

3D printing in hackspaces: *urban conflicts, spaces of otherness and heterotopias* - (*draft paper)

“Each heterotopia has a precise and determined function

within a society and the same heterotopia can,

according to the synchrony of the culture in which it occurs,

have one function or another”

– *Michel Foucault of other places*

The paper will draw from Foucault’s concept of heterotopia in relation to hackspaces and 3D printing. This specific concept is utilised to demonstrate how power reproduces spatially through social relations and usually is the basis either consciously or unconsciously of how social movements try to intervene in the civil society (Buechler, 1995). Hackspaces are spaces where value extraction happens in an increasing trend: spaces that are not thought of as spaces of production but nor strictly leisure either, in contemporary developed countries. A hackspace is a place that exists but is being addressed as counter-site, “a kind of effectively enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted” (Foucault, 1967). Hackerspaces and makerspaces are spaces of production but at the same time they are places of leisure time, seemingly autonomous and self-organized. They arose at the fringes of leisure and production from the development of

late capitalism networks of production and consumption practises (Castells, 2000; Benkler, 2006).

Heterotopias are spaces of otherness, they are spaces which constitute themselves on the basis of their difference to what is considered to be normal, they exist because of their difference. In contrast to utopias, they do exist in reality albeit in a divergent spatio-temporal configuration. They are in-between spaces in which the norms of contemporary society do not apply as they provide an alternative social ordering, yet in their deviation they do reflect the societies in which they are operating.

What is the function then of a hackspace within modern societies? Do they even have a specific function? Or perhaps are they spaces without function within our contemporary societies? My proposal today is that hackspaces serve a variety of functions according to their members on a subjective level, but there is one objective factor that gives them purpose in modern society. That purpose is the breathing space of a system in need for its outside, recuperation is the function of the capitalist system to engulf its own critique (Boltanski & Chiapello 2010, see also Soderberg & Delfanti 2015). In other words, many Hackspaces function as useful pools of talent, experimentation and creativity that the present situation (capitalist crisis) does not allow either the public or the private sector to invest, but which is deemed absolutely necessary for the continuation of the system.

The paper seeks to open the discussion on what are the theoretical presuppositions upon which recuperation functions (Soderberg & Delfanti, 2015), resulting in systematic extraction of value of the corporate world on

user innovation (Flowers, 2010) through 3D printing within these “other” spaces. Hackspaces are heterotopias of 21st century manufacturing. Central to the understanding of the concept of heterotopia is Foucault’s understanding of power and resistance (Rabinow, 1991; Gallagher, 2008).

Genealogy, Power and Resistance

Understanding Foucault without explicit reference to the genealogic method would be impossible. This is because Foucault uses genealogy in contrast with other modernist methodologies of describing history such as the one offered by Habermas (unfinished project of enlightenment) (1981, 1984) or the historical materialist utilised by Marxists (Lenin, 1909). If the Archaeological method which Foucault rests to describe knowledge, on the assumption that ideas and truths are produced within apparatuses with their own internal logic (Foucault, 1977), thus the task falling on where these discursive discontinuities begin and end, genealogy is the attempt to have a closer look how power, knowledge and the body interrelate (Dreyfus and Rabinow, 1982).

In his earlier work using the archaeological method, Foucault can be understood as a theoretician of tropes (Morgan, 1980; Bourgeois and Pinder 1982), fragmented periods of structures whereby ideas are developed. In the latter stages of his academic life, the genealogic method gives excessive importance to the how power is exercised, essentially losing faith in the quasi-structuralist approach of his earlier days. Using genealogy, experience of power becomes much more important than theory. Foucault is inspired by Nietzsche and shares the assumption that a scrutiny of objectivity through practises, ideas and power relations, can show subjective motivations. Thus,

truth becomes negotiable. History as a science is denied, there are no laws of history according to this understanding. Everything becomes a game of power and resistance. What is considered to be the norm in societies, is the work of professional groupings who establish the normal (Melossi and Pavarini, 1981).

