Reassembling the Archipelago of Workshops

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Contents

I. Problem statement

II. Material and immaterial forms of production: The factory beyond its material purpose

III. Perceptions on the anatomy of craft and labor

IV. The premises of urban manufacturing

IV.I The Machi-kōbas

IV.II The tofu factory

IV.III The Vitra campus

V. Towards a machine space with urban qualities

V.I The de-humanization of the machine space

V.II The machine and its semiotic qualities

VI. Conclusions

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I | Problem statement

The urban space has started experiencing a gradual detachment from its productive activities, a phenomenon with increasing pace over the past few years. At the moment there is an ongoing industrial transition, through which the dynamics of production and the logistical networks are being reassembled at a global level. The occurrent changes are driven by social, economic and environmental factors, leading to the hollowing out of industries and to the closing of factories in several industrial cities (Glancey 2016). These dynamic changes are not the result of an instant crisis. They came out of long-lasting socio-economic procedure starting from the early 20th century. Before that, manufacturing was an integrated function in the urban space, contributing visibly and interactively to the social and economic life of the city (Hill 2020).

The image of production taking place out of the urban centers started being developed after the WWII (Rappaport 2015). Throughout the economic crises of that period, the geographical anatomy of industry was restructured. Several theorists of the social sciences during the 1960s and 70s embraced the functionality of this restructuring, the fact that the industrial space shall be separated from the urban space. Production was then perceived as a backstage for the consumptive practices of the urban centers. The terms “Postindustrial” or “Information Age city” were thus invented in order to describe a society that shifts from a manufacturing-based economy in service-based economies, white collar occupations and information-generating technologies (Soja 2000). The city transformed from a productive space into a consumption scape. Allen Scott was among the once who rejected the erasing nature of post-industrialism and supported the relevance of productivity in a thriving economy. His position could be summed up in a triptych of arguments suggesting: (1) that information and business services could also be considered manufactured goods produced similarly to other commodities; (2) that the provision of personal services, such as education or health, are directly connected as necessary components to the productive practices; and (3) that most of the service based sectors, such as banking, insurance or corporate administration, serve the monitoring of productive activities and control the worldwide production system (Scott 2000). In other words, Scott claimed that the services sector is an indispensable extension of the productive one and vice versa. Even though in many cases, production was invisibly running at the backyard of the cities, several industrial urbanists supported a different point of view. "Manufacturing matters" summed up the position supported by those who highlighted that even after the industrial decline and the loss of power in industrial unions, manufacturing was still a core economic driving force in advanced industrial countries (Soja 2000). The elimination of manufacturing from the cities took place in two stages. On the one

hand, the urban producers were not able to keep up with the competition of the global market. Especially after the end of WWII the rising levels of the quality of life (higher wages, accessible education, plethora of available goods) increased both the cost of living in the city and the labor costs. Several large companies were forced to migrate in areas such as Africa, Mexico or China where land prices and working hands would need lower investment. On the other hand, these companies started controlling a great part of the market share. They were thus competing with smaller local manufacturers, who couldn't follow up with the paces of the larger producers and were eventually forced to migrate (Hill 2020).

At the aftermath of this gradual disappearing of the industry, followed a mythologization of the vacant industrial land. Many former industrial plots were associated by the locals with criminality. The areas once associated with the thriving aspects of a society became an unwanted symbol of disturbance that had to be cleared. The clearance in many cases was conducted through real estate developments. Another group which was very attracted by these spaces due to their low economic value, was the art community. Many remnants of the industrial past started being reused as corporate spaces, artistic hubs or cultural centers (Hill 2020). In that sense, cultural production ended up as a softener of the industrial character. As a result, the post-industrial cities transformed into service providers and landscapes of mass consumption. However, most of them are still connected to productive activities which run an irreplaceable part of their economy from a distance. The bringing back of manufacturing in urban centers thus, stands as a chance of reversing this condition while it presents a range of benefits that remain mostly unnoticed. Creation of new jobs, waste management and social inclusivity are just a few of these benefits (Hill 2020).

The reconsideration of the relationship between the industry and the city is not limited to thinking of what the place of the factory in the urban space is. It stands as an opportunity to reexamine from the start the whole concept of factory space and the production process taking place in it. It allows to rethink of the relationships between the producer and the essence of production, between the man and the tools it uses, between societies and the nature. The aim of this thesis is to set the separation of the manufacturing space and the city under reconsideration, to readdress their relationship and rethink the nature of the factory as a production space:

How could the affinity between the space for manufacturing and the urban space be redesigned?

My intention is not to address the issue of manufacturing through the lens of profitability and excessive economic growth, that excluded the factories of the 20th century out of the cities. Instead, I will consider manufacturing as a naturally urban condition that relates and contributes to the multiple realities of the complex urban life. The notion of affinity in the sense presents a relevance

for the topic, as long as it refers to the "*state of relationship between organisms or groups of organisms resulting in resemblance in structure or structural parts*"[1]. The resemblance between the production space and the urban space in this case is not literal but rather operational. For Hanah Arendt the activity of producing shall be much more a social act related to the city than it usually happens. The production of goods shall constitute a topic of discussion among communities before their actual production. Arendt referred particularly to the creation of the atomic bomb as an example concretizing her argument. If the construction of the atomic bomb had been at the center of the discussion table during its design, it's actual purpose would probably have been different, and its use wouldn't cause the damage it did (Arendt 1958). The space for manufacturing in that way implies a sociability that elevates it as a necessary urban condenser that architecture should bring back in the city. As it will be noted in the next chapters, there is an invisible relationship between the urban and the industrial space that architecture could wisely reveal.

Throughout the pursuit of providing an answer to the main question, a few more critical questions rise: How could the role of the human as a domestic, industrial and intellectual producer be rethought through the design of the factory? In what way could production spaces interfere in the urban space for the benefit of the social life of the city? What potential attributes design can offer in order to achieve the environmental, legislative and semiotic integration of the space for manufacturing in the city? How could the boundaries between material and immaterial forms of production be blurred in a space that promotes their cohabitation?

[1] Vocabulary, s.v. "Affinity", accessed September 28, 2022, https://www.vocabulary.com/dictionary/affinity

II | Material and immaterial forms of production: The production space beyond its material purpose

Besides their economic confluence, spaces for manufacturing have acted as social catalysts of radical changes. The factory's purpose extends far beyond the production of material goods. Its activity enters the realm of immaterial production, into which services, data, knowledge, values and ideas are also being produced. The production of goods (the material) derives from knowledge accumulation and processing (the immaterial) and vice versa. Material and immaterial production thus presents a strong binary which constitutes the prominent operation of the factory. However, the production of material and the immaterial in the factory today have been widely separated from each other. On the one hand, the production of knowledge takes place locked in labs, offices or academies, while on the other hand, the making process is delimited in the production halls through the repetitive motions of the factory workers. The reestablishment of the relationship between the space for manufacturing and the city, is an opportunity to reconsider the character of the factory's space itself. The 20th century Czech philosopher Vilem Flusser refers to the factory space by noting: "*Production center or 'factory' is the characteristic of humans, what was once called man's 'reason for existence' – by their factories you will know them.*" (Flusser 1991). The human, according to Flusser, is a maker of things that driven by its own instinct produces and reproduces the features of its reality. Human is strongly attached to its creativity which can be freely expressed in the production space.

