From Do It Yourself to Do It Together

Sociological analysis of knowledge sharing in Stockholm Makerspace

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Abstract

The study examines the variety of interaction and motivation practices to participate in the sharing initiative as well as pinpointing key elements of member-driven organization functioning; in the case of Stockholm Makerspace – a community of non-professional makers.

The current scholarship on sharing is mostly focused on the large-scale platform businesses in a North American context, thus evidence from grassroots small-scale initiatives is lacking. This paper aims to fill this gap by providing the empirically grounded sociological study of the operation of sharing initiative in Sweden.

Data including 1) 11 in-depth interviews conducted with active members of the community and experts, 2) ethnographic observation in situations of planned workshops and everyday life of the Makerspace, 3) systematic online observation (in the role of observer as participant) (Gold, 1958). Therefore, this study employs mixed ethnography and digital methodology – studying sharing economy communities both online and in situ to provide a ‘thick’ description of community building.

The results revealed that members of the Stockholm Makerspace, acted as prosumers, and attempted to benefit not only from the community understudy, but also contributed to the societal development at large, by creating a public good. Shared access to tools and common “know-how” democratized production of knowledge and its spreading, thus contributing to informal learning, which complemented formal education institutions. The main incentives of sharing, vocalized by participants in the study were open-ended socializing and community commitment, as well as self-expression and belonging.

Keywords

Sharing economy, knowledge sharing, commons-based peer production, DIY communities, ethnography
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Introduction

The financial crisis of 2008 revoked public and scholarly attention to the meaning of the established economic practices. The efficiency of cooperation over competition was highlighted by the Sharing economy model, which emphasized access to products and services over exclusive private property and ownership. Entrepreneurial spirit and the strive for innovation in organizing work and life, expressed in enormous growth of platform businesses, challenges markets in the traditional economy (Mair & Reischauer 2017). This can be formulated in one catchphrase, proclaimed by the Wall Street Journal (2015): “There’s an Uber for Everything now”.

While ones argue that sharing economy addresses an anti-capitalist rhetoric and a strive for inventing novel means of resource allocation, others assume that sharing economy is not about sharing at all (Eckhardt & Bardhi, 2015), “that label is either strategically or unwittingly employed to expand the market rather than sharing in the sense of providing access to goods” (Widlok 2016, p.193). Sharing becomes a room for maneuvering across both academic audiences (who confuse sharing with reciprocity, gift-giving, barter swapping and favors) and practitioners (who promote market mediated practices through the lens of social rules such as reciprocity).

The widely-discussed pioneers of the sharing economy (such as Uber and AirBnb) are profit-making companies, which stay out of the research inquiry. I am going to speak of a sharing paradigm instead to highlight the other end of the spectrum, and not the profit-making one. There is nothing new in the basic idea of sharing: it is the most universal form of economic action, distinct from the notion of reciprocity (Price 1975; Widlok 2016) and refers to “allowing others to take what is valued” (Widlok 2013). However, the “hype” caused recently by the sharing economy model has reshaped the way in which we think about production and consumption. In this sense, sharing points to the consumption ideology: “some consumers use their choice of mode of consumption—ownership versus access—as a strategy to articulate and promote their ideological interests to society, business, and government” (Bardhi and Eckhardt 2012, p. 885). This shows that the emergence of the rational consuming individual (Daunton & Hilton 2001), who has private consumer dissatisfaction, can become a platform of the formation of collective action. Since the momentum grew, movements rethought the impact of consumption and confronted the overproduction and overconsumption crises (such as anti-consumption, voluntary simplicity, downshifting, and new minimalism). What unites the
mentioned initiatives is the orientation toward the satisfaction of unsatisfied needs with underutilized resources.

Moreover, under the cultural domination of capitalism, uniform economic practices are enforced by the institutional settings, which vary across countries. The alternative (not anti-capitalist in essence, but alternative to conventional market) practices appear when the market economy does not provide people’s practices, either in situation of crisis, or transition, which challenges the values of capitalism. Looking at distinct practices, we can understand the logics of social change within the economic system (Castells et al. 2017). For example, if we take Sweden as a case study, we can see how the strong civil society coupled with the Swedish innovative capacity created a dialogue between many stakeholders, which resulted in a creation of socially and economically important projects, such as the promotion of the sharing economy in large cities.

The Swedish arena for the collaborative consumption initiatives is fragmented and not developed. Nevertheless, it carries a unique imprint of a Swedish lifestyle. As Felländer et al. (2015) explain, the Sharing initiatives in Sweden aim to answer the sustainable development goals, rather than provide cost-efficiency solutions for the firms; moreover, many of the platforms are non-profit, run by volunteers. Large state institutions are involved in partnerships with collaborative consumption platforms. For instance, “Sharing Cities Sweden”, a national program for the sharing economy in cities, has been recently introduced to contribute to the promotion of social innovation and sustainability in Stockholm, Gothenburg, Malmö and Umeå.

This paper analyses one of such initiatives – Stockholm Makerspace – a community of non-professional makers. It is a non-profit crowdfunded organization founded in 2012 and housed in a workshop in central Stockholm. The workshop is equipped with both traditional machinery and microelectronics, 3-D printing facility as well as digital-knitting technology, owned by the collective and governed by members. Smith et al. (2016) identify makerspaces as grassroots innovation movements. Through interdisciplinary collaboration and shared access to tools, classes, and each other’s knowledge, the members of the makers’ community promoted knowledge sharing and innovation. As Schor et al. (2016, p.71) noticed in the empirical case-study of one of the American makerspaces, “the combination of peer-to-peer networks and new production technologies such as 3-D printing has led some to predict a coming third industrial revolution based on small-scale local production that could revitalize communities while being environmentally, politically, and socially sustainable”.

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Aim and research questions

The aim of this contribution is to study the variety of interaction practices and motivation to participate in the sharing initiative, as well as to pinpoint the key elements of member-driven organization functioning on the case of Stockholm Makerspace. It aims to contribute to economic sociology by making an attempt to provide a better understanding of: (1) rationale behind non-market-based means of resource allocation and (2) non-economic collective outputs of economic action embedded in social structures.

Research questions that I state are the following: (1) Why do members become part of the sharing initiative? And (2) What are the collective outputs the members seek to create?

Sociological relevance

The sharing economy gained considerable scholarly attention recently, however there is still disagreement about the conventional term, describing its activity since the focal point of interest in the scope of sharing economy was switched to technological composition of Web platforms, attempts to set legislative agenda by jurists and law scholars, assessing market size and presence of collaborative consumption platforms and estimating revenues generated by platforms, brought by economists. Moreover, current scholarship on sharing is mostly focused on the large-scale platform businesses in the North American context, evidence from grassroots small-scale initiatives is lacking. Cases from other institutional and cultural settings are also underrepresented in sharing economy literature.

Sharing remains undertheorized in sociology - the paper aims to fill this gap by providing the empirically grounded sociological study of the operation of sharing initiative in Sweden. The field of “making” is also understudied in sociology. Makerspaces (also called as hackerspaces and Fab Labs) gained attention in Science and Technology studies as well as Human-Computer Interaction field with focus switched to digital fabrication and activity of making per se. The presented paper fills the gap by examining the social underpinnings of collaborative making.
Mapping the previous literature

Conceptualization. Sharing as a mode of exchange

The term “collaborative consumption”, which became then a synonym to the sharing economy, came into a spotlight with works of Rachel Botsman, who defined the sharing economy in terms of the short-term lease market where underutilized assets or “idle capacities” (such as an empty room in an apartment or a place in a car) become an object for commodification (Botsman & Rogers 2011). The phenomenon of “collaboration” came from the open software/open source movement with works of Benkler (2004,2006). Inspired by creation of Linux operating system, Benkler (2002) sheds a light on the principles of new open-source economics: its creation lies outside the scope of private sector, and property rights are not assigned to anyone. Thus, creative potential of masses coordinates through the Internet, and common “investments” result in the creation of socially important project – such as Linux, or Wikipedia. In the paper, I make use of both, broadly describing the paradigm of sharing and speculating about its empirical realization in collaborative making on the case of Stockholm Makerspace.

The proposed study departs from the assumption that speculative notion of “sharing economy” is far removed from the actual sharing in broad sense. Sharing in the sharing economy refers to the separate means of resource allocation, which is neither market, nor reciprocity or redistribution, as it rests upon the following characteristics: (i) counteragents do not enter a straight swap, (ii) equivalency of services is not sought, (iii) arrangements are not evened out: individual can occupy a strict donor role, only providing services, (iv) ownership is not transferred in sharing, and thus the informal debt (or expectation for reciprocation) cannot emerge, (v) profit one gets is often of non-monetary nature. (Shmidt 2019)

Sharing is not gift-giving

Belief in economic determinism is the modern evidence, up to XIX century markets did not dominate society, and economic system was embedded in social relations, and did not subordinate individual status to one’s capital. (Polanyi 1947). Subordinate role of market was displaced by other economic principles. Economy, accordant to the substantive significance of the economic is thus an “institutionalized process,” exemplified by Karl Polanyi by three organizational types (or forms of integration, according to Polanyi), each requiring a certain institutional mechanism: reciprocity, redistribution, market. Redistribution is characterized by the centralization of resources in the hands of one authority, which is followed by distribution of resources according
to established in the society norms. Market is described as displacement from hand to hand under the principle of equivalence of the exchanged. Reciprocity implies moving among corresponding points in symmetric groups (Polanyi, 2001). The idea of time-stretched return of the gift is what distinguishes the reciprocal exchange from the commodity exchange. In the anthropological literature, the logic initiated by Karl Polanyi give the central place to the notion of “deferred reciprocity,” to imply that the gift is ensued by a delay before its return in contrast to the market exchange of goods, where the transaction amount and terms are fixed and known to the participants in advance. Due to the fact that transactions under “deferred reciprocity” are not time-balanced, the giver must have an evaluation mechanism allowing them, on the one hand, to assess the recipient’s intention to make a return gift, and on the other hand, allowing the recipient to demonstrate their reliability in the short term (Sherry, 1983, p 159).

