

A MATTER OF DESIGN

MAKING SOCIETY THROUGH
SCIENCE AND TECHNOLOGY

PROCEEDINGS OF THE 5TH STS ITALIA CONFERENCE 2014

EDITED BY
CLAUDIO COLETTA
SARA COLOMBO
PAOLO MAGAUDDA
ALVISE MATTOZZI
LAURA LUCIA PAROLIN
LUCIA RAMPINO

sts
italia



A MATTER OF DESIGN

MAKING SOCIETY THROUGH
SCIENCE AND TECHNOLOGY

PROCEEDINGS OF THE 5TH STS ITALIA CONFERENCE 2014

EDITED BY
CLAUDIO COLETTA
SARA COLOMBO
PAOLO MAGAUDDA
ALVISE MATTOZZI
LAURA LUCIA PAROLIN
LUCIA RAMPINO



sts
italia

***A Matter of Design: Making Society through Science and Technology
Proceedings of the 5th STS Italia Conference***

*Edited by Claudio Coletta, Sara Colombo, Paolo Magaudda, Alvise
Mattozzi, Laura Lucia Parolin and Lucia Rampino*

*An Open Access Digital Publication by STS Italia Publishing
Released: December 2014*

ISBN: 978-90-78146-05-6

*Publishing project: Paolo Magaudda
Editing and layout: Stefano Crabu
Cover design: Sara Colombo*

*Contact: STS Italia, Via Carducci 32, 20123, Milano.
Email: stsitalia.org@gmail.com*

*The 5th STS Italia Conference was supported by: Doctoral Programme in
Design - Politecnico di Milano, Fondazione Bassetti and Fastweb.*

A pdf version of this publication can be downloaded at: www.stsitalia.org



*This publication is licensed under the
Creative Commons: Attribution,
Noncommercial, No Derivative Works - 2.5
Italian License (CC BY-NC-ND 2.5 IT).*

TABLE OF CONTENTS

EDITORS' INTRODUCTION	I
An 'Epistemic' Encounter between STS and Design	

SECTION I

Design, Social Innovation, and Cultural Identities

Diachronous Dilemma: representing American hegemony in three centuries of attitudes to design	3
<i>Ted Cavanagh</i>	
Design Practice: Making Beyond Borders	17
<i>Carla Cesare</i>	
'We, L'Aquila': Production and representation of urban space through a social map platform	35
<i>Manuela Farinosi, Alessandra Micalizzi</i>	
The game as social activator, between Design and Sociology: a multidisciplinary framework to analyse and improve the ludic experiences and their social impact	51
<i>Enrico Gandolfi, Ilaria Mariani</i>	
Towards a transnational history of urban design	69
<i>Michel Geertse</i>	
L'approccio storico al design. Stereotipi, aporie, paradigmi (?)	85
<i>Giorgio Giallocosta, M. Cristina Tonelli</i>	
Valorizzazione, fundraising, design: un'innovazione sostenibile per il patrimonio culturale italiano	99
<i>Gianluca Grigatti</i>	
Identità visive generative. Programmare la corporate identity	111
<i>Francesco E. Guida</i>	
Street Furniture and the Nation State: A Global Process	127
<i>Eleanor Herring</i>	
Beyond social innovation: design as cultures active-action	137
<i>Eleonora Lupo</i>	
(Dis)placement of/by Design: Social Construction of Pojang-macha (Re)Designing in Seoul	155
<i>Min Soo-hong</i>	
Cities transformations, social innovation and service design	169
<i>Alessandro Deserti, Francesca Rizzo</i>	
Temporal merging of actantial models of space	185
<i>Gunnar Sandin</i>	
Narrare il Territorio: Dispositivi e Strategie d'Innovazione per gli Spazi Percepiti	201
<i>Giovanni Baule, Daniela Anna Calabi, Sabrina Scuri</i>	

TABLE OF CONTENTS / INDICE

Social Design for whom and what purpose? Community network knowledge, conversation-as-commoning and design research <i>Kaye Shumack</i>	217
Otherwise Engaged: designing a post-digital Space of Appearance in Auckland, New Zealand <i>Charles Walker, Dermott McMeel</i>	233

SECTION II

Design, Creativity, and Process

A Manifesto of Change or Design Imperialism? A Look at the Purpose of the Social Design Practice <i>Danah Abdulla</i>	245
Exploring Model Making: Translating Intuitive Aspects Of Conceptual Models Into Digital Realm <i>Elif Aktaş</i>	261
L'immaginazione ludica, un sapere incarnato nella materia <i>Francesca Antonacci</i>	281
Doing Stuff with Stuff: Designing for the Everyday Metamorphosis of Collaborative Work Environments <i>Chris Berthelsen, Charles Walker</i>	295
Designing the Body of Architecture Through Biological Analogies <i>Fiorenza Gamba</i>	311
Are Open Innovation processes structured for disturbance? <i>Jan Eckert, Lukas Scheiber, Peter Schwehr</i>	329
Innovative processes for jewellery production <i>Paola Garbagnoli, Maria Vittoria Diamanti, Barbara Del Curto, Valeria Masconale, Maria Pia Pedeferra</i>	341
Procedures for Community Based Parametric Design and Making <i>Jason S. Johnson, Alyssa Haas, Guy Gardner</i>	351
Smart materials: development of new sensory experiences through stimuli responsive materials <i>Esther Lefebvre, Agnese Piselli, Jenny Faucheu, David Delafosse, Barbara Del Curto</i>	367
Participating in infrastructuring. The active role of visitors and curators in museums <i>Teresa Macchia, Lily Diaz, Vincenzo D'Andrea</i>	383
The Human Creator as an Interface <i>Sandra Plontke</i>	395
Research Through Design: What Does it Mean for a Design Artifact to be Developed in the Scientific Context? <i>Selena Savic, Jeffrey Huang</i>	409

<u>D-STEM: a Design led approach to STEM innovation</u>	425
<i>Anne Toomey, Veronika Kapsali</i>	
<u>The 'Makers contradiction'. The shift from a counterculture-driven DIY production to a new form of DIY consumption</u>	439
<i>Alessandro Carelli, Massimo Bianchini, Venanzio Arquilla</i>	
<u>Foretelling and Shaping the Future of Technology: the Role of Communication Designers in the Design of Innovation</u>	461
<i>Margherita Pillan, Marco Spadafora, Annamaria Andrea Vitali</i>	
<u>Break-it, hack-it, make-it: the 'Hack-a-Thing' workshop series as a showcase for the integration of creative thinking processes into FabLab Genk</u>	477
<i>Katrien Dreessen, Selina Schepers, Danny Leen, Kris Luyten, Tom De Weyer</i>	

SECTION III

Digital Media and Knowledge Society

<u>Designing Identities on the Digital Mirrors of Facebook: The Reflection & the Real</u>	495
<i>Zeynep Arda</i>	
<u>Quis Monet Ipsos Monitores? Motivations, methodological issues and techniques for monitoring the controversy on surveillance as a topic in on-line scraped textual data</u>	511
<i>Alberto Cammozzo, Andrea Lorenzetti</i>	
<u>Affrontare il divario generazionale tecnologico attraverso il gioco</u>	527
<i>Giuliana Catapano, Ilaria Mariani</i>	
<u>From bits to atoms: sensory displays for digital information</u>	547
<i>Sara Colombo, Lucia Rampino</i>	
<u>The Big Data as 'presentification' of knowledge</u>	569
<i>Sabino Di Chio</i>	
<u>Networked and Technological Paradigms of Digital Whistleblowing</u>	583
<i>Philip Di Salvo</i>	
<u>Identità immortali. L'Afterlife digitale come estensione dell'identità</u>	595
<i>Fiorenza Gamba</i>	
<u>Big Data and Nate Silver's Computational Protocols: predictive Analytics and innovative Digital Methods for the Study of the Political Trends. A critical debate</u>	609
<i>Michele Infante</i>	
<u>Towards a typology of materiality/corporeality of music in the digital multimedia regime</u>	635
<i>Stefano Lombardi Vallauri</i>	
<u>Borders. Visual analysis of Cinema's inner dynamics and evolutions. A case study based on the Internet Movie Database</u>	647
<i>Giovanni Magni, Paolo Ciuccarelli, Giorgio Uboldi, Giorgio Caviglia</i>	