Arendt discerns two types of conditions of the man as a producer of things: the Animal Laboran and the Homo Faber (Arendt 1958). In the first case, the human is dedicated to the non-creative conduction of operations jut for the sake of accomplishing tasks and without any ultimate cultural purpose. Animal laboran is thus a beast of burden, as Sennet also explains, that fits itself in the routines of its life. On the other hand, Homo faber falls closer to the character of the maker that Flusser seeks to portray. Homo faber, namely the man as a maker, can be women or men that create a life based on the production of commons, be them values, goods or knowledge. Their productive activity has an ultimate purpose serving the development of their social structure. Their activity does not develop only on answering how to do a task, but it extends to reveal the causes implying behind the creation of things (Sennet 2008). The maker's purpose in that sense coincides further with Arendt's claim on the sociability of the making process (Arendt 1958). Workshops could operate also as *forums*, where decisions are being taken for the making of things. The critical understanding behind the reason for making something is thus possible through the proximity of the making space with the city.

Before it's gradual disappearance from the urban space, the factory indeed served the purpose of facilitating the man as a maker, the Homo faber that was producing for both the sake of culture and social growth. It's not necessary to search for a machine-like entity in order to understand how production intuitively emerged as practice among other humans' activities. As it seems, archetypes of the machine spaces appeared in the human's distant past. We wouldn't go as far as to say that the cave was one of the first factories the human made. It was in the cave that the human was making series of identical tools following specific workflows in the same way a factory worker does today (Colomina Beatriz 2016). In the cave, the human was a producer, a dweller and an educator of his own. In other words, domestic, industrial and cultural production were all active under the same roof. Due to the coexistence of these three practices, a human was also allowed to be a producer of its free time and creativity.

The issue of alienation between these three practices in the factory has been highlighted by Cedric Price in his project, "The Potteries' Thinkbelt". In the project, Price encapsulates the nature of the cave, described above, in the form of a territorial architecture. Price designed a system into which the production of goods, knowledge and life were keeping up at the same pace (Lobsinger 2000). Through that project it was declared that the production of material and the immaterial fall into an unavoidable parallelism. A parallelism, that today goes mostly unnoticed because of the contemporary factory's fortress-like nature.

At that point one could wonder whether we shall perceive culture and the life practices as a counterbalance of work related to the production of things. Shall we think of domesticity and culture as a softener of the production process? Heidegger believed that domesticity provided a way of escaping the hectic realities of the working space (Martin 1971). His claim does not surprise if we consider that the separation between the home and the working place occurred through the advent of the industrial revolutions. The messiness of the industrial space wasn't compatible in any way with the needs of domestic life. However, before the late 19th century, the making of things was not detached from its cultural aspirations. The model of coexistence between the three forms of production, namely the industrial, the domestic and the cultural, had been maintained for centuries prior to the invention of techniques allowing the mass production of goods. The most recent form of productive space following strictly this form of social and cultural structure dates back in the medieval times. Sennet has elaborated thoroughly to the social and hierarchical structure of the medieval workshop as an ancestral form of the contemporary factory (Sennet 2008). The social organization of the medieval workshop wasn't based on the laborer-owner relationship, but it was shaped by the social structure of a family. Small family businesses, organized as gilds, were running under the master technician who was responsible for transmitting

knowledge to the members of the family. Indeed, workshops were hybridized both as working and living places. However, even in this case, the image of the workshop as a domestic environment is quite misleading. The social structure of the occupants was a bit different from the traditional model of the family which is based on love and proximity. These working environments were struggling for their survival in the market and hence, the groups of workers in the families were organized around disciplines and hierarchical ideas (Sennet 2008). Retrieving thus the relationship between industrial, domestic and cultural production doesn't necessary happen for the sake of mitigating the impacts of labor on humans. On the contrary it implies their complementary cohabitation. It implies that the production of things should not be disconnected from their domestic or urban use and vice versa. It suggests that the knowledge accumulated from the making of things and their usability in our daily life could be circulated in society in the pursuit of evolution and not just profit. Achieving this, means blurring the limits between the consumer and the producer in a way that both are involved intentionally in the processes of production and consumption. But it also means that they remain conscious in regard to the end product of their effort.

Despite their phenomenal separation, production space and urban space are operationally connected with each other. Maurizio Lazzarato clearly refers to the active but also unintentional engagement of society in the production process through the means of communication (Lazzarato 1996). Society contributes to the formation of the product through the consumption of information and by unintentionally expressing the products' desired characteristics. Technology and means of communication play they intermediators between society's expression of desires and the manufacturers who utilize this information as feedback for their products. Any online advertisement, any online interaction between users and online products feeds the modes of mass production. Society is thus an extension of the assembly line and the conception of the product in an invisible way. The domestic interiors, the offices, the plazas, the streets become in that way parts of the production process. However, this relationship between urban space and production space cannot be considered as "affinity" both essentially and metaphorically. As noted in the previous section, affinity as a notion integrates the quality of visibility in the resemblance between two entities. The resemblance in the case of urban and production space is hidden in the immaterial network of communications.

The loss of physical interaction with the ways that thinks are made contributes to the decrease of the quality of material life. If the public, according to Sennet, could be engaged in the production process of things, it would be possible to avoid irreversible incidents similar to the atomic bomb construction that Hannah Arendt noted. The public shall be able to develop a clearer

understanding of the making process, having thus the potential to shape sensitivities and consciousness. Sennet referred to this necessary mechanism as cultural materialism that engages the public as a group of Homo fabers (instead of just consumers), that are aware of their productive actions (Sennet 2008). Consequently, there is a need to think of the physical space for manufacturing in the cities, as an interface between the public and making processes but also between the public and nature.

III | Perceptions on the anatomy of craft and labor

Considering the invisible state of the industry, there is much space to consider the perceptions of the worker or laborer from the public realm. In ancient Greece, the ideology behind the nature of work and the nature of labor was coming in parallel with the quality of life of the occupant. Being a laborer was actually meaning being a slave, a necessary servant. The slave would struggle in the backstage in order to maintain the life of the ones participating in the public realm. Labor had not any creative implications. The laborer had no contact with a final product resulting from its struggle and their activity was completely hidden from the social life of the city, the *polis* (Arendt 1958). The idea of labor in ancient times, was thus not a way for obtaining cheap labor and exploit working hands, but a vehicle towards excluding this struggle from the everyday life of the city (Arendt 1958). The citizen and the laborer were thus separated through their occupation as server and dweller. The laborer consequently becomes productive for the sake of production. The effort of its work is devoted in producing and reproducing identical material or immaterial goods which do not add any value from a social aspect. The relationship between citizen/dweller-laborer/server today still exists in a different way. This dipole now consists of the relationship between machines/servers and humans/dwellers. On the contrary, the productive qualities of work describe an activity that produces uniqueness and adds value through the things it creates. The worker is an intellectual who understands the purpose of its action and its conscious of the end result of its effort. The blurring between work and labor would come in a society where the man serves no other purpose than the entertaining of its life. Work then would have transformed into labor, since there wouldn't be any appreciation of worldly values and the objective qualities of the things created by the productive processes (Arendt 1958).