Gifting is accompanied by the expectation of a return gift, and the principle of “returning reciprocity” does not at all imply equivalence, which also distinguishes the reciprocal and market exchange. Often, the return gift exceeds the original gift in terms of cost. The excessive compensation of the gift may be prompted by a desire to show nobility and to indicate generosity (Kolm, 2006, p.18). Widlok (2017) argues that social practice of sharing is devoid of displays of generosity and power. The “obliged” part of exchange is also irrelevant for sharing – informal debt cannot emerge within the condition of absence of transfer of ownership (ter Huurne et al. 2017). Moreover, deferred return gifting is not sharing. Transactions are unilateral: while an agent possess a resource, he shares it with the extended network of social contacts, which is structured around this resource.

**Sharing is not reciprocity**

The reciprocity requires a certain proximity of the participants, where kinship as well as shared neighborhood and totem are the most lasting and encompassing groups, within which voluntary and semi-voluntary associations form symmetrical groups of those bound to one another by mutual ties (Polanyi, 2001, p.70). Following the substantivist tradition and Polanyi, Sahlins (1972) argues that the economic cannot be considered in isolation from the social context. He understands reciprocity as “symmetric” relationships of the two sides, each pursuing their socioeconomic interests. At the same time, solidarity can be achieved via reciprocity, since the flow of “matter” in reciprocal relations is accompanied by mutual assistance and benefit (Sahlins, 1972, pp. 188-189). He points out that social relations restrict the spatial movement of material wealth, but at the same time, the symmetrical interchange implies a specific social attitude. Simply put, we either give to friends or give in order to become friends (Sahlins, 1972, p. 186). Thus, there is a generalized reciprocity between blood relatives, expressed in altruistic
help, which is returned to the initial donor if necessary. The balanced reciprocity implies moving “from hand to hand”, which stands for the equivalent exchange of resources between two parties with their own economic interests, making these relations less personal. Finally, negative reciprocity is the most impersonal and utilitarian type of such relationships that can be exemplified by barter (Sahlins, 1972, pp. 191-196). As it was already mapped in the previous literature, the principle of non-anonymity is not in evidence for sharing, realized by the Internet. Nevertheless, key difference lies in the structure of relation between donor and recipient.

The priority of exchanged good over the structure of counterparties’ relations principally differentiate sharing from reciprocity. Sharing principle characterizes by secondariness of structure of relations. Agent hold resources and select exchange partner with respect to the amount of possessed. Reciprocity plays by the opposite rule – resources are distributed with respect to the structure of relations between counterparties. Reciprocity revolves around the subjects of exchange, while in sharing emphasis is placed on the object.

According to Steiner (2015), in market driven society, reciprocity takes much more complicated forms than those introduced by Polanyi, and organizations make some of these forms possible. It is a very important notion as long as reciprocal transfer exchange as well as gift giving conventionally fall into the sphere of ‘household economy’, while sharing can be considered at multiple levels of social organization from local community arrangements to market-mediated practices. Pais and Provasi (2015) make an assumption, that sharing in the sharing economy should be input to the research as umbrella notion, relating to at least two form of integration in terms of Polanyi. Agents’ collaboration concerning exchange intermediate reciprocity and market, and disposal of the common pool of resources intermediate reciprocity and redistribution. Reciprocity is achieved by “peer-to-peer-based activity of obtaining, giving, or sharing access to goods and services, coordinated through community-based online services” (Hamari, Sjöklint, Ukkonen, 2015, p.2050). I prefer not to speak of symmetrical peer-to-peer exchange as of synonym to reciprocity. If P2P network is a structure, reciprocity should characterize linkage in it. However, symmetry in such network is not defined by horizontally located friend or kin households, alternately being donors and recipients to each other. Symmetry and equality of relations are emphasized only by the fact that resources are transferred from hands to hands within “peers”. Accordingly, I presume it incorrect to determine the characteristic of ties in peer-to-peer networks as reciprocal.
Sharing Mode of Exchange

The following table (Shmidt, 2019, p.151) summarizes the key conceptual characteristics of sharing as a mode of exchange as opposed to reciprocity and market.

<table>
<thead>
<tr>
<th></th>
<th>Market</th>
<th>Sharing</th>
<th>Reciprocity</th>
<th>Sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strict equivalence of exchanged (monetary nature), bilateral transaction</td>
<td>Imbalancedness of transfers, unilateral transactions</td>
<td>Return gifts are stretched in time, expectation of reciprocation</td>
<td>No return gifts, unilateral agreement</td>
</tr>
<tr>
<td>Anonymity</td>
<td>Personal autonomy</td>
<td>Non-anonymity</td>
<td>The amount of resources is fixed, the object of sharing is selected based on the volume of possessed among the extended network of social contacts</td>
<td></td>
</tr>
<tr>
<td>Mutual profit</td>
<td>Profit is non-monetized</td>
<td>Stability of contacts – the subject of exchange is chosen on the basis of non-economic preferences among the network of the closest contacts</td>
<td>Priority of the exchanged resource, but not of the structure of relations between parties</td>
<td>Priority of the structure of relations between parties</td>
</tr>
<tr>
<td>Competitive pricing</td>
<td>No pricing in the absence of distribution of property rights</td>
<td>Priority of the relationship built around the exchange, but not of the gift itself</td>
<td>Priority of the exchanged resource, but not of the structure of relations between parties</td>
<td></td>
</tr>
</tbody>
</table>

By observing the genesis of sharing economy platforms, Schor and Fitzmaurice (2015, p.420) came up with a typology of organizational forms in which sharing operate. Four forms derive from combination of organization type (peer-to-peer and business-to-peer) and market orientation (non-profit and for-profit). The mentioned forms are united by understanding sharing economy model as a combination of economic rationality and technological infrastructure, concluded in the socio-cultural context of the value of "sharing with the near". Following the conceptualization, I put an emphasis on non-for-profit peer-to-peer sector of the sharing economy to highlight the “purely social” aspects of collaboration and to exclude the “homo economicus” rationality behind the participation in this movement. The case under study also falls into this category by two dimensions: (i) the organizational form of ideell förening do not allow Stockholm Makerspace to make profit for its activities, (ii) the physical space, machinery and tools in Stockholm Makerspace are owned by the collective and used collectively, there is no other company which sponsors the equipment, and could open access to it.

Current scholarship on sharing is analytically incoherent. What was highlighted in the number of publications and what is the subject of this paper is the orientation toward social base of economic action within the studied phenomenon. Belk (2014a) criticizes so called “collaborative consumption” for mixing logics of market and gift exchange and proposes to define collaborative consumption through coordinating the acquisition and distribution of resources for remuneration (both monetary and non-monetary) (Belk, 2014a, p.1597). Sharing platforms that
require payment are viewed as a business model in which technologies allow people to obtain the necessary resource directly, bypassing the centralized exchange regulation institution (Owyang 2015) and are excluded from the sociological understanding of sharing. Belk's contribution to the theoretical conceptualization of sharing helps to "cut off" a number of initiatives erroneously attributed to the sector of sharing economy. He makes it clear that commercial platforms are included in the sharing economy erroneously and suggests separating labeled business relations ("pseudo-sharing") and "true" sharing - providing temporary access to the resource on free of charge basis (Belk 2014b).

The perspective which insists on excluding money from “true sharing”, however, seems to be week, which becomes evident from works in economic sociology. The metaphor of Hostile worlds was introduced by Zelizer (2009) to dismantle a belief that economic intervention is destructive for the normative order and there are moral limits that should support the sovereignty of the social sphere (e.g. commodification cannot intervene spheres of friendship, caring, personal relationships, etc.). Following Zelizer's line of reasoning, Fourcade (2012, p.1058) argues that by regarding personal relations and money as incommensurable quantities we make an analytical mistake, since boundaries between «personal», «intimate» and “monetary” are contested in everyday life. However, as applied to the case under study, despite the aspect of direct profit-making is excluded, the potential of deriving indirect economic profit cannot be abandoned. Moreover, the members-driven non-profit organization should raise funds collectively to support its activities, which means that completely gratuitous transfers are not possible within the peer-to-peer organizational form.

**Makerspaces as a part of sharing economy movement**

The concept of “makerspace” is usually used to describe the “community-led, open spaces where individuals share resources and meet on a regular basis to collaboratively engage in creative commons-oriented projects, usually utilizing open source software and hardware technologies” (Niaros et al. 2017, p.1144). Commons-based peer production, the term introduced by Benkler to describe decentralized, non-hierarchical structure of production, has brought a new logic of collaboration and presaged the key ideas of advocates for the sharing economy. Inspired by creation of Linux operating system, Benkler (2002) sheds a light on the principles of new open-source economics: its creation lies outside the scope of private sector, and property rights are not assigned to anyone. Thus, creative potential of masses coordinates through the Internet, and
common “investments” result in the creation of socially important project – such as Linux, or Wikipedia, often without any financial compensation. Shortly described, CBPP puts an accent on (i) collaboration of distribute networks of people, (ii) shared resources, (iii) common goal. In the light of this, Makerspaces may be attributed to the commons-based peer production initiative which attempts to bypass the dependence on private sector and provide small-scale solutions to problems of traditional production and consumption.