TABLE OF CONTENTS / INDICE

Smart Meters as boundary objects in the energy paradigm change: the CIVIS experience	667
<i>Giacomo Poderi, Matteo Bonifacio, Andrea Capaccioli, Vincenzo D'Andrea, Maurizio Marchese</i>	
The materiality of code: Towards an understanding of socio-technical relations	681
<i>Winnie Soon</i>	
Digital literacy e disuguaglianze tra i giovani: oltre le metafore semplificatorie	697
<i>Simona Tirocchi</i>	
Orientare l'analisi. Una semiotica critica e materiale è possibile?	711
<i>Matteo Treleani</i>	
Mobility and the Smart City. Innovative Solutions for Responsive Urban Spaces	725
<i>Marco Zilveti, Fausto Brevi</i>	

SECTION IV

Aesthetics, Narration and Critical Design

Narratives And The Co-Design Of Spaces For Innovation	743
<i>Anzoise Valentina, Stefania Sardo</i>	
Lições de Salazar [Salazar's lessons] 1938: the role of progress and technology on an authoritarian regime ideology	763
<i>Carlos Bártolo</i>	
Experts, Expertise and Qualitative Judgment in Canadian Architectural Competitions	781
<i>Carmela Cucuzzella, Jean-Pierre Chupin</i>	
Il concetto di sostenibilità nella moda: il caso della lana rustica italiana	797
<i>Monica Cariola, Greta Falavigna, Valentina Moiso, Elena Pagliarino</i>	
Eстетiche dei futuri come estetiche dei contrasti. Processi design driven di costruzione condivisa di scenari	813
<i>Flaviano Celaschi, Elena Formia</i>	
The rhetoric and rhetoricality of Bio-Design	829
<i>Marjan Groot</i>	
Chasing The Hobbit. The Cultural Contents Of Mainstream Media Products	847
<i>Luca Guerrini</i>	
Design, scienza ed estetica nei territori dell'innovazione	863
<i>Francesca La Rocca</i>	
The Human Emotional System and the Creativity in Design	881
<i>Marco Maiocchi, Margherita Pillan</i>	
Autarchy: The Making of Dutch Design in Practice	901
<i>Joana Ozorio De Almeida Meroz</i>	

<u>Interferenze digitali. Un'estetica delle pratiche digitali a supporto del discorso di design</u>	921
<i>Elisa Bertolotti, Federica D'urzo, Francesca Piredda</i>	
<u>Design Narratives and Social Narratives for Community Empowerment</u>	935
<i>Valentina Anzoise, Francesca Piredda, Simona Venditti</i>	
<u>Today's culture jamming aesthetics: an investigation to understand the consumption of visual resistance</u>	951
<i>Andréa Poshar</i>	
<u>Unpleasant Design. Designing Out Unwanted Behaviour</u>	975
<i>Gordan Savicic, Selena Savic</i>	
<u>When Human Body Meets Technology: The Designer Approach to Wearable Devices</u>	989
<i>Venere Ferraro, Matteo O. Ingaramo</i>	
<u>Per una sperimentazione materica postdigitale. Oltre i bits, i nuovi atomi</u>	1005
<i>Chiara Scarpitti</i>	

SECTION V

New and Responsible Socio-Technical Paradigms

<u>Anticipating and Responding to Challenges Regarding Digital Technologies and Valuing</u>	1017
<i>Barbara Andrews, David Hakken, Maurizio Teli</i>	
<u>Citizens' veillance on environmental health through ICT and genes</u>	1031
<i>Annibale Biggeri, Mariachiara Tallacchini</i>	
<u>The Corporation and the Panchayat. Negotiations of knowledge in an Indian Technology Park</u>	1045
<i>Elena Bougleux</i>	
<u>From physical to digital. A new way of interaction with an Integrated System of smart appliances</u>	1059
<i>Silvia D. Ferraris, Lucia Rampino</i>	
<u>Grounded Reflexivity: an approach to the polysemy of Responsible Research and Innovation</u>	1075
<i>Robert Gianni, Philippe Goujon</i>	
<u>La valutazione delle prestazioni urbanistiche dei parchi scientifici e tecnologici: alcuni casi italiani a confronto</u>	1089
<i>Giampiero Lombardini</i>	
<u>Digital Makers: an Ethnographic Study of the FabLab Amsterdam Users</u>	1105
<i>Irene Maldini</i>	
<u>Collective decision making on risk management and sustainable manufacturing of nanomaterials and the role of decision support tools</u>	1115
<i>Ineke Malsch, Vrishali Subramanian, Elena Semenzin, Danail Hristozov, Antonio Marcomini</i>	

TABLE OF CONTENTS / INDICE

RECYCLE TOOLKIT. Strategie per il riciclo di aree dismesse <i>Chiara Olivastri</i>	1131
In the Interior of Innovation: The FabLab Synthesis of Physical and Virtual Environments <i>Ricardo Saint-Clair</i>	1145
Radical Innovation in Urban Development as Making Unfolds Its Potential <i>Peter Troxler, Gert-Joost Peek</i>	1163

SECTION VI

Health, Safety, and Wellbeing

The document use as a situated practice in pre-hospital emergency care <i>Petra Auvinen, Hannele Palukka, Ilkka Arminen</i>	1179
L'interpenetrazione tra valori e design nell'ideazione, implementazione e funzionamento della rete di Telessaùde brasiliana <i>Carlo Botrugno</i>	1197
Una tutela 'by design' del diritto alla salute. Prospettive di armonizzazione giuridica e tecnologica <i>Raffaella Brighi, Maria Gabriella Virone</i>	1211
The role of artefacts in the coordination of home care practices <i>Adeline Hvidsten, Antonalla La Rocca, Thomas Hoholm</i>	1223
Taking Care of Drivers/Taking Care of Technologies? Tensions and Promises of Advanced Driver Assistance Systems <i>Oana Mitrea</i>	1239
Spazi di transizione tra strutture sociosanitarie e città. Condividere funzionalità in ambiente urbano <i>Valentina Napoli</i>	1253
Design partecipato e pratiche della sicurezza nei cantieri <i>Silvia Pericu</i>	1269
Connective practices in the access of immigrants to healthcare services: The role of the language and cultural mediator as a boundary subject <i>Paolo Rossi, Mara Tognetti Bordogna</i>	1283
Improving medical information of blood tests results through the application of co-design <i>Mónica Santos, Susana Barreto, Katja Tschimmel</i>	1297
Enhancing Corporeal Boundaries through Technology <i>Secil Ugur Yavuz</i>	1312
Il progetto della casa sensibile – Designing the Sense-Able Home <i>Niccolò Casiddu, Claudia Porfirione, Matteo Zallio</i>	1325
Organizzare la cura fuori dai contesti istituzionali: il caso dei pazienti anziani con terapie complesse <i>Alberto Zanutto, Francesco Miele, Enrico Maria Piras, Claudio Coletta, Attila Bruni</i>	1343