But the fact that labor was the activity slaves were primarily concerned with in antiquity, it doesn't mean that work wasn't valued by the public realm. On the contrary it had its own spiritual qualities, and it was especially honored. The main difference is that it was appreciated as such, when being conducted in the form of craftmanship. The reference of Homeric poems in the god of fire, Hephaestus, projects the existence of a culture that concerned craftsmanship as a goddess activity. However, according to Sennet, the hymns of Hephaestus in the Homeric poems, present something more than the appreciation of the skills of a craftsman. They complement the god's achievement of pulling society out of the cave where it was isolated through the mediation of his craft. It refers to Hephaestus as transforming society from mythological creatures living in the caves, the cyclopes, into social being, since craft and community for the ancient Greeks were indispensable (McEwen 1997). The Greek word demioergos, is a synthesis of the words demios,

meaning public, and ergon, the productive and it was used to refer to the manually skilled laborers of the time (Sennet 2008). These were distinguished from the slaves; they were part of the community, and they were involved in decision making processes as recognized political beings. They were considered as civilizers who would combine hand and head as productive tools, a fact that was deeply appreciated (Sennet 2008).

The differentiation between work and labor was maintained for several centuries before the machinery started getting mature. The industrial revolutions contributed to this maturing. The new technologies were capable of replacing the human mediation in almost any aspect of the making process. The small medieval workshops started getting bigger and bigger by time in the cities, taking the form of large complexes occupied by machines until the late 18th century. The craftsman became the counteractive opposite of the machine (Sennet 2008). A work made by a machine competes the artisanship of the hand and the uniqueness of the craftsman's thinking. The value of labor that would imply the mediation of the minimum skill of craftsmanship, was diminished in the form of repetitive moves, conducted by the factory workers in the new production plants. Each worker would be responsible for a tiny part of the process. As Marx accurately posed it, the division of labor resulted in the decline of skilled labor in total (Arendt 1958).

The 20th century's mass production strategies and the new technological advances played also a role in the disappearance of the image of the skilled worker from the production process. Traces of this attitude can be seen in the managerial tactics of that time, especially in the American production landscape. Taylor's scientific approach seeking for efficiency directed all efforts towards treating the worker as regulatable machine (Corwin 2003). Accurate time and movements measurement was considered as the best manner of improving the rhythms of production without paying any attention to the human aspects of the creation process. The ultimate purpose was the calculated production of quantities. Manifestations of the undervaluing of manual labor derive through the experiments conducted by Frank and Lilian Gilbreth towards improving the efficiency of production processes. The experiments took the form of motion studies throughout which workers had accurate directions on what to do and how to do it. The purpose was to trace the paths of wasted motions and remove them from the worker's making process. After placing small lights on the hands of the workers, the Gilbreths, would ask them to conduct repeating motions that were recorded through time exposure of a camera. Gilbreths transformed the depicted light paths of the workers' movements in three-dimensional wire models. The models were later presented to the workers as educational tools that would help them minimize the wasted movements. The wire models were might capable of providing some directions, but at the same

time they seemed to reach completely out of the bodily context of the workers and the reality of their work. The body of the worker in the end it was ignored and excluded from the process (Corwin 2003). What it mattered was how the body would serve the best combination of movements instructed by Gilbreths' models.

Corwin presents several other cases of the 20th century through which the labor of human body was completely ignored. There were several cases both in art and in marketing strategies the worker had no representational value. In the advertising campaigns of Ford Motor company during the 1940s, films were made as advertisements presenting the spectacles of the automobile manufacturing. The customers would experience the self-assembly of a V-8 automobile, a process into which factory workers were completely absent. The car was being made by itself. Similarly, the works of art produced through the premises of Precisionism would eliminate the human body in an intensively atmospheric manner (Corwin 2003). Several paintings would depict machines or cathedral-like factory complexes as technological wonders of the time. However, there wasn't place for the laborers in the frame of these images. The machines and the factories were standing on their own as there wasn't need for human mediation to operate them. The elimination of the body in the case of Precisionism reaches deeper even in the techniques used to make the paintings. Flawless textures would form the masses and the shapes of the paintings. Any mark indicating mistake or the passing of the brush by the painter, and thus his bodily engagement in the art work's creation, was diminished (Corwin 2003). The painting looked as it was manufactured accurately by a machine.

The spectacle of the machine and the independency of the production process from the human body today still dictates the industrial world. The contemporary factory turns gradually in a mode of complete automation towards reaching better efficiency. The third industrial revolution introduced information technologies that contributed to the structuring of rigid corporate control and computer management systems. The demands of the consumers are now directly accessible through online orders and the desired products can be immediately produced. This new condition altered the organizational and managerial mechanisms of the factories, which gradually transformed in flexible spatial environments into which workers shift flawlessly from one task to the other. The time of the worker is thus re-evaluated, and it fits into its own desired paces. The worker can skip a full-time schedule due to this new system of flexible time management. However, the independency provided thanks to automation and digital technologies misleadingly create the impression that the worker creates its own leisure time, as long as this time is necessary for running the digital machines (Rappaport 2015).

This tendency leads to several forms of alienation between the worker and the production process. Automation leads to the alienation between the blue-collar *and* white-collar workers (Rappaport 2015). Blue collar workers are being delimited in short tasks of the assembly line, while white collar workers conduct intellectual labor locked in the office spaces. Work in the factory is more associated to the notion of labor as it was explained by Hanna Arendt, than that of the productive labor as posed by Marx (Arendt 1958). Automation affected directly the spatial characteristics of the factory's typology as a building. More particularly the introduction of automation led to the formation of two types of factories that dominate the production network and silently exclude the bodily engagement of the worker: The first type regards the occupation of the factory space by automated machines and the exclusion of the humans. The completely automated factory transforms into a spectacular complicated machinic system that acts as a marketing tool. It is made as such, in order to highlight the wonder of production process in front of the eyes of its visitors. The second type is the offshored factory, such as the ones located in Maquiladoras of Mexico or the Pearl River Delta in China. The offshored factory operates as a 'black box', for which we lack awareness of its interior processes. We can only perceive its outcome in the form of the produced item, be it a car, a tool or even a micro-organism (Rappaport 2015). In the first case, the worker is a mere controller of automated systems. The architecture of the factory is more or less a corporate architecture devoted to the realities of an office space. In the second case, the factory provides an inhuman interior where control is imposed to the individuals running the production line.