Attention brought to Makerspaces as part of the sharing economy, as some advocates for it argue, may be partly explained by attributing them ability to disrupt traditional production and innovation. Open source and commons-based production has been mainly a phenomenon for intangible production (Seravalli 2012), as far as Internet technologies opened up opportunities for entrepreneurs creating digital products. Fascination with digital tools extended to physical prototyping and personal fabrication. Diffusion of open hardware (such as 3D printing, for example), is now starting to become not only cultural, but economic shift either, as Anderson (2012, p.19) argues: “The Maker Movement is beginning to change the face of industry, as entrepreneurial instincts kick in and hobbies become small companies”. Exploring the entrepreneurial spirit and strive for innovation in sharing economy, Sundararajan (2014), refers to the “maker movement” as the prime example of a peer-to-peer initiative, which allows people to express aspirations that would otherwise not been realized. One of such aspirations, as Dale Dougherty, the founder of the MAKE Magazine and the Maker Faire, argues, is people’s willingness to “engage passionately with objects in ways that make them more than just consumers“ (Dougherty, 2012, p.12)

While the most of sharing economy initiatives are directed towards consumption, collaborative making falls into the specific category of sharing that enable production. Schor (2014) argues the makerspaces providing shared access to workshop and machinery, and other production sites such as p2p educational platforms (skillshare, p2p university), complement traditional educational institutions by democratizing access to skills and knowledge. Moilanen (2012) points out that a makerspace is a community, which has a shared space to provide access to equipment and stimulate free exchange of ideas and information. Community own and run the space in a spirit of equality with non-for-profit orientation. Thus, Makerspace may be described as a CBPP initiative which promotes sharing practices; exercise self-governance (community-based), has strong reliance on technology and utilizes local manufacturing and personal fabrication.
What attracts users to sharing. Community-building potential of makerspaces

While economically rational motivation has been important in attracting new participants to the movement, it has not been pronounced in literature as the primary goal of participation. Lessig (2008) argues, that sharing economy is based on constant exchange, aiming to balance between the interests of the parties. When any of the parties does not benefit from participation in this system, it comes out. While in a market economy, pricing is an incentive for resource allocation, in the sharing economy this function is replaced by non-price social relations. When it comes to non-profit sharing, the lack of exchange value and absent motivation to extract material benefits, creates conditions for the development of certain non-market “rules of the game” and range of motives to enter into non-market relations of exchange. When the extrinsic economic motives do not exist, participants can pursue the goal of increasing social capital (intrinsic motive), making collective action and professionalization of platforms more sophisticated (Schor et.al 2017) Social networking is one of the key tasks of sharing. Rosen et al. (2011) findings reveal that the strive for being a part of community is an essential element, that stimulates engagement to the sharing economy, Schor (2014) shows that users remain dissatisfied with the "sterility" of communication with peers, as they expect to establish strong trust relationships and expand the network of contacts. It can be thus assumed that compared to the anonymous market environment, sharing attracts people who are interested in inclusion in an expanded network of weak ties. Participants’ enthusiasm with sharing practice, as Schor and Cansoy (2018) argue, may be explained by the emergence of a distinctive habitus, rooted in proneness of young high cultural capital consumers towards “more bodily, material, and locally rooted set of practices», especially in urban areas. This assumption echoes in collaborative making practices, oriented towards “a state of being, in which the subject feels enabled to activate their knowledge, manual skill, and materially productive engagement” (Sydow 2017, p.2). Empirical studies found the two top drivers of participating in Makerspaces: these platforms are seen as cultivators of social networks and informal learning (Saunders and Kingsley 2016, Sleigh et al. 2015, Moilanen 2012). It is also emphasized that sharing practice can be mediated both by the desire to obtain personal benefit (not necessarily monetary) and by the desire to achieve the common good (Lessig 2008), which again points to the orientation toward others in sharing. It is argued in the literature, that a desire to be socially responsible and helpful to other community members is deeply embedded in the human nature, and thus, collaborative consumption initiatives “hijack” this tendency to “drive cooperation within broader yet distinct
groups” (Berg 2017, p.417). Haenfler et al.(2012) point out to the mobilizing function of the collaborative consumption movements, which lie “at the intersection of private action and movement participation, personal and social change, and personal and collective identity” (Haenfler et al. 2012, p.1). Thus, I hypothesize that one of the possible drivers of the sharing is the aspiration for community-building, deriving from extrapolation of the self to the aggregate level: so called ‘extended self’ (Belk 1988).

Collaborative consumption, with its underlying logic of sharing rather than of private ownership, prioritizes access over possession, undermines previous definitions of objects, expands the idea of “self” and creates new identities. Our property is the main source and also a reflection of our identity, representing the so–called “extended self” (Belk 1988). Expansion of “self” in the collaborative consumption means that we bring our “I” to the level of social aggregate, now to include those with whom we share our good, thus sharpening our sense of belonging to an imagined community by making our “I” its integral part. Following Anderson’s (1991) idea of imaginary communities, it should be noted that these communities are not based on physical co–presence of participants but on a mere sense of belonging. According to Belk (2010), virtual communities of the sharing economy become a certain third place (after home and work space) for participants, where they spend a lot of time while feeling themselves accepted. Makerspaces, which share a physical space may also be an urban site, considered as a “third place”. Oldenburg (1999) developed the thesis that some urban spaces provide social experience outside our major places, such as home or workplace. The third places, as Oldenburg (1999, 2001) argues, contribute to the civic engagement, and therefore, democracy, by developing a sense of place and strengthening the community ties. This idea can be traced in Simmel’s works. He argued that some social occasions provide the most democratic experience as they allow people in them express themselves fully. Simmel (1971, p.132) refer to them as “sociability” - association for its own sake, occasion in which people get together for the purpose of “joy, relief, vivacity” and which in contrast to other associations, shows lack of reciprocity.

Concluding remarks

With the literature section, I attempted to lay emphasis on the analytical incoherence of the sharing economy scholarship by theorizing the notion of “sharing” and show its workings, exemplified by the state-of-the-art of makerspaces as a part of sharing economy. I bring the notion of sharing economy into research as an umbrella notion, summarizing the collaborative and decentralized means of resource allocation within a community and (or) organization.
By mapping the previous literature several assumptions for the further analysis were derived. Despite the concept of a makerspace is marginal to the sharing economy scholarship, the case is worth further empirical reflection, as it bears several critical points. Firstly, the detachment of market logic in *non-for-profit peer-to-peer* sector of the sharing economy brings up other than “homo economicus” types of rationality. Secondly, institutionally centralized forms of resource allocation, such as reciprocity and gift exchange, conventionally fall into the sphere of household economy, while sharing practice can be considered at multiple levels of social organization. Thirdly, the empirical studies show different attitudes and motivations when it comes to individual involvement into sharing. However, the most of sharing economy initiatives are directed towards consumption, while the case understudy falls into the category of sharing that enable production – the dimension, that have not been properly studied in economic sociology. Lastly, the empirically grounded study of a Swedish organization would contribute to filling the gap of knowledge about non-American sharing initiatives (which constitute the most of current research in the field).
Research design

Ethnography in physical and digital spaces is applied with the emphasis being put on the meaning of behavior and the interaction between members of the group, which shares the same culture (or, in my case, the same practice of being a part of sharing economy movement) and this design fits in the sense that we strive to get a picture of how the group works (Creswell, 2007). Brewer (2000, p.10) defines ethnographical approach as “the study of people in naturally occurring settings … by means of methods which capture their social meanings and ordinary activities”. The similar ‘capturing’ is carried out in the presented study. Geertz (1973) argues that thick description is what makes ethnography ethnography. Records which are gathered in the field are full of meanings, which were created by the objects of research. People attach significance and specific meanings to all the actions observed, and thus, my goal is to capture these self-attached cultural codes to interpret the action. I pursue to construct maximal interpretation that implies a transition from a micro-level thick description to formation of explanatory hypotheses about the structural features of the phenomenon under study (Reed 2008)

This approach is extremely useful to study motivation underlying action. Ethnography is the most appropriate approach to answer my research questions as it is directed towards description and interpretation of the shared patterns and meaning of actions – it gets at the “why” and “how” questions (Creswell, 2007). The multiple kinds of data – field observations, in-depth interviews and digital methods – provide different perspective on the phenomenon taken separately. Triangulation of these materials, informing my study, provide more holistic view on the empirical reality under study.

The proposed study relies on the digital methods. Drawing on “netnography”, or online-based ethnographic observation I implement digital sources of information to study the Makerspace community. Kozinets (2009) argues, social networking sites and virtual worlds carry complex markers of diverse cultures, proclaim and stimulate new types of communication and community building. Hine (2015) proposed a vision of “embedded, embodied and everyday” Internet, highlighting that social interactions mediated through virtual platforms acquire meaning through their embedding in everyday life. From that standpoint, the experience of sharing economy platforms infrastructure is hardly determined by the technical qualities, rather than the platforms are simultaneously tech-constructs and social-economic structures, having contingent social implications. Despite the fact that digital methods have been criticized for numerous issues from vulnerability for violation of ethical rules to production of biased representation of social
inquiry, scholars argue that investigation of digital dimension is fruitful as far as it highlights the interaction between social research and social life (Marres 2017). Digital became inalienable part of social life, especially for participants of sharing economy communities, which are mediated through virtual platforms. Significant amount of their interactions is absorbed by social networks, which become connecting and mobilizing force. The research aim is thus to capture these interactions hidden beneath the virtual profiles.

**Methods of data collection**

Methods of data collection applied include:

1. In-depth (semi-structured) interviews
2. Participant observation *in situ*
3. Online observation

**Interviewing**

Eleven interviews were recorded and then transcribed into Word-documents for further analysis. Preference was given to face-to-face interview. Compared to telephone or skype interviews, personal contact is not lost, making the interview more narrative, and the interviewer more involved in the conversation process (Vogl 2013), which is extremely important in abductive reasoning.

