentation of the institution. The expected outcome of neo-liberalistic ideology and capitalistic spirit of entrepreneurship is competitiveness, and not collectiveness. The social limitations of entrepreneurship reveal what is taken for granted in the shift of ideology, the sense of community that was supposed to be an integral part of the corporate culture and business. To quote Schwab once more from the WEF summit 16th of January 2016:

"*...Sometimes I wonder whether inexorable integration of technology in our lives could diminish quintessential human capacities, such as compassion and cooperation (...) Constant connection may deprive us of one of life's most important assets: the time to pause, reflect, and engage in meaningful conversation.*" (Schwab 2016)

Knowledge workers react to the digital workspace, using its benefits and experiencing its faults. They may even understand much of the dangers and implications of Industry 4.0 and they seem to have solved some issues through coworking. Some of the fear and inclination Schwab have towards fragmentation of society or Industry 4.0, he can probably rest assure with the current rise of coworking spaces.

Lessons to be distilled
The coworking concept itself may fade away and maybe startup-related coworking/startup communities go into obscurity, yet, I argue here that it is this culture of community which make aspects of coworking transcendent and stand the test of time. Although the phenomenon was comprehensively described only as late as 2013 by Moriset, informing on the genesis and formative years of coworking, it has since grown

to become a complex space of both cultural and urban character. As mentioned earlier, according to Oslo Business Region's estimates, startup-related coworking may take up to as 40% of the employment in Oslo in near future where the percentage is currently on 2. Coworking may not only become the norm of workplaces, but also generate unprecedented variations of what a professional or social community can be. The upcoming years may in fact reveal coworking spaces in its adolescent years, generating the most interesting data on collective ideology and the planning of communities, which have the potential to be translated into architectural and urban development. They should be monitored, studied and researched upon to understand what direction the next generation of workspaces and societies may take. We have to speculate from the very modest beginnings of the lone eagles rounding up tables in a shared facility, to what role and impact they may have on society.

6.0 APPENDIX

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