Foucault does not analyse power in terms of economic systems, but in terms of practises. Spatiality for Foucault has a central role on how power and discipline is experienced, according to him, power has no centres but is rather a multiplicity of relations on many levels. How space is organised, lived, classified, experienced and so on is predicated on the idea that modern societies are able to discipline by individualising and making the subject visible. Such an understanding of power suggests that “resistance is never in a position of exteriority in relation to power” (Foucault, 1979: 95). Identities, normalities and how knowledge is organised then becomes a matter of how subjects are organised in spaces. Under such an approach, despite suggesting power cannot be diminished by an outside (another system of power), it nevertheless gives individual and social subjects the possibility to fight existing injustices and narrow identities in places of reproduction of the system, engaging with the many layers of relations on which power manifests itself. It looks at the “micro-physics” of power.

Since life is mediated through normalcies and institutions where power relations are manifested in different spaces, then it becomes apparent that the proposition of hacking and hackspaces offering to open spaces and discussions of knowledge to non-professional groups seems or is, a radical proposal.

Hackspaces and 3D printing

Hackspaces consist of people that are constantly creating, building, modulating, tinkering, mixing existing technologies and structures but at the same time forced to adopt institutional logic as a way to integrate and spread. They are spaces where hacking, the creative engagement of the non-professional public with science and technology is encouraged (Oudshorn and Pinch, 2005). They are in other words “other” spaces, they constitute a departure from what could be associated as a space of division of labour and production (Constantinou, 2014), spaces where professionals are engaging within their special training fields. These spaces are predicated on post-physical imaginaries as they connect with other spaces in virtual worlds and engage in alternative time and space paradigms. It is no coincidence for example that many hackspaces seduce people through their social media accounts rather than face to face neighbourhood meet ups.

They are regarded as either spaces of resistance to the diminishing quality of life mostly in advanced modern societies or waiting rooms to enter the markets in future times. Some sort of mystical outlook, prohibits the outside viewer to describe them as spaces of production and to analytically scrutinise them in a direct way (Doctorow , 2009). They are rather being enacted as science and technology experiences and practises that can be included in a wide variety of narratives (Knuuttila, 2002).

With hackspaces on the rise, the post-industrial imaginaries that governed the developed world since the 1970s has passed its time.

Within hackerspaces generation M, learns how to build, how to create with material (Papadopoulos, 2014) using one of the most potentially disruptive manufacturing technologies, 3D printing. Despite the technology being utilised since mid 80s (Jacobs, 1996), only recently attracted attention (Anderson, 2012), much to the extent of the work done by hobbyists and hackers and the prevalence of 3D printing in these spaces.

The technology allows users to create objects without being relied upon third party companies, since design and creation of the object can be done on a desktop. A process that could take up from weeks to months, can be done in days (this can be thought as liberating or even more stressful as companies ask for prototypes and designs in much smaller cycles of production now). It therefore allows the production of various objects, in spaces considered to be places of play rather than work, creating an environment where innovation can spread from R&D labs and Universities, to public and community spaces. But 3D printing is not only a technological tool; it symbolises fluidity as part of the idea of the market and construction of flexibility - a vital concept of the new economy in which on demand and customization are important concepts- whilst at the same time embodying the material and economic relations as well as cultural interactions. Within hackspaces, one can find seeds to an alternative production paradigm either as an evolution or in stark contrast to the existing one.

They mostly concern cultural reproduction, an engagement of the public with Science and Technology they are spaces of capitalist reproduction who also

affect the normal capitalist spaces where production is carried out. In the UK, one can find such spaces near city centres, in many instances in areas which utilise the term “cultural quarters”, which is usually the mark of former industrial or semi-industrial areas of cities which now stand in ruins. Cheaper access in terms of rents is something the authorities are using to supposedly show support for such ventures, without meaning that in many instances hackspaces have serious budget problems. In fact, the EU, an institution committed on spreading the capitalist basis of our societies is not only in favour, but in many instances where projects resonate with its goals, secures funds for the creation of such spaces. This could be taken lightly, allowing us to indulge in talks about democracy and values, but we can also look at what the EU and industry give as an explanation in their reports.