The sample of respondents consists of 7 active members, having the history of membership from one to seven years as well as one newcomer; 4 board members (Vice-chair, Secretary, Deputy and a person responsible for machine-park). Despite being active members of a community, two of my respondents also have a scholarly and activist background which allowed them to give me more contextualized expert insights. One of them is a PhD candidate in Media Technology affiliated with Södertörn Högskola and Department of Computer and Systems Sciences at Stockholm University. Her research is dedicated to Human interaction with technology and materiality. The other is a technology pedagoge who works with different methods to make technical knowledge a tool for creative activity among women. Her contribution to the Maker movement includes establishment of two projects, stimulating women involvement into making, namely Makertjej and Makersheroes.

I interviewed 5 men and 6 women, from 32 to 40 years old, and an expert who was 75 years old. The demographic characteristics of the sample are representative of the group, striving to promote maximum diversity of participation in making activities. Despite the fact that men are
overrepresented in the community, I tried to keep equal amount of men and women in the sample, to get more polar views on the subject.

All of them are self-identified makers, mainly educated within STEM disciplines (two respondents have gymnasium education with ‘science’ profile, one is a Master of Science in Engineering, one is a PhD candidate in Media Technology, while the others hold Bachelor degree). The majority of respondents are Swedish born, three persons are foreigners from Germany, Ireland and the U.S.

In the process of interviewing the guide of semi-structured interview is used. The guide is developed taking into account the specificity of the community under study and divided into several thematic blocks: (i) socio-demographic information; (ii) the personal history of involvement in the community (narrative); (iii) information about the current projects held by a member and willingness to collaborate with other members; (iv) individual antecedents of participation in a community and perception of possible collective outcomes; (v) possible limitations of being a part of the Makerspace, barriers to participation. Additional blocks were added in the expert interviews, namely: (i) the history of organization establishment, (ii) organizational goals, (iii) Swedish organization as a part of a worldwide Maker movement.

**Participant observation in situ**

Materials were recorded on several occasions of the process of collaborative work in a situation of “day in life of the Makerspace”, as well as in a situation of scheduled workshop. Despite the fact that approximately 700 people are registered as members of the community, only 250 of them have access to the space. The space (or Lab) gather in one place the core of the community – the most active permanent members, working on the projects. One of the most important parts of that collaborative work is organization of workshops and courses, stimulating knowledge-sharing across participants. My objective for the observation was twofold: (i) to conduct the empirical prestudy via the first acquaintances with the community, (ii) to study interactions between participant of community in different situations. Materials gathered from the prestudy served as a tool for conceptualizing the field and understanding the cultural context in which it exists. Furthermore, assumptions for the main empirical fieldwork were derived from the prestudy. Protocols of observation filled in several occasions of observation of workshop and collaborative making process included recording of personal interactions through: (i) direct survey of participants, (ii) photographing the typical routine of the space and its venues (iii) analytical memos. The latter included description of observation situation, social portrait of
participants and their roles (according to the role structure of the community), participants’ explanation of the projects they were working on, approximate time spent in the space.

**Online observation**

Systematic online observation of members’ interactions on the “Stockholm Makerspace – Medlemmar” Facebook page, team’s Slack-channel and wiki-page, designed and run by members for members was conducted.

Netnographic materials informing the study reinforced the results from in-depth interviews and *in situ* participant observation, thus providing a logical conclusion to the triangulation of empirical data. Online observation of the Facebook group and Slack-channel was conducted over three months (January-March), while the wiki-page came into a spotlight in the end of March, when members started to update it frequently with information about the collaborative project they work with currently.

In this part of fieldwork, I occupied a role of observer as participant. According to the Gold’s (1958) classification of the researcher's position by the degree of involvement, "observer as a participant" is a passive online observer of community life, which does not produce any content. I documented my observations in a semi-formalized protocol of observation, which included general information about the community and its activities (wiki-page), as well as manifestations of daily interactions of Facebook-group members. I collect data that is publicly available - profiles of participants, forum/discussion branches in the community under study, comments that users leave.

**Case selection**

As it is argued in the previous section, sharing in the sharing economy implies non-profit orientation of a community under study, as well as self-regulation as its organizational form. Also, it implies the connectedness of extended network, peer-to-peer collaboration, which is not based on specific kin obligations, do not create long-term commitments. Based on the mentioned, the case of Stockholm Makerspace was chosen. Makerspace communicate that the core idea of the community is to share knowledge, tools and ideas. It is a community of non-professional makers, housed in a specific rental space, in which members share access to tools, classes, and each other’s knowledge. The community is crowdfunded, volunteer-run and self-organized, annually changing the Board members.
Sampling and recruiting techniques

After identifying the appropriate community, a list of criteria for respondents’ inclusion to the sample was identified. A potential respondent must meet the following characteristics:

1) Active participation, by which I mean occupying both roles of provider and user in collaborative making. We assume that being "on both sides", the user gets a more complete experience, which potentially affects the level of its involvement in the community, as well as creates a multiple motivation to participate.

2) Confirmed status of participation in the community for at least one year. The more the user is involved, the «brighter» picture of the functioning of the community he or she gets, and the more reflexive can describe own experience.

The population of users were recruited to interviews by purposive sampling targeting key groups of community participants: (i) Board members responsible for different areas of community functioning (gatekeepers); (ii) Lab members (participants having access to the venue and machinery); (iii) members who don’t have Lab access, but have an interest of getting it.

I approached to keep the maximum variation sample to maximize the diversity of cases relevant to the research question and recruit participants with varying degrees of involvement to the community (active members and newcomers) and varying degrees of awareness of community life (ordinary members and Board members). The Board members were recruited to the interview via personal e-mails, while the other members of community were recruited in person at the Makerspace during my visits there.

Methods of data analysis

Theorizing implies creation of empirically grounded theoretical ideas. This process can hardly be reduced to an explicit set of rules, that one must stick to, but there certainly are several procedures to follow, from observation to explanation (Swedberg 2011). Swedberg (2011) puts emphasis on the importance of a prestudy – theorizing based on early empirical materials that allow to make a “discovery” before the major study and its justification. Abductive reasoning, which implies going back and forth between data and theory, is a key to theorizing (Timmermans & Tavory, 2012).

Abduction, the method developed by Charles Peirce, entails the formation of explanatory hypothesis, which don’t become the final step of theorizing, but rather stays open for rediscovery
(Swedberg 2011). Heuristic value of abduction in social sciences lies not in the explanation per se, but in the process of coming up with the explanation (Swedberg 2014, p.101)

According to Timmermans & Tavory (2012), abduction is positioned in between of induction and deduction as analytical methods, seeking out the unexpected findings without disregarding pre-existing theory. Inductive logic, on the contrary, insists that researcher should be free of theoretical assumptions, while deduction is biased towards fitting results into pre-formulated theory.

The analytical work accompanying the proposed ethnographic study relies upon Grant McCracken's “long interview” approach. The key objective of this approach is to highlight the organizing practices of ideas, and to identify how these ideas have penetrated into the individual worldview (McCracken 1988, p.10). Procedurally, the four successive steps were performed to come up with explanation:

1. Review of analytical categories, which implies a theoretical review of the topic and making pre-assumptions for the field stage (including sample fit)
2. Review of cultural categories, or self-reflection on the problematic situation of the work. On this stage, the empirical prestudy is performed to conceptualize the basic concepts and understand the cultural context in which they exist. First explanatory hypotheses are formulated on this stage for the further test.
3. Discovery of cultural categories, the process of interviewing and observation accompanied by constant revision of analytical assumptions and going back and forth between the field and theory.
4. Discovery of analytical categories, or analysis of empirical data.

Thematic analysis is applied to reveal analytical categories. This process represents a movement from particular to the general, from analytical memos to concepts of a larger significance. Implementation of the process is based on two-stage coding. On the first cycle, In Vivo coding serves as a tool for marking respondent's views on the topic, to extract respondents’ own usage of terms (Strauss 1987). Second cycle coding serves then for reanalyzing data to develop categorical organization of codes from the first cycle (Saldana 2009) Axial coding is used to make more conceptual categories, referring to researcher’s interpretation of respondents’ words. I pursue to construct maximal interpretation that implies a transition from a micro-level thick description to formation of explanatory hypotheses about the structural features of the phenomenon under study (Reed 2008)
Ethical considerations

At every stage of the study, I was concerned of ethical considerations behind the procedures of producing data, handling it and presenting it in unharful for study participants way. The Code of Conduct I applied was specified by The Swedish Research Council (Stafström et al. 2017). This entailed that on the recruitment stage, a call with the information considering my research project was communicated to potential respondents (including my affiliation to the University as a master’s student, the purpose of the research and its ethical implications). Before the interview was conducted, the permission to record and to use information in confidential way (without sharing any personal information) was obtained. My respondents were given right to terminate at any point. The same points were communicated to every person which I met during observation process at the Makerspace where I communicated my presence for the purpose of empirical study. Digital methods I applied in the study rely on the general ethical guidelines for internet researchers specified by Association of Internet Researchers Ethics Working Committee (Markham&Buchanan 2012, pp. 8-11) and Kozinets (2006, p.136). These recommendations include: (i) disclose researchers’ presence and affiliation to the members of online community, (ii) guarantee anonymity and confidentiality to respondents, (iii) seek and incorporate feedback from the members, (iv) obtain an informed consent to use posts. Keeping observer as participant role (Gold, 1958), I used my personal profile to follow the “Stockholm Makerspace – Medlemmar” Facebook group and communicated the purpose of my on-line presence there with the post, containing background information about my study and my affiliation. While using internet-related materials, personal data (photo and user name) is hidden to ensure anonymity. Permissions to use screenshots were obtained via direct messaging. Any quotations from both digital and off-line conversations are used in anonymous way. General Data Protection Regulation principles are followed. The data I collected is specified for the purposes of the presented research and won’t be further processed for any other purposes. I store the data in password-protected folder on my personal computer, ensuring appropriate security and protection against unauthorized access.