The ‘Makers contradiction’. The shift from a counterculture-driven DIY production to a new form of DIY consumption

Alessandro CARELLI*, Massimo BIANCHINI and Venanzio ARQUILLA
Politecnico di Milano

The Makers, born in 2005 with the founding of the MAKE magazine, are recognised as the pioneers of the so-called ‘Third Industrial Revolution’ (Anderson, 2012, 2012; Rifkin, 2012; Marsh, 2013; Lipson, Kurman, 2013) as well as the proponents of a ‘Movement’ stemming from Do-It-Yourself (DIY) practices. Such a movement, whilst proposing a socio-technical revolution based on personal use of production technologies, tends to be taking a non-conflictual position towards those global economic players against whom it claims to offer an alternative model. This tendency, observed among some Makers communities, contributed to the shifting of DIY practices from production to consumption activities. In order to highlight this phenomenon, we devised three stages of analysis: i) The understanding of the Makers phenomenon within a social sciences theoretical view, to frame the emergence of Makers as consumer figures; ii) investigation of the role played by Maker Media in disseminating the concept of Makers and influencing the Maker Movement; iii) the analysis of the Makers’ activities within the Makerbot-Thingiverse communities, undertaken with theoretical and conceptual tools derived from ‘Practice Theory’.

Keywords: Makers ecosystem; practice theory; DIY; digital platforms; maker movement

1. A short premise on the Makers phenomenon

Several studies, especially those from a social sciences perspective, have focussed on the relationship between ‘production and consumption activities within the dynamics of web collaboration’.

Phenomena such as: i) the personalization of commodities in more ‘humanized’ products by users (Campbell, 2005); ii) the growing diffusion of

* Corresponding author: **Alessandro Carelli** | e-mail: alessandro.carelli@polimi.it

web customization tools and file sharing platforms; iii) the process of ‘consumerisation’ of hacking practices (Magaudda, 2012) have highlighted a connection among production and consumption practices as pointed out in the concept of *prosumption* (Ritzer and Jurgenson, 2010). Such studies, whilst referring to the phenomena lately appearing on the web, do not take into account the Makers as a global community dedicated to the practices of Do-it-Yourselfe (DIY), due to the publishing activities of the Make Magazine founded in 2005. Often described as the anticipators of the so called ‘Third Industrial Revolution’ (Rifkin, 2012; Marsh, 2012), Makers are generally associated with the concept of *personal fabrication*, the spreading of communities related to open hardware and open source physical computing systems.

Makers, thanks to their relationship with technology, have been described in a variety of ways, with technology evangelists and ‘startupper’ being the most prominent titles.

From a scientific point of view, in recent years there has been increased literature on the theme of Makers from a phenomenological point of view, extending but not limiting the area of interest to the design field.

Despite the fact that these studies focus mainly on ‘makers as producers’, various signals, including the involvement of large international groups¹, suggest that the dynamics of production-consumption addressed in social sciences can provide an alternative point of view on the Makers phenomenon.

The hypothesis that some of the Makers are shifting from being producers to being consumers² thanks to the same economic actors that contributed to the emergence of the ‘Makers culture’, is at the basis of what we addressed as the ‘maker contradiction’. In order to verify the truth of the above statement, the first part of the present paper will focus on the relationship between the community of makers, the role played by Maker Media as the leader of the maker movement, and the ‘market of making’ in which these economic actors operate. In the second part, will be analyzed the evolution of tools employed by the MakerBot-Thingiverse platform, the best-known online community for sharing 3D files that over the years has become the core of the business strategy of the start-up that founded it.

1 For instance in the sector of CAD software and additive manufacturing such as Autodesk e Stratasys.

2 Makers could also be seen as also *prosumers* as pointed out by Ritzer in several articles on his blog available at <http://georgeritzer.com/>.

2. The Makers Ecosystem: community, market and movement

The data on the growth of the Makers phenomenon reconstructed through a *desk analysis* performed on multiple sources – official reports published by the subjects investigated, articles on scientific journals, online newspapers, specialised magazines and blogs – support the existence of a socioeconomic system of *making* (table 1) or of a Maker Ecosystem (a term coined by Maker Media). The numbers and the presence of a high level of interactions between many economic actors active in this field support this hypothesis³.

Table 1 Analysis of the growth of the Makers phenomenon.

Subject	Launch	Status 2012-2014	Notes
FabLab	2003	294 Fab Lab available	Neil Gershenfeld states that the number of Fab Labs doubles every 18 months
Make Magazine	2005	300.000 readers	
Arduino	2005	About 5.000 Arduino units manufactured every day	
Fab@Home	2005	The 3D printers Fab@Home have been built in 43 Fab@home labs in the world	IThe project was concluded in 2012 as it reached its goal: The number of domestic 3D printers has outnumbered industrial 3D printers
Etsy	2005	500 employees and 30 million buyers and sellers	Profits for 2011: \$500 million Profits for 2010: \$314 million Profits for 2009: \$180 million
Raspberry Pi	2006	2,5 million units sold in 2012	(400.000 of which are presumably used by children)
Maker Faire	2006	100 Faires in 2013 with 530.000 visitors	61 Faires in 2012 (+64%) 24 Faires in 2011 (+335%)
TechShop	2006	7 TechShops open and 11 more scheduled to open in the US	
Ponoko	2007	15 making hubs in the world and	

³ There are several cases of collaboration in order to organise events, to open promotional and commercial channels, and to sustain activities of various nature.

		200.000 products created	
Rep@Rap	2008	Around 200 models created in 2012	The <i>Family tree</i> RepRap published on Wikipedia goes up to 2012
MakerBot	2009	More than 35.000 printers sold. Between 35.000 to 100.000 objects uploaded on Thingiverse in 2013, 21.1 millions downloads	Bought by Stratasys in 2013 for \$400 million

Within this system it is possible to distinguish two groups of subjects presenting different kind of relationships with the Makers and the ‘market of making’, and a divergent approach in the design and development of technologies and design:

1. Subjects seeing Makers as a community (of practice).

These are mainly not for profit entities operating to promote the (culture of the) democratization of production through the open source philosophy.

Subjects such as the Fab Labs⁴ or experiences such as RepRap⁵ do not consider makers as a movement but as members of a wider community of practice to work with in a symbiotic and mutual way⁶.

In order for this relationship to be sustained it requires a mix of alternative mechanisms that rely mainly on volunteering, collaborative consumption, on donations and crowd funding even if there is no resistance to the market logics.

In particular, the network of Fab Labs, which has grown rapidly whilst maintaining its original model,⁷ is today undergoing a phase of institutionalisation (FabFoundation), which aims to harmonise the development of FabLabs. These spaces are now looking for formulas that could balance economic sustainability with the coexistence of free and paid

4 The Fab Labs are a global network of manufacturing laboratories born as a result of the researches of the Centre for Bits and Atoms about the self-reproducibility of digital fabrication technologies.

5 Rep Rap is the name of the community that created that first open source 3D printer project to which we owe the widespread development of low-cost printer models.

6 In many Fab Labs the equipment is free to use, one need to pay only far the raw materials.

7 Up to April 2014 there are officially 294 laboratories globally (source: FabFoundation, www.fabfoundation.org/).

services⁸ and push to increase both their autonomy in the development of manufacturing technologies (by saving on the purchase and maintenance of equipment)⁹ and their ability to generate projects, innovation and entrepreneurship.