European Parliament, Economic and Scientific policy, Open Innovation in Industry, Including 3d printing, p.59

*“There is a need to better and more firmly incorporate social and societal aspects in the innovation process; innovation alone is not sufficient to cope with the key societal challenges in a successful way (Baroso 2009). **So far, social innovation and technological innovation have not been linked in a promising way.** Open innovation and open source innovation have the potential to close this gap, especially when it succeeds in bringing customers, engineers and others together in a problem-solving discourse. Additive manufacturing can only be successful when work place innovation finds a solution to organise the human-machine interaction in a fruitful way. **3D printing, especially in the context of fab labs, gives a unique opportunity to make young people more interested in and aware of the potential of***

technologies and to overcome the expected scarcity in qualified workforce [...] Open innovation strategies provide tools to bring together large companies, small and medium companies, public authorities and customers to work out smart specialization strategies. Fab labs have the potential to combine open innovation strategies and locally committed cooperation between makers, craftsmanship, or cultural industries.”

In other words, delegating the risk of unemployment to individuals at the same time as taking ideas from their work (spreading the risk of innovation to the users rather than paying for it). Such spaces, if we take the Marxist understanding of capitalism (Marx, 1990), are non-productive spaces because labour and wealth produced here is not directly utilised or dictated by capital. This was not the opinion of Marx, but his understanding of how capital utilises human labour. Here I argue that despite such spaces started as such (i.e not dictated by capital), capital increasingly finds its way to combine this “outside” source of innovation by recuperating and combining it with productive labour in order to enhance value creation and thus profit.

They are spaces where people who in the past have invested great amount of time in the basement of their house or their garage, alone or with some friends, come to meet new people and create in a multiplicity of ways. One can find people who are employed in giant corporations who are interested to work on their own projects without the bureaucracies of the capital, independent jewellery makers and business who do their creative work and prototypes in these safe spaces, university students who are able to use the machines and space for their assignment projects without having to fill the forms imposed by the university, to people who just hang around with their

own projects. The common denominator to all the heterogeneous types of individuals is their engagement with science and technology.

Drawing from the ethnographic research i conducted for more than six months, social media and online platforms play an important role in the gathering and set up of such spaces. They do not constitute a political subject as is also mentioned in Soderberg & Delfanti's special edition on Hacking (2015), they are rather a heterogeneous collection of individuals whose motivations and interests intersect at some point in time and space. The engagement with their common interests in science and technology is the unifying factor, one that masks the issue of class in our societies since in many of them, the issue of access is tackled in various ways. Access, instead of a political and social problem becomes a technical one, a matter of tinkering out a solution, which once tackled either with lowering membership fees or any other help, the political ceases to exist.

Hackspaces which I have observed either as a member or as a guest in the Midlands region in the UK (former industrial areas of the UK), begun as a way of people with similar interests to join forces and have their own space of experimentation. Many have been university educated that have some technical training, something which presupposes a specific social background. The access of participants to the premises rests on the individual's free time and proximity to the space, usually many members living quite of the site having to commute 20-30 minutes or more. Individual problems stay with the individuals that carry them, as they enter the hackspaces provide an access to tools and possibly friends, sometimes as an escape route from everyday ills. Not hacking or making, produces a feeling of awkwardness as the space's

culture feeds on the idea that members need to “do something”, inertia is the issue that needs to be tackled.

Some spaces organise more as innovation incubators (usually those who start with much capital), while others have much more practical organization. Some emphasize the reproduction of democratic practises as they celebrate general meetings, while others consider meetings as chores, practical problems that need to be done. Many users of 3D printing print their prototypes here, as industrial rules and regulations virtually do not exist yet in relation to the highly regulated corporate workshop. It is a cheap way to produce low volume production which then can test in online or other platform marketplaces. In such a way, hackspaces increasingly become spaces of production in the classic understanding of the term, since labour done is mediated by the price mechanism within marketplaces. In some instances, people do not even produce their own prototypes, but prototypes of objects that big corporations are in need, so they can market themselves for potential partnerships and jobs. Some corporations, by making donations or promises to such spaces, can also dictate some projects that members ought to carry out in order to secure funding. Thus, capital can also directly or indirectly dictate activity. The protection of each space to corporations is a matter of negotiation within the space. The more a hackspace is dependent on corporations, the less freedom it has on democratizing science and technology and working on needs rather than for the profit of others. Social-economic and even political conflicts are played out within hackspaces, albeit in many instances not recognized as such.