Limitations

The presented study is limited by the master’s thesis timeframe, by the fact that the only community under study is located in Stockholm and has a limited number of members, and by my resources.
Since the Stockholm Makerspace setting is limited to a fixed number of active members, it created a low response rate bias. However, the fieldwork conducted produced a sufficient amount of data to analyze and draw conclusions from.

Qualitative methods applied have generalization restrictions. The study conducted in Stockholm Makerspace cannot be generalized to other cases. However, as wiki.hackerspaces.org report, there are currently 2322 Hackerspaces (Makerspaces/Fab Labs) around the Globe, mostly located in North America and Western Europe. Saunders and Kingsley (2016) study of makerspaces in China, has shown that the movement started proliferating in the North-Western world. Moreover, the presented study is limited to functioning of non-for-profit volunteer-run initiative, while the makerspace concept is actively employed in different initiatives from school and library-based microfactories to commercially successful start-ups. Bringing evidence from other communities could further inform the study about differences and similarities between the knowledge sharing practice in different settings.

**Credibility**

Many perspectives setting procedures of establishing “trustworthiness” of research employ positivistic terms such as reliability and validation. Lincoln and Guba (1985) insist on using alternative terminology as applied to qualitative research, and “credibility” is considered as an all-encompassing term.

To establish credibility, I followed Creswell’s (2007, pp. 202-203) set of evaluative criteria for ethnographic research: (i) prolonged engagement in the field, reached by constant visits to the Makerspace venue and making contacts with its members, as well as following the Makerspace Facebook page in several months; (ii) triangulation of sources and methods, reached by mixing traditional ethnographic repertoires with digital methodology.

Tracy (2010, p.843) adds to conceptualization of credibility in qualitative research, arguing that credible research should be marked by thick description, meaning in-depth illustration that explicates culturally situated meanings (Geertz, 1973) and abundant concrete detail (Bochner, 2000). To illustrate the complexity and circumstantiality of data, I actively use quotations from my respondents’ words. Moreover, I make attempts to explicate and unpack the non-textual knowledge, gotten from study participants’, bring the implicit, latent, hidden between the lines issues to the surface to understand the interaction and meaning of practices. This wouldn’t be possible without doublechecking the accurateness of transcriptions (Creswell 2007, p.215).

Multivocality is closely interconnected to the mentioned practice of doing qualitative research of
a good quality. It emerges from verstehen practice of “analyzing social action from the participants’ point of view and requires researchers to provide a thick description of actors’ performances and their local significance to interpret meaning” (Tracy 2010, p.844). Practically, it implies highlighting various voices from plural standpoints to increase awareness of cultural differences not only between participants, but also between participants and researcher. In relation to the case under study, it was especially important to maintain gender and class diversity in the sample of respondents, as far as the field of making and personal fabrication is still heavily dominated by affluent men (Niaros et al. 2017). As Tracy (2010) argues, multivocality can be achieved through engaging collaboration with participants, and I attempted to gain that relationship with my respondents. Having a sociology major during my undergraduate and graduate years, I never had a chance to take any STEM discipline, which made me feel extremely alienated from the community of makers. Through asking tons of follow-up questions about the technology and machinery and making requests to show me machine-park at work, I acted as a team with participants, thus gaining trust and reaching complete understanding of situation.
Findings

Governing the sharing community

Stockholm Makerspace was established in 2012 as a meeting place for people interested in tinkering and building by a group of enthusiasts. Since then, the community has grown into the non-for-profit organization located in the rented 283 m$^2$ basement at the Royal Institute of Technology campus. Even though the workshop is surrounded by Institute’s buildings, it doesn’t have any affiliation with KTH. Compared to similar associations functioning in schools, libraries, museums, etc., Stockholm Makerspace communicates its organization on the website as the “grassroots movement entirely run on a volunteer basis” and funded by its members without having anyone employed.

Stockholm Makerspace has approximately a thousand members (of which 250 people buy access to machinery every month, and 700 have yearly membership without access to Lab), varying in their competences from total amateurs and hobbyists to experienced craftsmen. The community is open to every maker from the age of 16 who paid the membership fee. Stockholm Makerspace is run by the Board (styrelse), which consists of the Chair, Vice-chair, Secretary, Operational officer and managers/coordinators in charge of specific areas (machinery, for example). These people are identified as the gatekeepers of the community.

This economic and organizational structure designates the structure of governance. As I pointed out in Literature section, sharing communities are identified by self-governance. As Kostakis et.al (2015) argue, makerspaces try to replicate the principles of open source projects and online commons-based peer production in their governance. This implies creation of socially important project, with the help of coordinated creative “investments” of peers, neither assuming any financial compensation, nor property rights assignment. Such projects lack hierarchical control and give preference to communal coordination with tasks distribution. Despite the fact, that commons-based peer production system is usually illustrated with Internet-based projects such as Wikipedia, and open software such as Linux operating system, Kostakis et.al (2015, p.559) views makerspaces as a manifestation of CBPP in physical realm by the key aspects of the latter: “meritocracy with consensus-oriented governance mechanisms and communal shareholding <…> sharing, abundance of resources, intrinsic positive motivation, openness, collaboration,

[1] Please see Figure 1 above, illustrating the scale of the space. The map is included here to put a reader “in the scene”, so that one could follow my observations.
bottom-up innovation, community accountability, autonomy, communal validation, distribution of tasks, and common ownership of the results”.

Moilanen (2012) points to the significance of financial independence for makerspaces as communities. Participants of my study share the same idea, highlighting that shared resource base is fully crowdfunded and access to it is democratic. The sustainable economy of the Makerspace gives the freedom to be autonomous of external forces. As Vice-chair puts it:

“We’re a very diverse bunch of people on the board and in the organization. That is very important to us that we are not steered by external people or forces. This is an organization that exists purely due to its members. That is why the members are going to have the final say”

Abundance of resources in online CBPP sites, as discussed by Kostakis et al. (2015), comes from nearly zero marginal costs of production. Basically, only access to software and Internet is needed to produce a code for sharing it via open-source. When it comes to the physical realm, the sufficient resource base should be created within the network, to meet needs of any participant. Maximum diversification is what leads the network in the sharing economy and keeps it alive. This principle can be called the creation of a critical mass, or the point at which the system becomes sufficiently inert to support itself (Botsman & Rogers 2011). At the same time, both the presence of a sufficiently large number of participants and the diversity of the resources they bring become crucial.

Stockholm Makerspace resource base comes from membership fees and crowdfunding (monetary and hardware). Machinery and tools bought collectively for the space are owned by the organization. However, some machines are property of individual members, who decided to share their possessions with other members of community. Facilities, open for every Lab member include 3D printing room; textile room with sewing and embroidery equipment; workshop room, separated into computer programming corner, small electronics corner 2 and laser cutter corner; metal and welding rooms; wood workshop; “wet” room for painting projects and finally, Biolab – place for do-it-yourself biology projects. The mentioned supports that Stockholm Makerspace is oriented towards consensus – based governance and communal shareholding, which allows it to have the financial autonomy from third parties.

Comparing to the commercial projects, Stockholm Makerspace’s legal form of ideel förening do not allow commercialization of projects or any professional work within the space. The

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2 See Figure 3 above. The electronics corner is not only a working place, but a social gathering place, offering comfortable chairs, where members can hang out and chat. In the evening when the picture was made, the place was almost empty. It allowed me to take photographs without getting people involved.
following quotation illustrates proneness to share on the different levels of making process: from granting access to knowledge to sharing the results of individual projects.

“People invent things here all the time, but they don’t necessarily do it to make money out of it. Sometimes people here just give away great projects and ideas”

Ideologically it corresponds with the open source ethics, proclaiming open sharing of intellectual property and common ownership of production results. Openly shared technological infrastructure, created and developed in makerspaces (regardless of its commercializing potential) illustrate the “new form of interpersonal understanding and coordination” and “the unique human capacity that is unlocked through access to (and cocreation of) knowledge, infrastructure and fundamental means of making” (Niaros et al. 2017, p. 1149)

This form of open sharing also guides collaborative spirit of community. Respondents highlight that Stockholm Makerspace is not a company providing and offering services. It is rather a self-governed community which creates its infrastructure collectively and has certain expectations of how the maintenance duties should be shared.

“It feels that there is someone who should be in charge at the Makerspace, but there isn’t. People are all into this “we should all take part and do this”, and people all are. Stockholm seems to be in the middle, both hierarchical and bureaucratic and not. That combination I think makes people feel it’s more of a service being provided that it’s purely collaborative. What they’re looking for is actually a fab lab, not a makerspace. A company with staff and that sort of place, where people can come and say” I can’t use the thing, it seems to be out of order, who do I complain to?” You don’t, you fix it or find someone to help you fix it”

“Sharing is caring”: Maintaining the space

“The only thing you shouldn’t be making is a mess”.

Huge amount of maintenance work is needed to support Makerspace, and some participants even make the care-work their primary activity in the community, as a respondent noted: “there are people that don’t have their own projects. Instead they make improving Makerspace their project”.

3 from a facebook-page conversation about waste management at the space, 28th, November, 2018
Members are expected to respect the communal space and don’t leave mess after them. Storage facilities (boxes) are available for every Lab-member to store the products of their activities. Cleaning-up days are held every three months to clean up the Makerspace, renovate and repair the broken machinery, put everything in order.