2. Subjects seeing Makers as a market-community.

In this category we can distinguish two types of enterprises:

- To the first type belong companies such as *Arduino*, *RaspberryPi*, *Ultimaker* e *MakerBot*, defined by the development of *open source* projects-products, around which grow a large community that becomes also the companies' main market. The concept of 'market-community' (Bianchini and Maffei, 2012) derives from the overlapping between the production and consumption communities. These companies are, on one hand, increasing their market share by successfully using the strategic levers of globalisation and, on the other hand, developing a structured relationship with the hardware and software industrial system¹⁰. These subjects, in relation to the market, are also working to spread the philosophy of making by selling 'starter kits' and investing in educational projects such as *MakerBot Academy*¹¹.
- To the second type belong companies such as *Maker Media*, *TechShop* and *Etsy*, focussed mainly on building communication, promotion and commercial platforms that enable Makers to learn, share and promote projects and purchase technologies and products. These companies do not embrace the philosophy of the *open source* but are based on the principle of *open access* in order to expand the

8 The majority of Fab Labs have been created thanks to the support of public organisations and institutions. Many of these, out of financial support, now are going through a stage where they need to ensure their economic sustainability.

9 The self-construction is one of the development points of Fab Labs.

10 In a few years *Arduino* evolved from an open source project unknown outside of specific areas of use to a global open hardware company. *MakerBot*, a start-up operating in the consumer sector of 3D printers and recently acquired by *Stratasys*, industry giant, has focussed its strategy in the consolidation and expansion of its market-community through the *Thingiverse* platform.

11 Further information on the *MakerBot Academy* project is available on this address: <https://makerbot.com/academy/>. The official website of the *Makerspace* project and the repository of the affiliate laboratory is available through this link: <http://space.com/>

community of Makers as much as possible, offering several services at affordable costs¹², many of which follow the logic of *freemium*. Enterprises such as Maker Media and TechShop have significantly contributed to the birth and growth of the Maker Movement also thanks to the political support of the U.S, which is developing a set of actions for the regeneration of the new manufacturing culture in their country.

The data on the rapidly growing market of goods and services for making within a short amount of time provides food for thought about the evolution of the Maker figure.

It in fact needs to be clarified whether the Maker Ecosystem is proportionally abilitating the growth of a community of Makers entrepreneur and innovators (MakerMedia defines them as *Leading Edge Makers*¹³) or it instead favours the growth of Makers more interested in replication or personalisation of existing projects.

3. ‘Making Makers’: the triple role of Maker Media in the Maker ecosystem

There is no doubt that the worldwide spreading of the concept of ‘makers’ among others, such as crafters or hackers, resides principally in the successful Maker Media’s communication strategy based upon the rising awareness campaign about the Makers culture.

Maker Media has spin out from O’Reilly Media as a separate Company on January 2014, following the “[...] opportunity to extend and expand our popular brands beyond our current, engaged and devoted community”¹⁴. Maker Media is also the publisher of Make Magazine, “[...] the first magazine and media brand devoted entirely to the maker movement and the powerful combination of open source hardware + personal fabrication

12 The entrance ticket for MakerFaire costs between 10-35\$, one year membership to Make costs \$19.90.

13 The report on Maker Market underlines a data about ‘Leading Edge Makers’: 17% of the interviewed people identifying themselves as ‘Leading Edge’ makers, defined for the survey as makers who describe themselves as an entrepreneur, innovator, or influencer.

14 ‘MAKE Division Spins Out From O’Reilly Media as Separate Company.’ *Marketwire*. Accessed April 14, 2014. <http://www.marketwired.com/press-release/make-division-spins-out-from-oreilly-media-as-separate-company-1749632.htm>.

*tools + connected makers, to generate sweeping changes from the classroom to the boardroom.*¹⁵

There is a plurality of opinions related to the maker community and the public figure of Makers. According to Dale Dougherty, the founder and CEO of Maker Media, Inc. '... Makers are enthusiasts; they're amateurs; they're people who love doing what they do. They don't always even know why they're doing it. [...] They want to figure out how things work; they want to get access to it; and they want to control it. They want to use it to their own purpose...'¹⁶. For Chris Anderson '... basically, the Maker movement is what happens when the Web meets the real world...'¹⁷. Maker Media's vision is shared also by scholars such as Hod Lipson, who tends to see a cultural movement behind Makers (Lipson, 2012).

Since the key role played by Maker Media to shape the meaning and the favourable cultural environment for the quickly world-spreading of Makers seems to remain crucial and undisputed, the present paper recognises at least three roles played by Maker Media in order to spread the maker culture.

First role: Cultural intermediary and gatekeeper of the 'official' Maker culture.

As Maker Media is a for-profit organization aimed to take 'DIY geek culture mainstream'¹⁸ such communication activities also represent its core business. The role of Maker Media could be analyzed within the framework of the critical cultural studies of marketing¹⁹, taking into account both brand management and meme engineering, as it has been outlined by scholars and critics such as Arvidsson and Morozov.

15 'MAKE Kicks Off 'A Summer of Making' With Its 3D 'School's Out!' Special Issue.' *Marketwire*. Accessed April 17, 2014. <http://www.marketwired.com/press-release/make-kicks-off-a-summer-of-making-with-its-3d-schools-out-special-issue-1666841.htm>.

16 Dougherty, D. *We Are Makers*. Accessed April 3, 2014. http://www.ted.com/talks/dale_dougherty_we_are_makers.

17 Anderson, Chris. 'The Long View | Chris Anderson Says the 'Maker' Movement Is the Next Industrial Revolution.' *BoF - The Business of Fashion*. Accessed April 8, 2014. <http://www.businessoffashion.com/2012/11/the-long-view-chris-anderson-says-the-maker-movement-is-the-next-industrial-revolution.html>.

18 'Former Pixar, Disney Technology & Operations Head, Greg Brandeau, Joins Maker Media as President and COO.' *Marketwire*. Accessed April 14, 2014. <http://www.marketwired.com/press-release/Former-Pixar-Disney-Technology-Operations-Head-Greg-Brandeau-Joins-Maker-Media-as-1830327.htm>.

19 The definition of 'critical cultural studies of marketing' used here refers to Zwick's definition in 'Utopias of Ethical Economy: A Response to Adam Arvidsson' (2013).

In his essay about the influence of Silicon Valley's technocratic thinking, Morozov pointed out how the Tim O'Really' *meme engineering*²⁰, a particular process that enables the organization and shaping of ideas in order to be transmitted more effectively, and have the desired effect to reframe the mining of a particular concept once it has been transmitted (Morozov, 2013). As argued by Morozov, meme engineering allows connections among social, technological and economical topics, even if they seem apparently distant from each other²¹.

Such mechanism is also recognizable in the spreading of Makers culture. It has worked discursively to build an inclusive environment to connect together different visions: the one in which people enjoy making things for pleasure, with a more ideological one where by embracing open hardware technologies, they aimed to spread the open culture to the physical world.

As a result, those different positions have become blurred within the Maker Media rhetoric. Once both countercultural and commercial meanings have been melted together, the result is similarly to what Arvidsson, in his critical perspective of brand management, refers to as 'the context of consumption'. From this stand point, the role of Maker Media consists in the construction of a common ground of shared meanings, allowing different actors to interact with each other: makers by providing the contest for building social relations on one hand; sponsors and investors interested in capitalizing such a rich meaningful environment on the other hand. As Arvidsson argued, some of the products of the brand management in the contemporary cognitive capitalism are branded communities to encourage the production of ethical surplus, the combination of social relation, shared meaning, emotional involvement and sense of belonging (Arvidsson, 2005), which result in a kind of natural resource for brand managers. Similarly, the maker meme has oriented a worldwide audience, formed by hobbyists and professionals towards shared values, by convincing them that they are

20 According to Morozov, an example of the function of *meme engineering* is the role played by O'Really Media in turning the mining of *free software* in open source, reframing such concept from the social perspective of the individual freedom as it was originally thought within the free software movement, to one related to the ambiguity of the terms 'openness' and 'open access' as 'internet-enabled collaboration' and a tool to lower the barriers to entry into market (Morozov, 2013).