It is critical here to wonder whether the machine and the human body shall be considered separately in the making process. The experiences of the past showcase a continuous conflict between the human body and the machine. In many cases, as noted before, the machine became a tool of authorship against the working groups. There were also countless reactions run by guilds and unions against the evolution of technology and the introduction of new techniques. However, it seems like that even a passage to a completely automated system is at least for now impossible. In the research conducted by the Het Nieuwe Institut there were studied three cases of automated manufactories of the Pearl River Delta. The studied manufactories operate as flagship projects that would help the region to stand as a hub of innovation and sustainability in the future. Due to the shortages in working hands, introducing smart technologies in the production spaces seemed to be an attractive solution. China is thus trying to shift from a mass consumption model of production, into a wiser and personalized production system enabled by the advent of "Industry 3.0". Foxconn was among the corporations studied by the research team. The company which is one of the biggest companies specialized in the manufacturing of iPhones, was planning to introduce 1 million robots in its production line by 2014. In the end, only half of these reached the

production process. According to Foxconn's general manager, it stood extremely difficult for the robots to present equal flexibility to the worker's body. At the same time, the quick changes in the demands of the market meant continuous update of the installed automated systems. Consequently, manager herself advised the government to reconsider its plan for complete automation (Marina Otero Verzier 2018). In the case of Rapoo, a company based in Shenzhen, specialized in electronics manufacturing, alternative production models were invented. The company invested in the collaboration between humans and robots as a form of soft manufacturing process. The robots were responsible for repetitive or dangerous tasks. Workers on the other hand, were concerned with the tasks that need more flexibility. This collaboration is reflected in the spatial configurations of the interior, where humans and robots form coworking islands. Rapoo formulated a hybrid model into which the human body and the machine have equal performing value. Hybridity provided resiliency and capability of adapting to the changing needs of the market. According to the vice president, Steven Lee, automation cannot replace the human body's flexibility and it will always be necessary for the changing demands of the market (Marina Otero Verzier 2018).

IV | The premises of urban manufacturing

The bringing back of production in the cities has concerned sociologists, urban planners, architects and economists over the past few years. The term urban production is quite broad, and it embraces an ensemble of different activities. A more systematic description suggests that urban production refers to the productive activities aiming to the production of goods, that take place in densely settled areas. The productive activities in these areas are fed through local resources and contribute to the formation of local value chains. Due to their integration in residential areas, production spaces of these kind shall mitigate their emissions and use transportation networks that avoid conflicts between their operation and other urban activities (Annette Bathen 2019). However, this thesis is not concerned with urban production in its broader sense, but instead it focuses on the productive activities taking place in the form of manufacturing or industry.

Urban industry refers to large scale production plants producing series of goods with the use of machines in densely populated areas. Some of these corporations have been on site for prolonged periods and they employ workers with either high or low qualifications. Their range of action is not restricted to the local market but extends in order to create global networks. On the other hand, urban manufacturing refers to small scale corporations located in the city that produce less quantities of customized objects (Annette Bathen 2019). Some of these could also be concerned with repairs or food production, but the research won't be concerned with these types of urban manufactories. In *urban manufactories*, handicrafts are the core of production while machinery is rarely used only in order to support manual labor. With the uprising digitalization, 3D printers, CNC machines monitored through computer systems started being more present in the manufactories' interiors, supporting the crafting processes. The manufactory's owner is usually involved in the process and coordinates a team of highly skilled craftsmen. Manufactories where displaced by large industries in the past, but their return in the cities is on the way due to the new social attitude of individualization and sustainability (Annette Bathen 2019).

Cities are versatile landscapes that gather people with diverse backgrounds and different forms of knowledge. The urban space as Lefebvre noted, operates as an *assemblage*, an accumulation of crowds, market products, actions and symbols that attribute to it a social aspect and centrality (Lefebvre 1991). Urban centers present valuable opportunities for sharing knowledge. A manifestation of this potential is the evolution of the 17th century coffee shop, where knowledge was being shared, and was gradually institutionalized in the form of universities, agoras or local business hubs (Hill 2020). The realization of the city as a dynamic and continuously changing element was

crucial in order to understand its capacity of accepting new elements. The architects of the Modern movement treated the city as nothing more than a utilitarian corporation, strictly regulated by the masterplan. It was divided in functional zones separating the working from the domestic life. The updating post-modern approaches changed completely this attitude. The development of scientific thinking and technology that delved into the expanding problems of our universe through new theories, such as the chaos or relativity theory, revealed an aspect of life that modern movement strictly rejected: complexity. Deeply affected by the new realizations, urban planners and designers theorized city as an entity governed by information flows and knowledge transfer. Charles Jencks referred to the city as a complicated, adaptable system that passes through several lives and deaths, countless artificial regenerations while adjusting in the marketplace. Restructuring, reflection and reinvention define a continuous recursion, an artifact created through endless feedback (Jencks 1997).

The term *assemblage*, noted before, has been examined by several philosophers, such as Delanda, Lefebvre and Latour, as a medium of describing the complexity that certain social systems present. The term of social assemblage is not limited to mono-material assemblies (e.g., the accumulation of elements described by a single material), but its essence derives from its inclusive nature. It could embrace the interconnections between chemical bonds, legal ties, atomic forces, corporate bodies, physiological and political assemblies (Latour 2005). With the term social, Latour refers to a set of associations that can be dynamically modified or re-assembled. The highlighted part of an assemblage is the interconnection between its parts. This is assemblages' strength and frailty at the same time. Latour here distinguishes two types of assemblage elements. Firstly, *the applied*, is the element connected to local conditions but without being a creator of multiple connections in this context. The second he calls it, *the applicator*, and it refers to the one shaping the multiple connections in order to develop, grow and thrive (Latour 2005). It functions in the form of a structure-making site which is in need of its connections in order to survive. Without them, it cannot structure anything at all. As a result, a defined assemblage takes the form of a network consisting of nodes and paths that associate the nodes with each other. Then Latour introduces two scales explaining the effectivity of the nodes of the system, the levels of *macro* and *micro*. Macro and micro do not differ through their scalability. Macro does not describe a wider region into which micro is embedded. Their difference lies on the multiplicity of connections they develop and thus the safer conditions they shape. Production spaces usually act as nodes in such systems. Each production space takes the form of a star, connected to multiple nodes through which associations are being created. In that way, production spaces become mediators for the creation of certain material cultures, economic growth and the transfer of knowledge.