“Even though people come here and make it dirty, we don’t expect everybody to come and do it, it is out of free will”

Despite the fact that opportunism in taking care of the space is not sanctioned, free riders are treated differently. Members of the community monitor the community functioning and warn offenders on possible consequences of their non-compliance with the norms. As respondents noted, it rarely takes a form of open conflict. The social control over the Makerspace maintenance goes into the virtual space – Facebook group or Slack channel – the two communication platforms for members. Even though members cannot block an “offender” or exclude him from a community, the publicly available shaming feedback that they leave signals to the rest of community: “It is not worth contacting this member”. 4

This attitude is highly connected to the denial of “service-minded organization” ethics. “Commons” created by the members at Makerspace demand constant contribution. Without proper maintenance, performed collectively, the communal workshop is going to ruin quite soon.

Specific equipment and machinery demand some extra attention, especially when it comes to sophisticated technologies like 3D printing facilities or biolab equipment. Taking care of these parts of Makerspace also demand a certain level of expertise in both technical and organizational sense. One of the respondents shared his experience of building a welding room from scratch. To start the project, he had to get special permissions from corresponding authorities, get the Board’s approval, start proper crowdfunding among interested community members, find the equipment and tools necessary for welding, buy and deliver them to the space, repair and recover second-hand tools to make them work, and finally, organize a course in welding within the community to get people involved in room’s utilization. The same processes were performed by the other group of initiative members, who built a wood workshop inside the space.

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4 See Figure 2 – example of such “shaming post” on Facebook. One of the members got a picture of a wall, damaged after polishing someone performed. He does not point toward a particular person, neither does he warn a mess-maker about the possible consequences. However, the rhetoric question a member posted (“who has polished?”) bring the maintenance issue to other members’ notice.
I built a welding room because I really wanted it and I thought everybody would love it. What is Makerspace without a welding room? Most of the things we do here you can do at home, but welding you cannot do at home.

Board member, responsible for a machine park noted that maintenance is “networked”, meaning that community rarely call an “outsider” to do the job – from cleaning to hardware service. The community relies on “the strength of weak ties” (Granovetter, 1973), searching among members’ social contacts to find someone to help out. The fact echoes with the hypotheses of sharing economy contribution into generating social capital.

“We have a lot of projects connected to the development of the space together, we work really great then. Fixing laser cutter, buying new machine, deciding on who would teach a course is set quickly. You can't even get a place because people are already interested. Wikipedia is built on the same [principle] – people’s contribution”
“Do It Together”: Practice of knowledge sharing

“Do It Yourself” practice gained a renewed interest recently due to the widespread affordability of tools and emergence of novel sharing mechanisms, as Kuznetsov and Paulos (2010) argue. Stockholm Makerspace act here as a perfect illustration of the DIY trend, transformed into collective action.

Machinery and tools, access to which is open for every Lab member, allows participants to perform various experiments in making. From my observations, these projects may take any possible form: from assembling a stool to building inventory for live-action role-playing game; from fixing replacement parts for electronic equipment to making high-definition prototypes. It was my very first entry to the community, an evening, when a respondent let me into the space to show how it looks like. Besides that I was astonished by the scale of a basement, accommodating every possible tool and equipment, I also noticed the variety of projects people are involved into. The project respondent showed me that evening was a labyrinth painted in such a way as to create an optical illusion.

While ones are passionate about obscure artistic projects, others make active use of complex hardware devices to build and tinker. What unites these numerous makers is strive to work collectively. As respondents noted, it can be hard to disengage oneself from a collective, when one spends time at the Makerspace:

“You do 95% of the job yourself but you still get inputs from other people, even if you don’t want sometimes”

The mentioned “inputs” are constituted from daily knowledge sharing in both physical realm and digital space and teaching at workshops as more formal and centralized form of knowledge sharing. It could be thus assumed that readiness to share your “know-how” is a prerequisite for participation in the community. However, requirements for previous knowledge are not established. The degree of competence varies between individual makers.

“We have high school students talking to PhDs and professors here about their tinkering projects, and they meet on an arena where they are equal. They can learn from each other in a more organized way”
Some members specify on particular technology and have a high level of professional expertise to give advice on a certain machine or a certain area, such as programming or electronics. These participants guide others’ project, answer questions about exploitation of tool or even share complete ideas on how to improve a project or build it from scratch. This contribution is very significant as it facilitates not only common interest in making, but also interaction within community. Thus, daily knowledge-sharing mediates interaction with specific objects or technologies and interaction with other members, whose projects are influenced by open resources.

“I don’t want my project to be stuck in the “do-it-yourself-better-ugly-then-nothing” drawer. I really like the idea that nothing is impossible. If I want to work with some kind of advanced particle generator, cutting edge CRISPR DNA technology or fix the circuits in my iPhone I could learn how to do that and there would probably be someone else who’s also interested in joining me in that adventure”

Community stretches beyond the physical space into the digital. Various platforms are used to keep information flow going. Makerspace’s own wiki-page summarize members’ know-how. It was filled out by competent volunteers who provided instructions concerning exploitation of tools and service manuals. Current schedule of workshops and current events is updated on a regular basis. The page is also used to post calls for projects, which demand on full collaboration and team work. At the time of writing this paper, members were engaged in building a kite for festival. Earlier this year they have participated in Gingerbread house competition at ArkDes and have been taking care of hydroponic garden together. If the Wiki is static and descriptive, Facebook group for the members is dynamic. It connects the extended community network and provides opportunity to contact any member or post question, regarding making projects or maintenance of the space. My respondents point out that online communication plays a big role in exchange of knowledge due to immediate response that one can get in absence of physical co-presence at the space. Online-dimension of communication gives also possibility to hide beneath the virtual profile to approach others in a more careful and nonintrusive manner or complain about other’s inappropriate behavior without disclosing a person. The following quotation illustrates this attitude:

“We communicate digitally 100 percent. In the space its more isolated, careful”

The other specific online-platform used by Stockholm Makerspace community is Slack – collaboration hub for teams. This platform is designed to create a chat-like “channels” for
discussing specific issues. The most fruitful and timely conversations on the platform are centered around exploitation of sophisticated tools, such as 3D printing and laser cutter. Both of the tools demand the above average level of expertise and background experience in programming and personal fabrication. It is hardly surprising that an increased attention is brought to create knowledge about these particular technologies, since the members of the makers’ community promote knowledge sharing and innovation.

The fascination about 3D printing and even some sort of fetishism of this technology, which is a commonplace for Maker movement around the world, points out to strive of being acknowledged with novel prosumption means. Prosumption implies “the interrelationship of production and consumption where it becomes difficult, if not impossible, to distinguish one from the other” (Ritzer 2015, p.413–414). Anderson (2012) refers to diffusion of three-dimensional printing technology as an invention turning consumers into producers, who become enabled to manufacture things which were formerly produced elsewhere and then put into a consumption setting. These technologies are empowering is a sense that they create opportunities to share not only open source software (intangible code), but also pieces of open hardware (personally fabricated tangible products) to forward the invented resource up for further enhancing by the other person. The following quotation highlights the workings of grassroots innovation in the Makerspace:

“Maybe someone has designed it already and put it online and it’s open for you to grab, maybe you adjust it, downside it, upside it, do it your own.”

Communication channels mentioned above enable members to educate people around them. Teaching at workshops and courses held by members for the other members serves as a more centralized form of knowledge sharing and essential contribution to “common good”.

It is noted in the literature that makerspaces create open learning environments, focused on productive processes, rather than acquiring skills (Niaros et al. 2017). This potential of makerspaces, as I mentioned in previous section, supplements the traditional formal educational institutions by democratizing access to skills, knowledge and results of work. Sharing of, or granting access to open source intangible assets (such as programming codes) and open hardware create “opportunities to develop new forms of technological citizenship, based on better knowledge about how things work and increased abilities to take apart, repair and reconstruct the devices that increasingly mediate and facilitate our communications. This establishes a new set of opportunities for democratization of knowledge” (Powell, 2012, p.705)
This quotation from Konstfak student illustrates how the informal “course” in programming complemented her formal studies:

“I’m not going to get this knowledge from my school. I started the project and exchanged with the machine learning guy, he helps me to start programming and I succeeded with the voice recognition system”

Successful completion of particular courses gives participants “entry ticket” to working with advanced technology, such as welding or laser-cutter. For the safety reasons and for the sake of spreading the more advanced knowledge, Stockholm Makerspace do not allow exploitation of particular hardware by complete amateurs. The basic instructions must be acquired to begin working with welding, wood work, laser and 3D printing.

“In some areas you can come and explore, in others you have to achieve some expertise, to get a course, otherwise you will either hurt yourself or destroy the place”

The mentioned practices echo the sharing paradigm in different ways. “DIY is a culture that strives to share together while working alone”, as Kuznetsov and Paulos (2010, p.302) put it.

Firstly, by granting access to the personal asset (both tangible and intangible), one expresses commitment to the chosen area of expertise. As the examples of sharing practice mentioned above illustrates, one may choose sharing organizational capabilities and serve as caretaker, who puts a lot of effort into proper maintenance of the space. Others may take leader role and act as instructors and supervisors of less proficient makers, investing their personal time to upgrade others’ skills. The other way of contributing to knowledge sharing practice, is to keep working on individual tinkering projects and make active use of access to machine park, simultaneously opening access to one’s own know-how on demand.

Secondly, these transfers are unilateral. Labor (in its various forms) or a specific asset (such as programming code or a tool) shared within the community are fixed resources possessed by an individual who decides to grant access to them. Network is thus structured around these scarce resources and function only until members invest the resources into the network.