21 As argued by Morozov '... The exact nature of these connections is rarely explained in full, but this is all for the better, as the reader might eventually interpret connections with their own agendas in mind. This is why the name of the meme must be as inclusive as possible: you never know who your eventual allies might be...' (Morozov, 2013).

makers. The construction of the social identity works into the life-world in order to drive makers to build social relations and ethical surplus. Makers communities also look like a particular form of branded community that could support and create values for a bunch of selected brands, rather than a single one. By doing so, Maker Media could affirm its role as cultural intermediary within the maker community, conditioning the direction for the production of ethical surplus in order to value sponsors and selected brands by unfolding them to the 'official' Makers culture.

Second role: Global platform for Makers

The intent of Maker Media to be the intermediary among different actors, and their related interests, is even clearer when it describes itself in terms of a 'Global platform for connecting makers with each other, with products and services, and with our partners'²². As argued by Gillespie, the meaning of 'platform' within the information society's public discourse has shifted from 'technical', rooted into computational dictionary to 'cultural', obtaining the more figurative meaning 'platforms of opportunity'. Such a shift in meaning has been drawn by stakeholders working both politically and discursively to elide the tensions inherent in their service: 'between user-generated and commercially produced content, between cultivating community and serving up advertising, between intervening in the delivery of content and remaining neutral'²³ (Gillespie, 2008). The role covered by Maker Media as global platform and cultural intermediary, seems to assume a more crucial role once Makers have acquired public relevance by being recognized as a movement 'which is transforming innovation, culture and education'²⁴.

Third role: Leaders of the Maker Movement

The idea that Makers are not only a growing heterogeneous global community of people involved in doing things, but a movement, as Maker

22 'Maker Movement.' *Maker Faire*. Accessed April 8, 2014. <http://makerfaire.com/maker-movement/>.

23 Framing his observation to service providers such as YouTube, Gillespie argue that the role of such platforms are increasingly becoming prominent in the distribution of information online and for the whole movement of digital culture. Once they became the keepers of the cultural discussion on the Internet, a clarification about their public role and responsibility related 'to their users, to key constituencies who depend on the public discourse they host, and to broader notions of the public interest' is needed (Gillespie, 2008).

24 'Maker Media | Leading the Maker Movement.' Accessed May 11, 2014. <http://makermedia.com/>.

ALESSANDRO CARELLI, MASSIMO BIANCHINI, VENANZIO ARQUILLA

Media declares, comes with no surprise since Makers are universally involved in 'bringing a DIY mindset to technology'²⁵.

The 'DIY movement can be characterized by a rejection of the consumption of objects produced by dominant culture in favor of creating the items one needs and desires on one's own' (Abrahams, 2008), it means that such a political vision is rooted into an anti-consumerism, anti-capitalistic and anti-establishment mindset²⁶. Based on this view Makers have developed their own Bill of Rights: a manifesto that recommends the use of accessible, extensible, and repairable hardware - 'If you can't open it, you don't own it'²⁷, as well as to push Makers to embrace and share hardware open source. But, differently from the hacker communities²⁸, in which 'there is a dialectical relationship between particular technocultural forms and more general cultural structures, which leads hackers to variably implement, reformulate and critique liberal social institutions, legal formulations and ethical precepts even as hacker practice' (Coleman and Golub, 2008), Makers 'are not necessarily troublemakers' (Morozov, 2014).

They come from a cultural system related to information technologies that is not struggling against the 'system'. The Maker movement is sponsored by global corporations as well as publicly supported by governments for its economical and educational potential²⁹. This phenomenon raises questions about the freedom of speech of the movement within profit-seeking entities such as file sharing platforms when they also play the role of culture providers (Gillespie, 2008). As Tim O'Reilly spoke about Maker Movement as '*a movement that began with enthusiasts*

26 Both DIY approach and Punk Culture have also been the inspiration for others related underground socio-cultural movements, such as the indie crafters and Riot Grrrl who are seeking 'to empower individuals (predominantly women) through the creative act' (Abrahams, 2008). There are other movements related to the Makers, such as *craftivism*, people that decide to abandon their profession to dedicate their time to craft work (Crawford, 2011).

27 Jalopy, Mister. 'A Maker's Bill of Rights to Accessible, Extensible, and Repairable Hardware.' *Make Magazine*, n.d.

28 A first proof of the difference between maker and hacker communities is rooted into the conflict within maker movement's declaration of intents, in which the defense of free access to knowledge rights within the Maker Movement is far to seem a priority when even the Maker Media official store sells some selected closed-source hardware products as well. A second conflict coming from the growing numbers of closed-source platforms involving makers in order to engage each others and sharing projects within sponsored environment.

29 Consider, for example, the growing interest in the Makers community by DARPA and the Chinese Government.

has turned into an entrepreneurial revolution'³⁰, such an entrepreneurial predisposition is drastically emphasized within the movement. In such a scenario that mixes together entrepreneurship and social movement, the role that Maker Media created for itself in terms of 'synonymous with the Maker movement' and 'the recognized leader of this growing community of makers'³¹, is far to be marginal.

Finally, the three roles played by Maker Media as *cultural intermediary* and *gatekeeper* of the 'official' maker culture, *global platform* for makers as well as *leader* of the maker movement, looks to be highly complementary. By covering such a triple role, Maker Media has the power to stretch the boundaries of the 'official' maker culture in order to strengthen the brand value of selected sponsors to elide the tensions inherent in the community between sponsors and investors.

By doing so, in the construction of the concept of maker, even maintaining the focus on sharing knowledge and collaborative process within the community, Maker Media has also lowered the importance of topics such as the defense of privacy rights and free access to knowledge (as intended from the open source communities point of view) putting a radical entrepreneurial vision into place.

Such a mechanism seems to suggest that there is an ongoing shift in the real role of makers from producers, as it has been artificially built and publicly communicated to a consumer. In order to provide supporting evidence for this intuition, the next chapter will focus on the relationship between makers and the Makerbot-Thingiverse platform.

4. DIY Consumption: the case of Thingiverse

MakerBot is one of the most well known producers of 3D printers and, according to *Maker Media*, one of the most representative case of the Maker Ecosystem. Founded in 2008, at a time when Makers were still a marginal phenomenon, *MakerBot* operates in the consumer segment, with a strategy focussed on building and involving an online community of Makers. There is an obvious connection between *MakerBot* and *Maker Media*, traceable in the continuous media coverage offered by the latter

30 'MAKE Division Spins Out From O'Reilly Media as Separate Company.' Marketwire. Accessed April 14, 2014. <http://www.marketwired.com/press-release/make-division-spins-out-from-oreilly-media-as-separate-company-1749632.htm>.

31 'Maker Movement.' *Maker Faire*. Accessed April 8, 2014. <http://makerfaire.com/maker-movement/>.

ALESSANDRO CARELLI, MASSIMO BIANCHINI, VENANZIO ARQUILLA

about the activities of the producer, and by the fact that *MakerBot* printers are distributed by *Maker Media* through its digital store (Make Shed).

Thingiverse is a file-sharing platform for 3D printing, designed by one of the co-founders *MakerBot*, one of the most used among those in the Maker Ecosystem (see figure 1):

‘... Thingiverse Community was built from the ground up as a place for people to freely share their digital designs for physical objects. We built it to be as inclusive as possible. It will accept almost any digital file, so long as it a design for a real, physical object’³².