The cohabitation of diversified features in the urban space provides an undercoat for multiple synergies between them that become visible through productivity. There are consequently several reasons for rethinking the introduction of manufacturing back in the cities. First of all, through knowledge accumulation and the multidisciplinary collaboration, it is easier to produce high valued products that serve better the needs of urban life. In most of the cases, cities around the globe exercise their productivity in a linear way following the path take – make – waste. This linear model is based on an extractive culture that harms the environment by polluting and uncontrollably retrieving material from the natural resources. However, there seems to be a rising interest to reverse this economic model by prioritizing circularity and recognizing manufacturing as an interface between the cities and nature. Secondly, taking into account the continuity of urbanization and the affection of the market by automation, urban manufacturing can secure high-skilled and middle-class job positions that will also be properly paid. In that way, it creates more job opportunities in comparison to the service sector and knowledge-based industries (Annette Bathen 2019). Urban production can integrate socially and economically the locals through the establishment of businesses and maintaining the city's workforce. Finally, a form of distributed manufacturing supported by digitalization could reach social integrity and transform the citizens from merely consumers into co-creators and participators in the production process (Hill 2020). Urban production in the form of open workshops, creative labs, can integrate the city in the creation process. This could lead to consciousness around the ways of making goods, the resources' treatment and extractive practices and contribute to the shaping of a neighborhood's character and knowledge transfer (Annette Bathen 2019).

At this point we could retrieve the triptych elaborated in the introduction of this research. The triptych suggests the cohabitation of productive, domestic and educational practices under the same roof similar to the ways the cave and the medieval workshops were operating as cultural condensers. Cedric Price in his “Potteries Thinkbelt” project indeed imagined the mixing of these activities in a territorial level. His proposal was shaping a network of connections allowing for the complex’s organic development and freed from the operational constraints that could be posed by an enclosed region. Price’s proposal though floats in an imaginative realm. However, it could function as an exemplar towards linking the productive qualities of a manufacturing space with the domestic and educational aspects the urban condition fruitfully provides. Manufactories used to coexist with other uses in the urban environments until the 1960s. In the 19th and 20th century factories were also located in between houses, many of which were sheltering workers. The strict building regulations that followed after urban redevelopments (Hill 2020).

The mixing of manufacturing with urban uses today is still possible. However, there are certain patterns that need to be followed in order to reach the necessary compatibility between the urban and the industrial. Towards increasing the density of industrial uses combined with other urban functions, urban planners started thinking for older densification strategies that create opportunities for manufacturing to enter. The terms *industrial intensification* and *industrial co-location* refer to the mixing of industrial uses together with housing or retail, securing at the same time availability of industrial land. The former term suggests the stacking of industrial uses on multiple levels, while allowing for other uses to function properly on the land. The later refers to the occupation of the ground floors by manufacturing and the development of mixed uses on the upper levels. These strategies were common during the 20th century, but they were gradually completely abandoned due to several functional issues emerging from the cohabitation of functions. First of all, the stacking led to problems related fire protection, heavy lifts and lack of storage space on the ground due to its occupation by other functions. In the second case, emerging health issues and noise made locals from the neighborhoods complain about the existence of manufactories (Hill 2020). Consequently, it doesn't seem to be possible for all kinds of manufactories to mix with urban uses. However, the complete abandonment of industrial co-location and intensification disturbs any kind of mixing, even of small textile production facility.

Certain accurate definitions suggest that manufactories in the city could take place in three main urban types: inner-city mixed use, transition areas and business parks (Hill 2020). In the first case, small scale production units, mainly concerned with crafts or repairs, find their way in several levels in building blocks. These spaces often combine domestic and working qualities and they are run by small family businesses. In the second case, former factories located on high streets transform into collective working spaces and act as thresholds between industrial and urban areas. High accessibility distinguishes this industrial urban type from the other two cases. This type allows for mixing with both commercial functions and communal activities. Finally, the business parks, constitute mono-functional industrial areas which are under the pressure of housing development. In most of the cases they are being pushed even further out of the cities due to nuances and heavy work. They constitute the least preferred solution in terms of urban integration, since they can better facilitate heavy industries that should definitely be located at the outskirts of urban centers (e.g., cement and steel plants). However, all of these cases can be equally described as nodes of an assemblage that create networks and define material cultures through their socio-spatial organizations. Is critical thus to understand how these nodes are structured as artifacts and how as such, do they effect their network. For that reason, I introduce three case studies that adhere to the characteristics of the aforementioned urban types: the Machi-kōbas in Tokyo, the tofu factory in

Caizhai village and the Vitra Campus. All three examples were chosen due to their proximity to an urban condition or a densely populated area. The case studies are not to be examined through their architectural qualities even though some of them present particular architectural interest. However, the scope of their examination is to understand them as spatial actors of the systems they are integrated in. My aim is to perceive how they shape a spatial network of associations, where the value of these associations lies and finally, if they succeed to develop urban qualities and at which level. Consequently, three parameters define the directions of this speculation: Socio-material networking, urban integration and scale.

IV.I | The Machi-kōbas

Japan experienced the offshoring of its factories similarly to several countries around the globe. Many of the leading companies especially in the production of electronics found their way in regions where cheaper land and labor hands secured their profitability. However, in the case of Tokyo, the migration of industry didn't necessarily mean its disappearance from the city. A significant number of small manufactories which were coexisting with large companies since 1980s, maintained their productive activities in densely domesticated neighborhoods of Tokyo. Machi-kōba is the name given to these small factories, that run usually as family businesses employing a short number of skilled workers. In most of the cases, these factories do not focus on the production of specific goods. Instead, they develop advanced skillset and artisanship that they improve through continuous experimentation. After the offshoring of the large factories, machi-kōbas had to survive the competition imposed by the global market. Through the establishment of networks and collaborations with large companies they managed to create the representative of a factory spread all over the city. If a designer, or a citizen wishes to realize an idea of an object, they need formulate a production line by choosing a certain amount of these small factories, each one specialized in a different part of the process.

Many of these family businesses collaborate with larger factories by taking over tasks of the production line that large manufacturers are incapable of conducting, due to high costs. Sometimes, collaborating with specialized artisans for specific procedures is more efficient than investing on their developing in the factory. Consequently, the small factories of Tokyo have shaped a dense manufacturing cloud, a multidisciplinary network integrated in the domestic environment. Knowledge is continuously spread among the manufacturers, the designers and the investors. However, this system presents particular disadvantages. Allowing larger companies to get involved in production leads to secrecy due to increasing competition among companies, which need to hide their innovations from their competitors. Furthermore, their accessibility by unfamiliar

stakeholders is very difficult. This is due to the chaotic distribution of the factories in the city and the lack of guidance through the process of finding the right ones for the production. These are basic shortcomings of this form of urban manufacturing.

However, the cloud of machi-kōbas maintains a domestic character more than any other urban type of space for manufacturing. Most of them occupy one or two floors inside the residential blocks of Tokyo. In some cases, the families running these businesses have their work on the ground floor and their houses on the upper floors. The people employed in the factory usually do not exceed the number of 10, which contributes to shaping a sense of belonging, very similar to the atmosphere of a family. The machinery is usually specialized, and it responds to the specific skillset provided by the business. A factory like this could be specialized in almost anything, from the casting of resin to the construction of micro-electronics. Consequently, these spaces constitute a dense assemblage combining domesticity with production and knowledge accumulation.