Third, the knowledge sharing is imbalanced; no one enters a direct swap or seeks for equivalent exchange. Arrangement are not evened out, as members in a community may occupy a single role of provider, or receiver and never change them. Commenting the role in community, one of my respondents, who professionally consults in 3D printing, noted that within the walls of
Stockholm Makerspace he decommercializes his professional experience for the sake of creating the open-source product.

“I just want to share my experience. Kind of weird because I am creating competition”

Sharing does not only benefit the members of community under study, but also contributes to societal development at large by creating a public good. Accessing common know-how within of walls of Makerspace, members bring it to their daily lives. To set an example, one of the respondents, whom I met at the workshop dedicated to programming on single-board computer, shared his “hidden agenda” for attending such events. Being a school teacher in basic computer science, he thought about approbating the makerspace concept and open learning environment at his school.

Given that makers are connected by the global Maker Movement, together they contribute to creation of common pool of innovative ideas in technology. As Hemetsberger (2012, p.117) puts it, “sharing knowledge creates a global conglomerate of intellectual capital through various knowledge creation practices thus, accumulating member-generated expertise”.

**Motivation behind being a part of a sharing community**

Having determined the practice of care and governance of collaborative making and speculated about the informal education potential of knowledge sharing, I initiate a discussion on what turns consumers into sharers. How the commitment to a community is secured and how the members rationalize it?

“A playground for adults”: prosocial motives

Benkler (2004) claims that sharing is a prosocial act. Multiple studies are dedicated to examination of various social underpinnings of participation in sharing economy, including networking and accumulation of social capital (Parigi and State 2014; Schor 2014); overcoming social alienation (Shmidt 2019), gaining flexibility and autonomy (Fitzmaurice et al. 2018).

In Moilanen (2012) study, communication and community commitment were pinpointed as the main incentives, which bring makers into makerspaces. That is consistent with every interview I made with the members of Stockholm Makerspace.
Stockholm Makerspace can definitely be described as a “third place” – an urban site, which provides social experience outside our major places, such as home or workplace, where members spend a lot of time feeling welcomed and accepted (Oldenburg 1999).

“You never spend an hour there, it’s always 6-8 hours. One thing which is really good is that you can talk about everything. And you can’t do that in other sides of society.”

These associations play a significant role in keeping up communities’ social vitality by giving its members means of socializing and self-expression., The most pervasive distinctive feature of third place involvement is need for “convenient and open-ended socializing—places where individuals can go without aim or arrangement and be greeted by people who know them and know how to enjoy a little time off” (Oldenburg 1999, p.78). As Oldenburg argues, the essential parts of this socializing practice involve search for novelty, constant social encounters, and emotional component, feeling of sociability.

Novelty as motivational argument involves providing oneself with a creative activity, which could not be gained in other settings. Respondents are positive in thinking that the process of co-creation and sharing access to tools and collective know-how is means of spending time in productive set.

“One of the things that makes me so activated here is that 6-7 years ago I just threw out my TV. I didn’t want a TV anymore because it’s stealing so much time. TV kills imagination, creativity, sucks people’s lives away. Even if I’m tired, I go here. Just to hang out, drink some coffee. Just the social thing here.”

The mentioned “social thing” or, seek to provide oneself with constant social encounters (to follow Oldenburg’s line of reasoning), is closely connected with human need to have some group affiliation and Makerspace gladly offers it.

“When you’re a teenager you have some place where you can go and hang with other teenagers. It’s the same, like an ungdomsgård for adults. We come here, we hang out and we are old nerds”

Here and elsewhere (Shmidt, 2019) I suggest that many people keep sharing in order not to feel existential loneliness. Offering their resources (be it a tangible asset, service, or access to one’s skills and knowledge), putting it figuratively, the movement participant distributes particles of themselves, to others: their talents and capabilities, their ability to communicate and empathy. By being involved in sharing, people involve in social activity and overcome alienation. In the ordinary sense, social alienation is a lack of close contacts, cold, superficial and mistrustful relationships. Modern communication technologies exacerbate the problem: in constant
interaction with artificial intelligence, face-to-face dialogue is replaced by communication simulacra, and the while own representations in Internet-based social networks is an idealized virtual construct, an illusory imprint of the real “I”. In turn, the abundance of superficial communication atrophies the need to establish deep relationships, thus contributing to loneliness.

“When people need each other, they start talking about their projects, what they want to build. In that meeting something happens, people get to know each other over social boundaries”

“We have some people for whom the place means almost everything. You are around other people. You speak to other people; you’re doing something with other people, or someone is doing something in the same room – you are in some way still doing it together”

“Not a consumer, but a creator”: critique of consumerism

Sharing not only has the social function of developing a sense of belonging to community, but also responds to the logic of sustainable consumption, calls to overcome the problems of overproduction and excessive consumption, preserving natural resources and protecting the environment (Belk 2010).

Democratization of personal fabrication and common access to sophisticated means of production enabled DIY-culture, as I mentioned in previous sections. Makerspaces, as a subset of DIY-communities, employing sharing as a mode of exchange in their creative activities, enabled community to center around transfer of technical knowledge and skill, thus stimulating a “creative act of rebellion against mass production, consumerism, planned obsolescence and waste” (Mota, 2011, p.283). As Schor et al. (2016, p.71) noticed in the empirical case-study of one of the American makerspaces, “the combination of peer-to-peer networks and new production technologies such as 3-D printing has led some to predict a coming third industrial revolution based on small-scale local production that could revitalize communities while being environmentally, politically, and socially sustainable”.

By having shared access to open hardware, members produce new artifacts, or refurbish products, which were excluded from consumption, further establishing their prosumer (Ritzer 2015) identities.

«If I can fix things, then I can afford a lot nicer stuff. Living on the side of the economy – what people are throwing away – I think that’s the best way. I always buy all my electronic stuff secondhand. I have no interest in having the latest. By repairing quality stuff, you can keep things going forever – tools, electronics, whatever. I don’t like to waste things, either. It’s not much about creating new stuff for me, it’s more about repairing stuff»
The logic mentioned by a respondent above, echoes with thinking of sharing as a form of anticonsumption. Ozanne and Ballantine (2010) and Ozanne and Ozanne (2009) argue that participants in sharing economy pursue to find means of expressing antimaterialism values and move towards “voluntary simplicity” lifestyle by free-willingly reducing their consumption level. Nelson et al. (2007) suggests that downshifting assumes voluntary reduction of consumption level and time devoted for work, for the sake of balance in life. Decrease in income and anti-materialistic beliefs influence propensity for sharing, re-use and re-cycle, hand-made. Material necessity in this case can’t be the first and the foremost motive; economic explanation rather goes after ‘voluntary simplicity’ argument. Consumers seeking to truly engage in de-cluttering or downshifting of material possessions must be able to dispose of goods and decouple notions of "identity" from goods (Nelson 2007, p.152).

Members of the community under study committed themselves to be producers (or, makers) of what they consume, either creating products or refurbishing existing goods. This part of anti-consumerist statement is expressed in having agency to break normative consumption patterns by being a maker. Respondents who vocalized proneness to creation of new objects, highlighted that they have a privilege of access to tools and skills that enable them to produce rather than buy. The following quote illustrate the prosumer attitude – willingness to consume self-fabricated goods, avoiding traditional market-economy practice of provisioning. The quotation also highlights the uniqueness of the produced product, in contrast to unified products available on market.

“You are having power and knowledge to make something; do the actions you want it to do. Making by your own hands. There is a lot of toys and stuff you can buy and get, but you just get them there and you don’t have to create anything. If you show and involve a person in a process of making that is the most interesting part, then if you give a child a finished toy. In this way you are creating something. You’re not a consumer, you’re a creator”

The abovementioned practices align vision of making as willingness to engage passionately with objects in ways that make them more than just consumers (Dougherty, 2012, p.12) by involving in peer-to-peer initiatives, which allow to express aspirations that would otherwise not been realized (Sundararajan 2014). Such communities “offer transformational potential by enabling agentic action” (Dusi 2017, p.7), as far as members involved in making on the basis of sharing community “invest” such personal resources as time, skills and knowledge, ambitions and passion, in what is produced by a collective.
Sharing as self-expression

Even though such incentives of participation in Stockholm Makerspace, as socializing and communication; informal learning and consumer empowerment come to the fore, the raison d’être of the community is to get and provide shared access to advanced machinery tools and skills/knowledge. In this section, I present the specific motivation of community providers – those people who maid sharing their first and foremost communal duty.

Participants noticed the significance of dissemination of knowledge, spreading and sharing it within the frame of Makerspace:

“Creativity is going to be less and less in the future. There is so much information that just goes lost because of generations of people not using their hands to build stuff”.

“People are willing to share knowledge without being paid for it. It has to do with inspiration and the nerdiness”.

Harvey et al. (2017) suggested the “playful sharing” metaphor to highlight participants’ proneness to practice sharing for its own sake; “typically for the simple and unconditional pleasure of expression … done for the experience of belonging” (Harvey et al., 2017, p.84).

Similar to what Belk (2010) calls “sharing in” – extending the circle of those who benefit from a resource unconditionally. Sharing, as he puts it, is a connective communal act, oriented towards other people and which “creates feelings of solidarity and bonding” (Belk 2010, p.717). “Sharing in” refers to possessions as collective, belonging to or involving the community at large. In “sharing in”, the “self” is extended through others and a sense of “we” is introduced.

Under collaborative consumption practices, the logic of sharing dominates private ownership, access is prioritized over possession, thus undermining previous definitions of objects and expanding the idea of “self”. The practice of sharing creates new identities. During that process, as I argue, consumers turn into sharers. Our property is the main source and also a reflection of our identity, representing the so–called “extended self” (Belk 1988). Expansion of “self” in sharing means that we bring our “I” to the level of social aggregate, now to include those with whom we share our good, thus sharpening the sense of belonging to an imagined community by making our “I” its integral part.