Companies driving the Maker Ecosystem

Source: Riedited from the original map by Ponoko_MediaKit.pdf

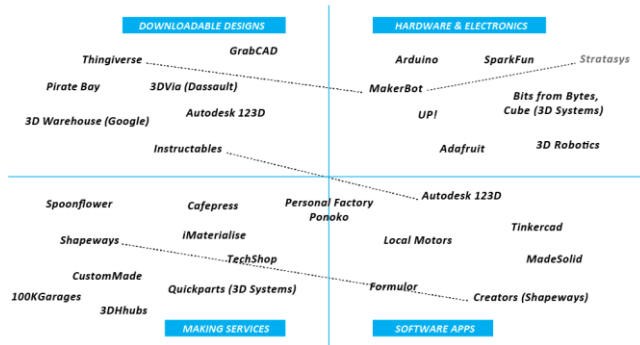


Figure 1 *MakerBot-Thingiverse within the Maker Ecosystem* (source: edited map from Ponoko Media Kit.).

Today the *Thingiverse* community is the backbone of the commercial strategy of *MakerBot*, based on sharing projects by its members and open licenses.

The most significant changes made to the platform, prior to the obtainment of the first funding from *MakerBot* announced in August 2011, have affected the relationship between *Thingiverse* and the user community. Two events are examples of the transformation of the *Thingiverse* community in a *branded community*: the announcement of a

32 Remko. 'THINGIVERSE / ZACH SMITH | Open Design Now.' Accessed May 11, 2014. <http://opendesignnow.org/index.php/case/thingiverse-zach-smith/>.

name change into 'Makerbot Thingiverse' in January 2012 and the changes in Terms Of Service in September 2012.

In particular, this affected the less expert users, being provided with 'ready-to-print' content and tools that simplify and automate the customisation of designs. By doing so, *MakerBot* affects the modality of interaction to the community of *Thingiverse*, by changing the Architecture Information (AI) and the *User Interface* (UI) of the platform. Practice Theory is a theoretical framework related to socio-technical studies based on the idea that, in order to better understand social phenomena, 'practice' should be taken as the main unit of analysis (Magaudda, 2012).

Through Practice Theory we want to show how the original intent of making *Thingiverse* 'to be as inclusive as possible' should be checked against the commercial strategy of *MakerBot* (table 2).

Table 2 Chronological reconstruction of the relationship between *Makerbot* – *Thingiverse*.

Year	Month	Thingiverse	Makerbot	Link
2008	October	Launch of the online platform		http://opendesignnow.org/index.php/case/thingiverse-zach-smith/
2009	March		Launch of Cupcake CNC.	
2010	September		Launch of Thing-O-Matic.	
2011	August		Makerbot announces \$10million fundings.	http://www.makerbot.com/blog/2011/08/23/all-star-lineup-invests-in-makerbot/
2012	January	First update of the platform interface, introducing the 'featured items' and the first tools for the personalisation of the user profile. The two best improvements relate to the introduction of two new functions to share derivative designs. The introduction of two new functions: 'I Made a Derivative' then transformed in 'remix' and 'I Made One' to share the results of the cretion of an object shared by another user.		http://www.makerbot.com/blog/2012/01/09/new-and-improved-thingiverse/
			Launch of Replicator.	
			'Thingiverse' becomes 'Makerbot Thingiverse'.	http://makezine.com/2013/01/12/makerbot-changes-the-name-of-thingiverse-to-makerbot-thingiverse/
	June	Introduction of project 'categories' (3D printing, art, fashion, gadgets, hobby, household, learning, models, tools, toys and games).		http://www.makerbot.com/blog/2012/06/12/thingiverse-categories/
	August		Makerbot publishes the files 'Black Dynamite Bust' on the Thingiverse portal during the marketing campaign of the film carrying the same name.	http://www.thingiverse.com/thing:27832
	September	Changes to the Terms of Service (TOS)		As a response to the Terms of Service, Joseph Prusa starts the campaign Occupy Thingiverse (http://www.thingiverse.com/thing:30808)

		Launch of Replicator 2 and Replicator 2X	This version was sold exclusively pre-assembled. The design of the printer is definitely closed-source.
	November	Launch of the new Dashboard including tools for the customisation of user profiles and the introduction of new features such as the button 'like', 'follow' and the notification feed system .	http://www.makerbot.com/blog/2012/11/07/introducing-makerbot-thingiverse-dashboard-and-follow-features/
		Launch of the 'Makerbot Academy'	http://www.makerbot.com/blog/2014/03/21/makerbot-desktop-education-part-1-perfect-pair/
2013	January	Makerbot releases the web application 'customizer' and the features for the platform	http://www.makerbot.com/blog/2013/01/18/design-unique-things-easily-with-makerbot-customizer/
		Makerbot releases the file: Nokia Lumia 820 MakerBot Shell on Thingiverse	http://www.thingiverse.com/thing:43163
	August	Improvements of the UI for mobile devices and further tools for the customisation of profiles.	http://www.makerbot.com/blog/2013/08/08/thingiverse-a-fresh-new-look-on-thingiverse/
		Launch of the Makerbot Customizer Challenge	http://www.makerbot.com/blog/2013/01/23/win-a-makerbot-replicator-2x-experimental-3d-printer/
		Makerbot announces the collaboration with Microsoft and the sale of their printers in selected Microsoft stores.	http://www.makerbot.com/blog/2013/08/07/the-makerbot-experience-at-a-microsoft-store-near-you/
		Makerbot announces merger with Stratasys.	http://www.businesswire.com/news/home/20130815006088/en/Stratasys-MakerBot-Complete-Merger
		Launch of the Digitizer Desktop 3D Scanner	
	October	Implementation of the 'featured items'.	http://www.thingiverse.com/featured http://www.makerbot.com/blog/2013/11/08/stylecolor000thingiverse-featured-things/
		Implementation of 'verified items'	http://www.thingiverse.com/thingiverse/collections/verified/page:1 http://www.makerbot.com/blog/2013/10/16/thingiverse-verified-prints/
	November	Launch of the contest 'Math Manipulative Challenge'	http://www.makerbot.com/blog/2013/11/12/thingiverse-makerbot-academy-math-manipulative-challenge/
2014	January	Makerbot announces the opening of their Digital Store for the sale of printable toys on-demand.	http://www.makerbot.com/blog/2014/01/06/makerbot-digital-store-new-online-shop-for-unique-3d-models/
		Launch of the Replicator Desktop 3D Printer (Fifth generation).	
		Launch of the Makerbot 3D Ecosystem*	http://www.makerbot.com/blog/tag/3d-ecosystem/
	March	Introduction of the 'Makerbot Desktop' software : to manage printing files, use cloud computing service, access Makerbot digital store and integrate the profiles of the Thingiverse platform.	http://www.makerbot.com/blog/2014/03/21/makerbot-desktop-education-part-1-perfect-pair/

In order to show that the strategy of *MakerBot-Thingiverse* is based on the shifting of the making practices from production to consumption, we will consider two emblematic examples:

1. the introduction of the *customizer*, a web application that simplifies the customization of parametric geometries;

2. the introduction of *verified items*, whose files, optimised to be printed with *MakerBot* products, are directly distributed by *MakerBot* onto Thingiverse.

These applications have been analysed in relation to the changes of the AI and the UI of *Thingiverse*³³, chronologically reconstructed through the official press releases by *MakerBot* on its blog³⁴.

In January 2013 *MakerBot* announced the launch of 'Customizer', a web application for the customization of 3D designs based on OpenSCAD. It is a tool that allows customisation of parametric files through simple visual commands. Customizer makes it easier for users to modify designs without prior knowledge in 3D modelling.