IV.II | The Tofu factory

The village of Caizhai in China has been specializing in the production of tofu over the past two hundred years. The production of tofu traditionally was taking place through small family businesses scattered in the village. However, this socio-spatial form of production obstructed the fitting of the product in the security standards and its selling in the supermarkets. The families owning the workshops decided to join forces by establishing a union towards upgrading the quality of their product. The initiative would be spatially expressed through a shared production unit, a tofu factory which was eventually completed in 2019. The factory is formed as rectilinear block lying along the riverbanks of the river passing through the village. It is organized in six compartments based on the topography and the production sequence. Each compartment is responsible for a different part of the process, namely preparation room, grinding compartment, boiling compartment, deep-frying compartment, drying compartment and tasting hall. The village thus shaped its own productive force almost in the same way that Henri Ford gathered specialized teams under his factories' roof. The family workshops are being involved in the union as shareholders and thus are immediate beneficiaries of the production.

Reaching back to Latour's notions of the nodes of an assemblage, we could say that the tofu factory functioned as an *applicator*, that expanded its system of associations in order to grow and thrive. The initiative's positive effect extended beyond the securing of the family businesses' product. The factory has already started shaping networks and increasing the village's population. The village's tourist input increased from less than 1000 visitors per year, to 2500 per month. This led to the

advancement of the touristic industry and the opening of several touristic corporations around the village. However, what is more notable is that more businesses concerned with tasks related to tofu production have gathered in the area in order to take advantage of the tofu factory's productivity. Among them, a soya bean cooperative was also established and secures the quality of raw material that is being imported in the production line. The factory's network involves also local schools for which it works as a supplier. Except of its productive activities, the factory shelters a shared kitchen and a community space as part of its extroverted character.

IV.III | The Vitra Campus

The Campus of Vitra is a representative of production spaces that densely accumulate diverse contradictory features in a self-regulatory system in order to grow. The campus lies close to the domesticated areas of Weil am Reihn in Germany. Starting as a shop-fitting business in 1934, it quickly grew in the form of a colossal Swiss furniture manufacturing company concerned with the construction of furniture for any type of space. The campus is not limited to the functioning of production plants, but it includes museums, exhibition halls, conference rooms, restaurants and parks. After a catastrophic fire that burnt the facilities in 1981, the owner of the campus, Rolf Fehlbaum, decided to rebuild it as a village paying homage to its content, design and architecture. He thus commissioned the design of the facilities in prominent architects who had the chance to introduce their architectural signature in the complex. Nicholas Grimshaw, Zaha Hadid, Frank Gehry and Alvaro Siza are a few of the architects who gave birth to the complex's buildings.

The corporate success of the campus is based on the development of a complex system of associations that reach far beyond its customers. Vitra's significance is both of productive and of cultural importance. On the one hand, it has managed to consolidate a strong brand name by collaborating with talented designers securing the diversity of its products and focusing on the quality of design as a core value. On the other hand, most of these designers' professional development happened partly because of the exposition of their work through the company. This applies both to the furniture designers and the architects behind the campus's facilities. Consequently, the company managed to shape a rich network of knowledge accumulation that is directly reflected on the wealth of its furniture collections. By establishing these dynamic relationships with the designers, it was possible to attract clients from any part of the world. However, its range of effect has no local value since the complex has no interaction with local manufacturers or businesses.

The industrial complex was based on Nicholas Grimshaw's masterplan and with the passing of time, it evolved into a complex synthesizing cultural institutions with the industrial buildings.

The campus consists of four production units, two designed by Nicholas Grimshaw (1981, 1983), one by Frank Gehry (1989) and the last one by Alvaro Siza (1994). SANAA designed in 2012 a logistics facility, a storage center, which is the last productive unit contributing to the industrial character of the campus. The cultural aspect of the campus started taking form in 189, when Frank Gehry designed the first museum. Then followed the construction of many other cultural buildings such as the Vitra Haus, designed by Herzog & de Meuron, the Vitra Design Museum Gallery, the Conference Pavilion and a variety of small-scale buildings as prototypes scattered in the campus's landscape. The landscape of the campus works in that way as an exhibition space as well. The dualistic nature of the campus, which is shaped by the coexistence of cultural and industrial facilities is not accidental. It formulates a strong marketing tool that helped the enterprise to grow and acquire the wide publicity it has at the moment. Indeed, the campus is socially penetrable. Tours around the facilities are constantly being organized, opening thus the content of production to the public. However, this cultural dimension is delimited a marketing tool than a creator of a material culture. The factory in this case functions as a spectacular machine that aims in impressing the visitors without really involving them in the production process. Paying a visit in the campus can help visitors to appreciate the values of good design and learn about the company's more or less ethical dimensions, but they are completely out of the creative implications of the production process. We wouldn't go as far as to say that even the visit to the complex itself works as a strictly controlled production line of impressions. A map provided in the company's manuals presents a certain path that visitors follow for their sightseen. Despite that the path adheres to selective choice of spaces that visitor can see, it completely excludes the productions units. They factories thus fall in the category of the in-accessible black box, for which we have no clues of what is happening inside.

V | Towards a machine space with urban qualities

V.I | The de-humanization of the machine space

As noted in the previous chapters, manufacturing wasn't always excluded from the urban environment. On the contrary, it was forming it and it was shaped by it at the same time. Scott extended further this argument by connecting the contemporary urban development with the advent of the industrialization. Motives of urbanization evolving hand in hand with industrial activity can be seen in several cases in the history of cities. In Britain of the early 19th century workshops, mills and manual workers were densely concentrated in places such as Birmingham, Bradford or Leeds, driven by the rising factory system. Similar phenomena could be seen in the Fordist industrialization of the United States, in cities such as Chicago and Detroit, where industry fed the premises of the American Dream (Scott 2000).

The question of how manufacturing can re-enter the urban space is not unilateral. It relates directly the question of how a factory can actually stand in an urban environment. How could a space devoted to the machine can be part of the social life of a citizen and how could a designer respond to the quest of designing the machine space in the city. The introduction of the factory in the city is not only challenged by the detrimental effects coming out of its operation, such as pollution or noise. It is equally criticized for its semiotic social aspects. The factory, as a physical space is often associated to negative societal models of organization, that promote inhuman conditions. Capitalism generated a system into which merchants and industrial investors occupied positions in any every scale of the factory system. Since the early 17th century, they accumulated power and wealth the led the formation of inhuman environments that today still exist in offshore regions (Rappaport 2015). The factory became equivalently the analog of the prison (Foucault 1977). Restricted to its own utilitarian organizational strategies, the factory was linked by Foucault to *heterotopias* that are isolated from the city and society, yet a mirror of it. For Foucault, the factory falls in this category of spaces, that are highly controlled environments fostering social changes. In these institutionalized spaces, the relationships between the members of a society are continuously reorganized towards reaching a radically new social condition (Foucault Michel 1986). Hence, the factory on the one hand serves purposes extending beyond the production of material goods. At the same time, it achieves that through its social isolation and the application of austere forms of discipline. The contemporary factory becomes on its own a society following certain rules, away from the society that it feeds through the products it creates.