“I know that people believe that in the future technology is going to take over and we will probably be forced to have a new economic system. If people lose their jobs, for instance, to technology, then what is left for humans? It is making. It does not mean that you will survive on that, but it will make you feel good and happy about life. I think that is the common ideology. We love technology here.”
The quotation illustrates how in process of making, solidarity between technically-oriented people is created. Moreover, such constructs as “I feel good”/ “happy about life” points to positive intrinsic motivation, the pleasure of self-expression gained in the community.

Paraphrasing Marcel Mauss’ scheme, Widlok (2017) argues that sharing creates and maintains social ties through the ability to request, respond and renounce. Replacing the obligation with opportunity means that in the field of sharing there is no external binding force (like the spirit of hau, described by Mauss). An opportunity may be accepted, but it may also be missed. The ability to make a request as opposed to an obligation to give away is grounded on potential rather than involuntary exchange. The idea of “social contact”, as Widlok argues, lies in replacing the “obligation to receive” with “the ability to respond”. This implies waiting for a proper request and adequately responding to, and it affects the potential of future contacts and of future reactions to requests. Finally, the opportunity to refuse (or release) as opposed to the obligation of return gifting is introduced into the scheme to emphasize the object’s marginal utility. This theorizing of sharing is surprisingly reflected in the words of my respondents. The following quotation shows motivation to share on autotelic basis.

“I’m a welding teacher here. They just have the start of welding, and then they keep on learning by themselves. Just standing, teaching and trying to press out information, I think that sucks. It’s about learning just a small bit and then you can keep on doing by yourself. My motivation is doing something for someone else, It’s like a religion almost. It just feels good.

Teaching people here is the best thing you can do.”

Giesler (2003) in his study of file-exchange suggested to separate the purposes of action into autotelic (behavior which ends in itself) and instrumental (oriented towards further ends) to follow the motivation underlying. Thus, I assume, that Makerspace’s knowledge providers’ words align autotelic purposes – practice of sharing for its own sake.

Conclusion and discussion

The research questions I addressed in the study reflect the community involvement on several levels – from individual antecedents to the collective outcome. With the study, I attempt to connect the key elements of member-driven organization functioning with the practice of knowledge-sharing on the case of Stockholm Makerspace. The aim of my contribution was to study the variety of interaction practices and motivation to participate in the sharing initiative, as
well as to pinpoint the key elements of member-driven organization functioning on the case of Stockholm Makerspace. I was interested in (1) Why do members become part of the sharing initiative? And (2) What are the collective outputs they seek to create?

To sum up the main results of a study, several motivational arguments were pronounced in the Makerspace community. Firstly, prosocial arguments. Members seeking for open-ended socializing involve into the Makerspace, as a “third place” – an urban site, which provides social experience outside our major places, where members spend a lot of time feeling welcomed and accepted. Second argument is expression of anti-consumerist values, accepted in the community. Some members are members due to their willingness to express their attitudes and “prosumer” identities by making artifacts and sharing experience within the walls of the Makerspace. These attitudes are closely connected to the third motivational argument, pronounced in the study. Sharing give members means of self-expression, and means of unconditionally extending the circle of those who benefit from a shared resource.

The collective outputs that Stockholm Makerspace community seeks to create are: (1) to sustain the non-for-profit organization through active communal involvement into care and maintenance practices and spreading “word of mouth” about the community to make it more visible, as such associations are significant for the civil society; (2) to enable forms of exchange, embedded in social structure and connectivity, based on weak ties; (3) to complement formal education sites by knowledge sharing, thus contributing to informal learning; (4) to provide involvement into STEM for diverse group of participants.

Despite the fact that makerspaces (also called as hackerspaces and Fab Labs) are thoroughly studied in Science and Technology studies as well as Human-Computer Interaction field, there is a lack of economic sociological research dedicated to these initiatives. My findings thus contribute to economic sociology by examining the social underpinnings of sharing of intangible resources, such as skill, knowledge and expertise.

The prevailing amount of literature on sharing based in non-for-profit sector, puts accent on collaborative consumption practices (Ozanne & 2009; Schor et.al 2016; Pais&Provasi 2015), while the case under study is directed towards enabling personal production. In line with Schor (2014) and Moilanen (2012), my results suggest that shared access to tools and common “know-how” democratize production of knowledge and its spreading and contributes to informal learning, which complement formal education institutions. The mentioned points out to prosumption practices (Ritzer 2015; Dusi 2017) in the Makerspace – willingness to consume self-fabricated goods, avoiding traditional market-economy practice of provisioning.
Shared open source intangible assets (such as programming codes) and open hardware create opportunities to actively engage with objects in ways that make members of the community more than just consumers (Dougherty, 2012). This brings providers’ motivation and identity-formation into analysis. The actors of sharing economy, exemplified by a makerspace, are prosumers (Ritzer 2015), or professional amateurs (Kuznetsov and Paulos 2010), whose practices lie between hobby and professional work; production and consumption. By involving into collaboration, they benefit not only community under study, but also contribute to societal development at large, by creating a public good.

Further, my results are inconsistent with previous studies of makerspaces in different institutional settings. The gender composition of Stockholm Makerspace happened to be more balanced compared with the same organizations functioning in the U.S. (Schor et al. 2016) and the UK (Sleight et al. 2015), despite their close connection to traditionally male-dominated fields, such as computer science and engineering (England, 2010). Schor et al. (2016) and Dubois (2014) findings point to formation of inclusive sub-environments in sharing communities, based on social status and gender. The former is exemplified by Schor et al. (2016) in the division of labor in maker communities, where welding and robotics facilities are occupied by men, while jewelry making becomes a female zone, thus revealing the stigma associated with “feminine” DIY activities. Stockholm Makerspace works successfully towards overcoming this division by not only cherishing diversity, but also by providing means of acquiring basic competency in technology. Those who lack technologic frame of reference, as my analysis shows, gain it within the walls of makerspace with the inputs from more advanced members, who share expertise in both physical realm and digital space on the daily basis, and who teach at workshops as more formal and centralized form of knowledge sharing.

My findings support Niaros et al. (2017) and Kostakis et al. (2015) vision of a makerspace as a commons-based-peer-production initiative which promotes sharing practices; exercise self-governance (community-based), has strong reliance on technology and utilizes local manufacturing and personal fabrication.

Further, my analysis shows prosocial basis of involvement into such associations. At the beginning of ethnographic fieldwork, it seemed like Stockholm Makerspace is very tool-focused, and access to machinery dominates the rationale of involvement into community. A different understanding of community’s social situation emerged after spending a while in the field. Stockholm Makerspace proved to have more in common with theorization of a “third place” – an urban site, which provides social experience outside our major places, such as home or workplace, where members spend a lot of time feeling welcomed and accepted (Oldenburg 1999,
“Third places” has a social function of creating solidarity and bonding, by developing a sense of belonging to a community. By being involved in sharing, people involve in social activity and overcome alienation. Participants in my study highlight communication and community commitment as the main incentives of participation in makerspace. Sharing in such associations is performed for its own sake, for self-expression, or unconditional “joy, vivacity, and relief” (Simmel 1971).

Eventually, this study makes an attempt to contribute to the theory of sharing from economic-sociological perspective and to enrich the state-of-the-art of makerspaces, by situating them in a sharing paradigm. The label of “sharing” is endowed with positive connotation, being a fundamental humanistic value, and thus being strategically employed by business players to expand the market niche and to promote their services. The study explores makerspaces as a part of sharing economy. Even though it is a marginal case for the all-encompassing sphere of sharing economy, it shows how the idea of market may be challenged within the walls of a small-scale volunteer-run organization, and what happens to sharing in practice, when it forfeits the financial component.
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Figure 3. A photograph of an electronics corner in Makerspace, photographed by Mayya Shmidt. P.27

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Appendices

Appendix 1. Interview guide

Social-demographic information

Let us start with a couple of questions about your background: how old are you, which educational trajectory did you take, what is your occupation etc.

History of involvement

How did it happen for you to become a member of the Makerspace? How did you get acknowledged with this community? Please, try to recall, what did you think back then, what interested you back then etc.

When did you become a full-fledged member and why?

Do you consider yourself as a Maker? If so, what does it mean for you? How would you describe a figure/personality of a maker? If you had to describe the specific mindset of a Maker, how would it look like?

Why do you have an interest of being a part of a community? What does it add to your life?

Additional questions for experts

How the organization was established?

Why and how have you participated in the establishment?

Current activity

What projects are you working with now? Can you give me some examples of already closed projects? Can you call your work more practical/useful or creative/obscure?

Do people form circles/teams/groups inside the space? If so, based on what characteristics?

Are you collaborating with people when working on projects? How do you contact them? How is your team organized? How do you secure copyright?

Courses and workshops – what are they for? Have you ever participated in one? Have you ever organized one?

Do you have any barriers/limitations/worries/doubts about being a part of a Makerspace?
Have you ever faced any conflicts or unpleasant situations? What were they and how were they solved?

What can stop you from being a part of a Makerspace?

**Collective goals**

Have you ever heard about the worldwide Maker movement and Makers of Sweden? Could you say that you are a part of this movement? What is unique just for the Swedish makers movement?

How do you prefer to speak about the Makerspace community? Are you a part of any movement?

Have you ever raised discussions on sustainable development, circular production and consumption here, at the space? Are they important in making?

The Makerspace website says that the core idea of the community is to share knowledge, tools and ideas. Is it realized in practice? Why should one share? Are there any specific goals that members pursue to reach?

Makerspace is also called a platform for innovation. Do you agree, that community can contribute to the innovational infrastructure of Sweden? If so, how?