A good case study is the 'Customized iPhone Case'³⁵ (Figure 2) a project for the customization of an iPhone case shared through the official *MakerBot* account. According to a research conducted on 117.450 objects published on *Thingiverse*³⁶, this is also the project that has been 'remixed' the most by users – that is customised and re-shared on the platform – although printed only 11 times. The interventions that specifically affected the platform are the following:

- the implementation of the category 'customized things' to make it easier for users to find customizable files;
- the addition of the button 'open in customizer' on the web interface.

In addition, it is interesting to note how the strategy adopted by *MakerBot*, further to the interventions on UI and AI of the platform, includes the organisation of thematic challenges to engage the community (table 3). In this case, the implementation of the *Customizer* was followed by the launch of a *contest* for the creation of parametric designs customisable with the web application.

By simplifying and automating the customisation of 3D geometries, customizer had drastically increased the 'derivative projects' (ie remixed),

33 As summarised on Table 1.1.

34 The changes in the information architecture of Thingiverse have almost always been followed by significant improvements to the user interface. From this point of view, in the history of the platform we can find four main moments summarised in Table 1.1 (January, June and November 2012, August 2013).

35 'Customizable iPhone Case by MakerBot - Thingiverse.' Accessed May 11, 2014. <http://www.thingiverse.com/thing:40703>.

36 The analysis is based on metadata available via website, not API and contains things collected from Jan 2009 to Aug 2013, and is available at the following link: <http://ossoil.com/thingiverse/>

ALESSANDRO CARELLI, MASSIMO BIANCHINI, VENANZIO ARQUILLA
 although without eliciting learning and spreading of significant knowledge,
 since all steps have been automated and optimised to be implemented with
 MakerBot products.

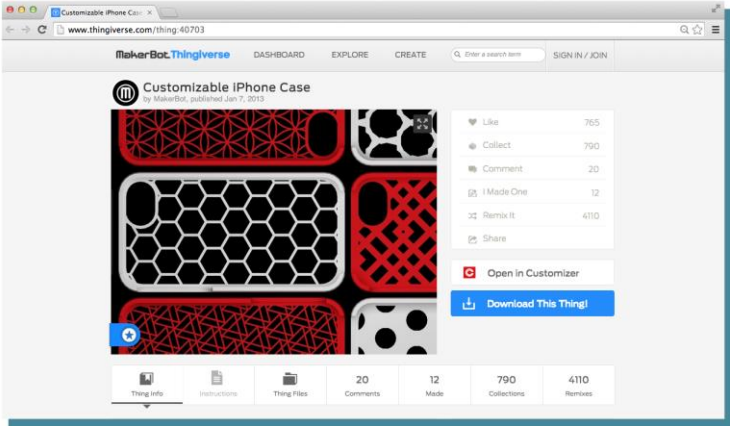


Figure 2 A sample of customizable thing: the iPhone Case.

Table 3 Description of the tools to share files on Thingiverse.

Tool name	Description	Implementation date
Comments	Main area dedicated to users.	Since the first version
Made	It is a tool for sharing photos showing the creation of a project shared by another user. All projects created in this way are collected under the specific item "I Made One" on the page of the original project.	January 2012
	'Screwless Cube Gears' ³⁷ , a gadget lacking any specific function, is the most 'reproduced' project among the community of Thingiverse.	

37 The project is available on the following link: <http://www.thingiverse.com/thing:38712>

<i>Remix</i>	This feature allows the identification of a project as the derivative of another. In the jargon of the hacker community activity the implementation of a new project derived from an open source project is called "fork". In this case, the choice of referring to 'remix' seems more inspired by the phenomenon of the creation of derivative projects on the network as the "mashup" found in the digital culture. This provides the combination, visualization, and aggregation of content available online, originally produced for other purposes	
	'Customized iPhone Case' ³⁸ , The project for the customisation of an iPhone case shared through the official Makerbot account, is the most 'remixed' project although printed only 11 times, according to the data on the project page.	
<i>Categories</i>	For each project shared on Thingiverse it can be applied a category between those allowed by the platform, in addition to the possibility of adding a series of tags through the folksonomy system.	June 2012
<i>Like</i>	Provides the opportunity to express appreciation of projects shared by other users.	November 2012
	'Gear Bearing' ³⁹ , the equivalent of a prototype of a ball bearing designed to be printed in 3D with plastic material turns out to be the object with the greatest number of 'likes' as well as 'collected'.	
<i>Follow</i>	It allows the creation of a list of users of whom it is possible to receive updates on their activities on the platform. It is currently not possible to organise lists of users by theme.	
<i>Updates/feed</i>	The notification feature on users that are being followed.	

Verified items

These are optimised geometries 'ready to print' distributed on *Thingiverse* (October 2013) through the official *MakerBot* account. Their introduction represents a further step towards the simplification and

38 The project is available on the following link. <http://www.thingiverse.com/thing:40703>

39 The project is available on the following link. <http://www.thingiverse.com/thing:53451>

automation of the processes that generate digital design. In fact, thanks to *verified items*, *MakerBot* has on one hand reduced the technical skills necessary to the users and, on the other hand, pushed users to use their product.

As in the case of the customiser, also the *verified items* are part of the strategy called 'Makerbot 3D Ecosystem', that includes a new set of digital applications integrated and across devices. Among these is the 'Makerbot 3D Printshop', an application for tablets that will soon be released and will allow to browse the list of tested geometries, view and make simple changes, and optimise the printing process of the printer model that will soon be released.

MakerBot has therefore affected the development of *Thingiverse* by favouring their own products and reducing the gap between the online community and the marketplace. This latter aspect of the strategy clearly appears in the application *Makerbot Desktop*, the equivalent of iTunes for 3D geometries, in which many cloud computing services coexist for the synchronisation of devices, of the digital library, the *Thingiverse* community and the marketplace.

In the light of this reconstruction it is possible to observe how the changes made to *Thingiverse* for the past four years have been determined by strategic choices, even at the expenses of the first user community, as shown by the reaction of community members after *MakerBot's* decision to abandon open hardware and changes in the TOS.

MakerBot, in order to reposition its brand from a niche to a market capable of attracting less expert users, it has introduced in *Thingiverse* a series of tools to simplify, automatise and optimise the design phases.

The tangible result of this strategy, similar to that observed by Magaudo (2008) in hacking practices, is the process of 'consumerisation of the making activity'. In certain areas, such as the ones analysed in the *Thingiverse* community, *MakerBot's* market strategy has shifted Makers from being producers to consumers, in which the 'practice of making' is gradually accompanied by their 'experience'. The latter acts in two complimentary ways: on one hand it lowers the level of expertise necessary to realise the design – often reduced to small customisations – on the other hand it encourages users to employ systems bound to the functions provided by the producer.

The combination of these aspects, turning Makers into consumers of a service, and including them in *MakerBot's* commercial strategy aimed to

direct Makers towards non open source tools, all contribute to define what we called the 'Makers contradiction'.

5. The 'Makers contradiction': conclusions, limitations and potential for further analysis

The global spreading of the Makers phenomenon is leading to the emergence of a new socioeconomic system of *making*, in which DIY practices are shifting from a pure production to a consumption experience, with the addition of services and simplified tools for self-production.

Our analysis has pinpointed two main kind of relationships between Makers and market. One focussing on the 'market-community' and on the study of subjects that consider Makers as 'consumers of making', where *Maker Media* plays a vital role.