Back in the late 18th century there where some humble efforts to attribute human dimensions to the production space having social utopianism as a medium. This utopianism often took the form

of extra care provisions that would contribute to the development of the character of the future worker. Robert Owens was among the industrialists who invested in the formation of such workers by providing to children from an early age basic life service, such as kitchens, dining rooms and sick funds. The factory in Owen's approach, was shaped as a city with communal qualities that was formulating its workforce from the early age of a human being until its adultness (Faciejew 2013). It was a programmatic machine building up working communities, based on the ideas of inclusivity and care. However, Owens's social utopianism contributed very little to the actual humanization of the factory system. It ended up as an experiment among several others conducted during that period by caring industrialists. Anthony Trollope, the English novelist, wrote characteristically for the humanized factories of the city of Lowell after his visit in the 1860s: "*It is Utopia. . . Lowell is a very wonderful place and shows what philanthropy can do; but I fear it also shows what philanthropy cannot do.*" (Trollope 1862). These well imagined communities declined in the industrial world not due to their actual caring qualities for the workers. These virtues were not even going against the seek for efficiency that was asking from the workers to act like machines. The problem was based on the fact that they were strictly enclosed, and they were not capable of expanding their effect outside their limits. This enclosing character could radically change if applied in an expanded way from the beginning. In that case, instead of thinking of the factory as a city, we could reach a programmatic complexity, including spaces of sociability and care that relate to the factory and the city at the same time. Instead of making factories as cities, we could reverse this condition by designing the factories in the cities and link them to the urban programmatic richness that advances the life of quality of the workers.

The human aspect of the factory has been in conflict with the pursuit for efficiency, especially after the introduction of mass production strategies. The first glimpses of the dehumanization of the industrial space appeared in the early 20th century. Henry Ford was the prominent figure that was about to radically change not only the form of the factory as a typology, but also its perceptional qualities that were maintaining a human dimension to the industrial space. The gradual hollowing out of industry from the city gave birth to new typologies of industrial spaces. The urban factory, the way it existed before the spread of the Fordist model, evolved in the form a vertical layout following specific production workflows. However, the introduction of the assembly line changed this condition.

Henry Ford's factories for Ford Motor Company changed multiple times in the span of only fifteen years. The new managerial approach treated the factory as a part of larger system of production units that shall end their operation in case of not being able to reach their production targets. The main philosophical approach was not aligned with the wellbeing of the workers but with the efficient planning of the assembly line. Factories such as the ones designed for Ford by Albert

Kahn, where definitely proving that the center of the design was productivity and not the human (Faciejew 2013). The rapidly increasing pace of productivity was blending the machines' movements with the workers', who were regularized in repeating fast motions. These hectic flows of production, imposed on the workers who were trying to catch up with the machinery, are the ones that popularized Ford's production strategies and became prototypes for most of the factories that were built in the post war period.

Seeking for economic solutions meant to reject the verticality of the production units, that needed excessive energy supply for moving parts of the assembly line from the bottom to the top of the building. Allen Scott linked the vertical disintegration with the rising horizontality of industrial complexes forming isolated districts (Scott 2000). The new horizontality gave birth to the contemporary factory building in the form of a landscape. The factory as a landscape is an endless cartesian plane, allowing the continuous change of the machinery layouts for the service of the countless needs of the market. The factory of the 20th and 21st century became equivalent to the "generic". It is an irrelevant shed, similar to the generic character of the labor of its workers who have no clue of their final purpose of their activity (Aureli 2011).

The organizational model is based on hegemonic capitalistic approaches that still follow Ford's and Taylor's managerial, non-human tactics (Rappaport 2015). Even if we want to speak of a post-Fordist model that appeared after the 1960s and 1970s, then this is not the opposite to Fordism, but on the contrary, a restructuring of it (Soja 2000). Many of these contemporary factories can be seen in areas where cheap labor hands and land can be easily accessed. In the Maquiladoras of Mexico, in the Pearl River Delta of China or in the African regions anonymous factory sheds still act like prisons for their workers. The fact that factories offshored didn't just detached the production process from the societal consciousness. It made architecture of the factory an irrelevant value for these spaces and erased the necessity of thinking how the machine can become part of the city. The machine on its own caries semiotic and aesthetic qualities that more or less makes its place in the city a matter of the designer.

V.II | The machine and its semiotic quality

The 20th's century technological regime played a vital role in formulating the semiotic qualities of the machine and how society perceives it. Industrial engineers in collaboration with architects were working on the modernisms directions through which they were formulating the modern factory. The maxim "form follows function" was deeply connected to the Taylor-based managerial tactics that combined functionality with formalistic elements (Rappaport 2015). The factory became the exemplar of modernism, the ultimate representative of the functionalistic principles

that gradually passed to any scale, any function and institution built according to the modernist directions. Modernism's association to the technological innovations of its time fall in certain paradox. Modernism was persistently trying to disconnect the urban space with its historical roots. This effort included the zoning out of industry from the centers of habitation (Vidler 1992). At the same time, and in contradiction to the aforementioned condition, modernism played an important role in familiarizing the machine as an object with the human as a dweller. The house, as a "machine for living in" manifests convincingly that effort. Making the association between the factory and the house could be misleading. The house for modernism was indeed a factory dedicated to the production of life, organized as an assembly line attached to the processes. However, in the end, as Banham claims, modernism achieved to embrace a machine aesthetic, but its creations weren't anything more than theatrical representations of the machine world fitted to the production of life of the dweller (Banham 1969). The modern dwelling was filled with machines constituting technological wonders of the time, almost in the same the factory did. These machines, the television, the kitchen devices and several other automated systems, were aiming in linearizing the daily practices of the dweller, resulting thus to what we referred before as "production of life". However, as Banham also said, in the case of the house, this uncritical reproduction of life didn't follow same paces and forms of the factory's production line. That is because the house is a place where free will and autonomy can be still protected.

The technological evolution of the machine in the 20th century is highlighted by a phenomenon observed by Anthony Vidler. The term "uncanny" that has been widely examined by psychologists, such as Freud, refers to the contrast between the sense of safety and security with the fearful invasion of an alien presence (Vidler 1992). The uncanny was updated as an aesthetic category through modernisms preference towards shock and disturbance. For Vidler, the feeling of uncanny results through the activation of certain spatial conditions and it is filtered through the human's connections with its past, with the forms that seem to the human being more familiar (Vidler 1992). The human unconsciously maintains deep connections with its past as a dweller of the cave and as an extend of it with nature. That was a hinge for some architects in early 20th century, most of them exercising their practice through the premises of art nouveau, who pursued to re-establish the aesthetic relationship of the human with the senses that modernism was then rejecting. Among them, Frederick Kiesler's endless house, was trying to elevate the necessity of the dweller to find its way back to the cave (Editors 2023). A synthesis of organic cavities, juxtaposed, intersected and elevated above the ground, were introducing qualities that the machine aesthetic erased from the modern domestic environment. Roughness, scalability, a short of calculated randomness and earthliness were characterizing the materiality and the form of a house that was making its statement against the futuristic visions of the machine space and the modernist doctrine of the

house as a machine. At this point, is relevant to bring back the notion of precisionism noted in chapter III, that formulated a factory aesthetic based on the clean, flawless surface that rejected any trace of labor. The materiality of cast iron and steel conquering the factory interior was responsible for its uncanny qualities. It was this industrial rejection of the senses that Kiesler was contradicting with his project.