Fabulous St. Pauli's story is much more subtle. The space was not created as part of the city's plan for redevelopment, nor from the interest of certain

individuals to come together and practise science and technology, but rather as an anti-gentrification demonstration. When the authorities decided to sell a public space and a few buildings for commercial purposes, people from the area have occupied the space and refused to leave. The idea of creating a fab lab came only afterwards, when the people who blocked the commercialisation of the space, decided on what to do with the space; on how it could be useful to the needs of the people rather than for corporate profits. The different origins of the particular fab lab has already been engraved on its “dna”. This is of course not to say that a wide variety of heterogeneous individuals are associated with the space, as in many other hackerspaces.

Access to the space is ensured as most of the users of the space are living in the neighbourhood and personal problems are carried in the spaces to become collective problems. Characteristic examples are the meetings of “the right to the city” network on how to help welcome refugees that take place in the same space as a teenager as young as 13 years old print the parts of an exoskeleton he saw on a movie called “Elysium”, or the explanation of the concept of the “social factory” to people that are interested in using the space. People are not only encouraged to 3D print, but 3D printers are part of a discussion on how to rethink production in relation with the city, its people and governance.

Despite mostly needed in developing countries, hackerspaces flourish mostly in countries with cheap flow of electronic devices. Characteristic of this reality, is the spread of different charities coming from Western countries who more often than not, are trying to “teach” people in developing countries in Africa on how to make a living or print exoskeletons for the amputated hands of

children in war torn areas. One can find hackspaces looking back to the 90s or perhaps the 70s with very different demands, it is a “movement” nonetheless that gained momentum in times of economic crises. Why the hackspace culture in western world? Nick Dyer-Witheford (2015) in his book *Cyberproletariat* problematized the material basis for our consumer societies. Namely, how have extraction of raw materials from Africa, different industrial production zones in the world such as China and the cheap flow of materials and electronic devices in places such as Europe and the US, are connected organically. He was not the first to point it out, but his contribution is important in unmasking the working of this process, demonstrating that the capitalist system haven't changed in a substantial way (antithesis labour-capital), but quite substantially in its secondary characteristics (form of jobs, technologies, the way information is used, transportation, etc). The hacker-culture is possible on the cheap flow of goods in the Western world. A characteristic example is the maker's movement taking its name from a magazine in the US, and the fab-lab network growing out of the vision of an academic in MIT (Niel Gershenfeld, 2005). The idea that societal deviants can appropriate the wealth created and rework on it how they please, without adhering to society's norms probably reminds us of something we romanticized for years in the past; piracy.

Pirate organizations?

Hackspaces resemble pirate organisations. Piracy makes sense where civilisations occur, they deviate from the norm upon which they feed themselves; but piracy during capitalist mode of production is interesting because of its relation to the system it supposedly subverts.

As Durand and Vergne (2013) put it,

"[modern] Pirates appear in pivotal periods in history. When capitalism began to spread along the trading routes toward the Indies. When radio opened an era of mass communication. When the internet became part of the global economy. When the biotech revolution began bubbling to the surface. And it's no coincidence that these four Golden Ages of piracy correspond major turning points in the history of capitalism. In fact, we argue, piracy could very well be one of the drivers of capitalism's growth and evolution."

Just as pirates show up in a historical period where there is an organized mode of production, since themselves are not creating wealth but stealing and reworking on it (acting on reproduction rather than production), so hackspaces pre-suppose societies that they already have established a mode of production where tools are available. In other words, only when the consumer society finds itself in a predicament where there is an endless supply of cheap electronics and on the other hand an increasing de-industrialization process, the hackspaces start to have meaning in societies. Garage workshops, backyards, all spaces that used to be considered spaces of resistance, with users experimenting, in many situations having visions of alternative futures to capitalism have as they matured either been co-opted, became new giant industries or died out, with the exception of some which remained as small groups at the fringes incapable of inspiring change. The limits of the pirate, are the limits of the system which it opposes, for without it, the pirate seizes to exist.