A second interpretation comes from the study of the literature on 'critical cultural studies of marketing' (Zwick, 2013), analysing the activities of *Maker Media* in relation to critical theories on brand management and the shaping of branded communities (Arvidsson, 2005), and by investigating the mechanisms supporting the viral spreading of the maker.

In this second scenario we highlighted the transformation of some DIY practices, shifting from production to 'consumption of production' and, consequently, the emergence of a new kind of Maker, for whom DIY and personal fabrication become the expression of a sophisticated form of consumption.

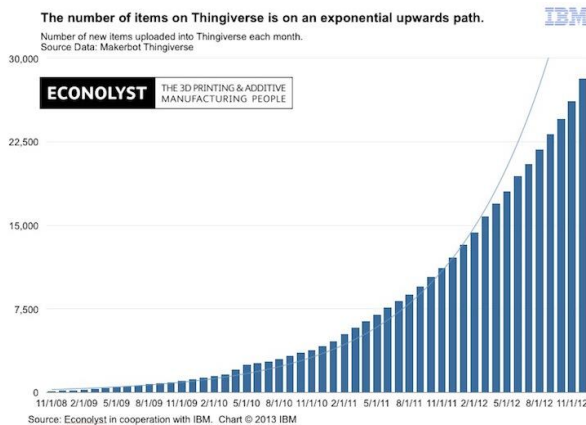


Figure 4 The exponential growth of the uploaded items on Thingiverse.

For a better understanding of this passage, we analysed the branding process undertaken by the *Thingiverse* community, showing how this then affected the development of the commercial strategy of *MakerBot*.

The changes made to the *Thingiverse* platform fall within *MakerBot*'s strategy of expanding their consumer segment within the 3D printers market. The analysis has shown the course of action of *MakerBot* towards the community: it favoured users with less technological expertise by adding digital tools to the platform aimed to simplify and automatise the design process. However, the analysis reported in the present paper has some limitations:

1. The 'Makers contradiction', the influence of the economic actors on the development of the Makers community and the public figure of the Maker have not been extensively analysed in relation to the role of economic forces within the processes of social negotiation (Latour, 2005);
2. The analysis was limited to the *Thingiverse* platform, which did not allow comparison with other communities dedicated to making.

A follow up analysis on the transformation of the Maker figure could, as well as incorporating the two points reported above, use the critical theory of technology perspective in order to look at the mechanisms underpinning the construction of the 'making experience'.

If it is proven that the actors investigated and their commercial strategies are aimed to expand the Makers community (or expand to those experiencing making), it still needs to be demonstrated whether this benefited the quality of knowledge created within the maker community and the material culture of our society in general.

The present paper does not want to diminish the social and economic importance of the Makers phenomenon, but wants to contribute to fuel the public debate outside the rhetoric adopted by the economic actors, who seem now to prevail within this context. This raises several questions on the social and economic role of Makers, now that making practices are seen as possible sources of development and that 3D printers will soon appear in schools.

Finally, with an increasing worldwide community of makers and the increase of promoted initiatives aimed to such community, it seems necessary to address some crucial themes related to the development of such Movement. For example, what instances of social, economic and technological innovations could develop within a movement created, sustained and guided by global economic actors that aim to capitalise on the

fundamental values of this rising culture? How is it possible to promote the aspects genuinely most innovative? How will the Maker Movement (and its ideals) evolve following the consolidation of the 'maker contradiction'?

References

- Abrahams, S. (2008) *Handmade Online: The Crafting of Commerce, Aesthetics and Community on Etsy.com*. University of North Carolina: Electronic Theses and Dissertations.
- Dean A. and Dean A. (2012) The DIY 'Maker Movement' Meets the VCs. [online] *BusinessWeek: Small_business*. Available at: <http://www.businessweek.com/articles/2012-02-16/the-diy-maker-movement-meets-the-vcs>. [Accessed: 2014, May 12th].
- Arvidsson, A. (2005) Brands: A Critical Perspective. *Journal of Consumer Culture*, 5 (2), 235-258.
- Burgess, J. and Green, J.B. (2008) *Agency and Controversy in the YouTube Community*. Paper Presented at the Association of Internet Researchers (AoIR) conference, University of Copenhagen, Denmark.
- Campbell, C. (2005) The Craft Consumer : Culture, Craft and Consumption in a Postmodern Society. *Journal of Consumer Culture*, 5 (1), 23-42.
- Coleman, G. and Golub, A. (2008) Hacker Practice: Moral Genres and the Cultural Articulation of Liberalism. *Anthropological Theory*, 8 (3), 255-277.
- David, S. (2008) *Open Systems in Practice and Theory*. Dissertation Presented to the Faculty of the Graduate School of Cornell University.
- De Bruijn, E. (2010) *On the Viability of the Open Source Development Model for the Design of Physical Objects*. Thesis for the degree of Master of Science, University of Tilburg.
- Dean, J. (2010) *Blog Theory. Feedback and Capture in the Circuits of Drive*. Cambridge: Polity.
- Delfanti, A. (2014) *Biohackers: The Politics of Open Science*. London: Pluto Press.
- Delfanti, A. (2013) Geni ribelli. La scienza aperta nell'immagine pubblica di due biologi. *Tecnoscienza. Italian Journal of Science & Technology Studies*, 4 (2), 27-49.
- Feenberg, A. (2005) Critical Theory of Technology: An Overview. *TAILORING BIOTECHNOLOGIES*, 1 (1), 47-64.
- Gillespie, T. (2008) The Politics of Platforms. *New Media & Society*, 12 (3), 347-364.
- Harvey, D.A. (2005) *Brief History of Neoliberalism*. Oxford: Oxford University Press.

ALESSANDRO CARELLI, MASSIMO BIANCHINI, VENANZIO ARQUILLA

- KelTy, C.M. (2008) *The Cultural Significance of Free Software*. Durham: Duke University Press.
- Latour, B. (2005) *Reassembling the Social. An Introduction to Actor-Network-Theory*. Oxford: Oxford University Press.
- Lessig, L. (2004) *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity*. London: Penguin Press.
- Lipson, H., Kurman, M. (2013) *Fabricated*. Hoboken: John Wiley & Sons.
- Magaudda, P. (2012) How to Make a Hackintosh. A Journey into the 'consumeri- Zation' of Hacking Practices and Culture. *Journal of Peer Production*, 2, 1-8.
- Marsh, P. (2012) *The New Industrial Revolution: Consumers, Globalization and the End of Mass Production*. Yale: Yale University Press.
- Morozov, E. (2013) The Meme Hustler - Tim O'Reilly's Crazy Talk. *The Baffler*, 22, 66-67.
- Reckwitz, A. (2002) Toward a Theory of Social Practices A Development in Culturalist Theorizing. *European Journal of Social Theory*, 5 (2), 243-263.
- Rifkin, J. (2013) *The Third Industrial Revolution: How Lateral Power Is Transforming Energy, The Economy, and The World*. New York: Palgrave Macmillan.
- Ritzer, G. and Nathan, J. (2010) Production, Consumption, Prosumption : The Nature of Capitalism in the Age of the Digital 'Prosumer'. *Journal of Consumer Culture*, 10 (1), 13-36.
- Zwick, D. (2013) Utopias of Ethical Economy: A Response to Adam Arvidsson. *Ephemera. Theory and politics in organization*, 13(2), 393-405.

ISBN: 978-88-940625-0-2

SUPPORTED BY


DOTTORATO DI RICERCA IN DESIGN
POLITECNICO DI MILANO, DIPARTIMENTO DI DESIGN

FASTWEB
un passo avanti



Fondazione Giannino Bassetti
for Responsibility in Innovation

ISBN 9788894062502



9 788894 062502