The smooth and flawless object was extensively supported by modernism also through the rejection of the ornament. Ornament was treated as a disease, a characteristic of excessiveness that doesn't fulfill the purposes of life. It was associated to weakness and to the opposite of progress and efficiency. Adolf Loos claimed in his famous essay written in 1919, "Ornament and Crime", that even the craftsman "is so healthy that he cannot invent ornament" (Loos 1997). In contrast to Loss's persistent rejection of the ornament, Colomina believes that ornament implies more functionality than it seems. The ornament is a visual information that coordinates the flows of communication among the species. The tool itself has its own ornamental qualities since it exposes the skill of the craftsman who made it. The tool thus doesn't need to be used in order to be useful. It develops through its form the sense of desire for an individual that has the skills to craft it (Colomina Beatriz 2016). The success of progress lies thus on the combination of the informational qualities of the ornament and the functional characteristics of the tool, that inform a thinking process. Colomina concludes that the blurring of the limit between nature and technology-machine-tools resulting from an ecology of the machine in the scale of the planet, is possible only by embracing the ornament as an embedded value in nature (Colomina Beatriz 2016).

The pursuit for an organic or sensual dimension in the production space is certainly not a norm in the design of the factory today. However, it is not either completely absent. In 2010 Junya Ishigami completes a space for manufacturing for the students at Kanagawa Institute of Technology. A square-like transparent box, completely hollowed from the inside, shelters an interior landscape filled with working stations, machines and materials. At a first glance, approximating the building from the outside, it doesn't seem anything than a simple glass box. However, the interior presents an organicity that could be associated with the organic fluctuations of a forest's clusters. The visual effect results from nothing more than the non-standard placement of the columns supporting the space's canopy. The steel white columns are of a rectangular section and placed on the structural grid based on a controlled randomness. By turning each column in a completely different angle along their vertical axe, the space fills with densities and dilutions of phenomenally thinner and thicker vertical lines. The space encourages a flow of processes in a creative way that doesn't adhere to any linearity. Production seeks to become the result of the intuition and the free will of the producers. Ishigami's building stands as a rejection of the standardized model of the production space, that suggests, linearity and repetition. In contrast to

this, Ishigami introduced flow and differentiation. We could claim that his persistence to the standardization's rejection reached almost stenographical levels. The plan of the space is not a perfect square, but it presents a slight deformation shaped by the displacement of its diagonal corners. This deformation doesn't seem to offer any spatial quality as long as it perceivable only through the drawing of the building. Similar to Ishigami's deformation of the standard, SANAA presented the deformation of the perfect circle, in the plan of the logistics center in Vitra Campus.

In 2014 Herzog and de Meuron complete the Ricola processing facility for herbs in Laufen. The rectilinear building is again shaped as conventional prism emerging out of the fields. A hollowed interior leaves enough space for the compacted placement of the steel machinery for the herbs processing. In contrast to the traditional skinning of the industrial shed with the smooth corrugated panels applied on metal frames, Herzog and de Meuron proposed a concrete demountable frame covered by a loam wall of rammed earth blocks. The prismatic volume looks quite monolithic from the outside, but the concrete framework is visibly combined with the earth blocks in the interior. The unavoidable smoothness of the machines' steel surfaces contradicts with the earthy appearance of the massive walls. Herzog and de Meuron's proposal is a reference to the earthly qualities and the roughness of the ground formations, very similar to the cavities that Kiesler wanted to celebrate, even though still delimited to the regulations of the industrial standards. Despite its material boldness, the hollowed interior fills with the conventional layout of the production line.

VI | Conclusions

The bringing back of manufacturing in urban space has already started concerning authorities, urban planners and designers around the globe. Heading towards a re-integration of the factory into the city implies a different understanding of the making process and a re-invention of the factory as a making space. The factory as a production space has historically proved to be more than a molder of material goods. It is the place where also knowledge can be produced. As a result, the access to the factory implies access to systems of educational advancement, which have been strictly denied due to the factory's offshoring during the past few years. Furthermore, cities are diverse environments that provide a context of blending educational, productive and domestic qualities, not as separated elements, but as complementary values. The production of things, knowledge and life can be better addressed if the factory is part of the city, than a city itself. Re-urbanizing the factory thus implies the accessibility to these forms of knowledge that are directly to linked to the making processes. The re-appearance of the factory in the city establishes the relationship of the society with the culture of making. It paves the ground for turning society from mere consumers and invisible participants to the process of making, into conscious producers and consequently Homo fabers. Treating the factory as a decision space, or in other words, as a forum for the city, secures the reasoning behind the making of things the importance of which extends beyond the technical knowledge.

The research made an effort to understand how certain production spaces operating in urban environments, affect their surrounding and at which level do they achieve to shape a material culture in a local or global level. The assemblage theory, as elaborated by Bruno Latour, was used in order to consolidate the complicated networks into which these spaces act as significant nodes. The Machi-kobas, the tofu factory and the Vitra campus, represent three different paradigms through which the space for manufacturing act as a node of a wider synergy. All three examples present a set of advantages and disadvantages. Consequently they don't necessarily define acceptable models since they developed dynamically by the particular socio-spatial and economic conditions in their immediate environment. However, the analysis of these examples could stand as an exercise for developing an understanding of these complicated productive systems. It could further provide a reference of how planners and designers can read a certain context before their intervention.

Finally, the research dived into the role of the architect as a designer of a machine space into the city. The semiotic and aesthetic dimensions that machines inspired during the 20th century

generated negative perception of the factory by the society. A perception that extends far beyond its operational disturbances. The re-introduction of the factory in the city implies the re-evaluation of its character and it's as the result of precisionism. Certain architects have delved into rejecting the machine culture, by changing its principles that are based on accuracy, calculation, efficiency and productivity. The factory both in the hands of SANAA and Ishigami, tempts to reach the level of an artistic lab, allowing for the intuitive flow of the making processes, in contrast to the linear production flows. In the case of Herzog and de Meuron, the production space returns to the primitive forms of the cave that re-establishes familiarity and contradicts the machine's uncanny qualities. In both cases, design stands a mitigator of the intense laboring conditions and they could be references towards an urban integration of the machine space. However, the humanization of the factory is linked to more aspects than normally an architect can aesthetically address. These aspects are directly linked to managerial issues and the social structures coordinating the production processes. They are linked to the ways that workers relate to each other, to their coordinators and to the society. It is through the re-structuring of these relationships that the factory can be further re-humanized again almost in the same way the medieval workshop maintained for a long time its domestic quality as a place for the family. This sense of care and social integration can be better achieved in the urban neighborhoods, the commercial streets of a city, in-between the domestic gardens, where the worker can sensibly feel at home.

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