Why are they heterotopias?

Hackspace are juxtaposing simultaneously in a physical space the virtual social media worlds that connect people with the same general interests in technology or particular technical interests. They challenge the notion that knowledge is only for experts but at the same time undermine the role of our universities as they increasingly being converted from institutions of knowledge to producers of information, skills and labour force for corporations.

Hackspace constitute heterotopias as they can be used as open source technical libraries, an accumulation of time through the combined leisure time of the participants pursuing their own needs, in a capitalist world where knowledge is expensive and extensively used for the sole purpose of making profit. But also temporal heterotopias through maker-faires and festivals in which one enters the world of creation, where making is celebrated as if outside them inaction is the guiding principle. Insofar as they are pressuring the system to open, they themselves become penetrable by capital, as the increased interest of DARPA and the military-educational-industrial complex towards them shows (O'Leary, 2012).

“The ship [for Foucault] is the heterotopia par excellence. In civilizations without boats, dreams dry up, espionage takes the place of adventure, and the police take the place of pirates”. In the case of the hackspace, the presence of someone at the hackspace is not limited on one's ability to attend physically but also on virtual presence and acceptance of the hackspace an

idea that moves, which provides an important social leverage in the political economy of hope. Hackspaces can be used as illusions of freedom and participation in our increasingly societies of control and commodification, providing as science and technology often do, a unifying concept in our class societies.

Discussion – Problematique

So what is my purpose in this paper? I want first to show that we are not all in this together, something which is so common sense that is often forgotten. Class societies with conflicts taking place in everyday life are not immune to these spaces of “otherness”. What we usually see in the political arena at least, is that technology is used as a unified factor, sometimes forgetting that societal problems are not technical per se but problems of social injustice and exploitation. So after setting this forth, there are two options that have been tried so far. The first is to try radical political alternatives to the management of spaces, how people participate, have access, make decisions etc without thinking much on the economic possibilities. The other is to try radical economic alternatives such as p2p networks and solidarity economies, thinking that if we set up our own networks – between or within the market and the state - we will not be dependent on big centralised corporations. Looking at the politics around the world, these alternatives fail to provide a compact vision for social change despite that on a local level they may manage to solve some issues and pose a few cracks.

In hackspaces one can see the emergence of a society of commons, yet the spaces themselves cannot overcome their mirror, the society they reflect and

which they participate. This is because they act in the sphere of circulation of materials and reproduction of the system, rather than on the exploitation at the point of production (Alexiou, 2014).

Hackspaces are both of these sites at the same time. They constitute heterotopias as long as they constitute within a capitalist society where private property is the foundation and profit the purpose. In a society based on commons they would serve no purpose. They provide an essential alternative space of the capitalist system, but more of them does not mean changing the system as they cannot replace political will, they do not constitute an outside but rather a margin. Therefore seeing them as political spaces in themselves is problematic. Perhaps what they can provide best is what Greek architect Stavros Stavrides (2002) called as “passages” towards otherness. Hackspaces can provide windows to an alternative future. These potential windows function can function for accumulating political will for social change or as potential re-newers in capitalist societies through recuperation in times of systemic crisis and failure for the system to reproduce itself. Their contradictory nature is what gives hope for possibilities but also its own nemesis.

By thinking hackspaces as heterotopias, ie as spaces of both cultural reproduction and production of objects we have. One, is to try and spread power spatially, eventually thinking that all these cracks do not allow the system to control completely. But I content that such ventures, are ventures that if taken by themselves as ontologically something different, without a robust political movement that challenges the capitalist economic basis of societies in terms of political power – to challenge the system where

exploitation rather than distribution and access - , they provide a good source of stabilization to the system, either by integrating or by showing how it can solve its cracks (confirming the rule by showing its outside). So more of them, does not automatically mean success of spreading power. I argue that a solution then becomes the politicization of hackerspaces, making them spaces where people not only get an interest on how the world functions, but to also engage in political collectives who potentially can challenge the centres of power (those who own the fibre cables, server cities, electricity, water, transportation, heavy industries etc), those who own the vast conglomerates of production.

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