

“Do-It-Together” and innovation, towards the Factories of the Future (FoF)

Laurent Dupont, Fedoua Kasmi, Joshua M. Pearce, Roland Ortt

► **To cite this version:**

Laurent Dupont, Fedoua Kasmi, Joshua M. Pearce, Roland Ortt. “Do-It-Together” and innovation, towards the Factories of the Future (FoF). 2020. hal-03024062

HAL Id: hal-03024062

<https://hal.univ-lorraine.fr/hal-03024062>

Submitted on 25 Nov 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Call for papers – Special Issue

“Do-It-Together” and innovation, towards the Factories of the Future (FoF)

Guest Editor(s): Laurent Dupont¹, Fedoua Kasmi¹, Joshua M. Pearce², Roland J. Ortt³

Faced with the environmental and socio-economic limitations of the current production model, that has persisted for several years, the accelerated development of information and communication technologies has made it possible to explore new innovative fields in the productive sectors. New reflections are emerging on the transition towards a more sustainable and innovative production models. In this context, the emerging "Design Global, Manufacture Local" model (DGML), aims at transforming the global manufacturing industry so that the vast majority of products can be manufactured locally by globally exchanging the information flows on how to manufacture the product (information, knowledge, design, codes, models, drawings, etc.) over the physical flows (Kostakis et al., 2015; Kostakis et al., 2018; Waldman Brown, 2016). This model is based on the principles of commons-based peer production (Bauwens, 2005; Kostakis et al., 2015) in which resources are shared with equal interest for all the involved stakeholder (Ostrom, 1990). It represents a form of democratization of the industrialization through processes in which the design is developed as a global common, while the manufacture of products takes place locally, considering the specificities of local ecosystems.

The mode of commons-based peer production, particularly digital commons, has mainly developed within the so-called Makers' movement, also known as the Do-It-Yourself (DIY) movement. The emergence and multiplication of spaces and networks of makers, hackerspaces, micro-factories, fab labs or other spaces equipped with digital manufacturing tools and technologies (3D printers, sensors...) has favoured the development of a more agile, democratized and distributed production (Kohtala, Hyysalo, 2015; Pearce, 2014; Fox, 2013; Dupont, 2019). Such environments are conducive to distributed collective creativity, which plays an important role in the emergence of new forms of innovation and entrepreneurial activities (Capdevila, 2015; 2019; Boutillier et al., 2018). Based on the customization, integration and involvement of users in the production processes and local production in small series, the DIY practices represent a source of the development of *"prosumption (local production with local materials by local people), innovation, and*

¹ ERPI Laboratory (*Research Team on innovative Processes*), Université de Lorraine, France

² Department of Materials Science and Engineering and Department of Electrical & Computer Engineering, Michigan Technological University

³ Department of Values, Technology & Innovation (VTI), Section Economics of Technology and Innovation (ETI), Delft University of Technology

entrepreneurship by local populations in regions without industrial manufacturing infrastructure" (Fox, 2014). The confluence of ideas and technologies and the interconnection between digital and physical environments offer the potential for a transition to a new form of hybrid production that combines the scale and efficiency of high-volume manufacturing with the benefits that small local producers (SMEs and SMIs) bring to local economies (Fox, 2014; Waldman Brown, 2016). Nevertheless, supporting this hybrid production approach and disseminating the do-it-yourself principles among local producers requires the development of new production modes and strategies in a context where processes "*are less open, less distributed and less minimal than the new Do-It-Yourself processes*" (Fox, 2013). As a result, many actors, especially small producers, miss the opportunities of development and innovation offered by the DIY.

The new "Do-It-Together" (DIT) approach attempts to address these limitations. It is a participatory design and collaborative production strategy that allows "global design and local manufacturing" involving "prosumers" (consumers/producers) (Toffler, 1980) in the manufacturing process. It has recently been developed in the context of social manufacturing, which is a more open and democratic approach to traditional manufacturing, involving different levels of user participation in the production process (Shang et al. 2013; Hirscher et al, 2018). The social manufacturing approach aims to "*seamlessly link the social manufacturing network consisting of the Internet, the Internet of Things, and the 3D printer, thus enabling social people to participate fully in the entire manufacturing process through outsourcing, facilitating personalized, real-time, and socialized modes of production and consumption*" (Mohajeri et al., 2014). It integrates consumers in all the processes of customized product development, such as ideation, design and production, engaging them more actively in local production in a commons-based peer production context, inspired by the agile and distributed functioning of the DIY (Hirscher et al., 2018).

The first studies on the collaborative creativity practices of the Do-It-Together have examined its impact on the creation of value in the fashion industry. Social, economic, environmental, knowledge, emotional and experiential values associated with the DIT were identified, generating positive externalities for all the involved stakeholders (customers, professionals and local producers) (Hirscher et al., 2018). The DIT strategies are indeed adapted to small-scale production on local sites offering significant potential for new business opportunities and new innovative activities especially for SMEs that face many challenges to engage open innovation processes. The potential for open creativity generated by the DIT can provide competitive advantages for companies while limiting the costs and risks associated with the development of innovative products (Cullmann et al., 2015).

Building on social manufacturing paradigms such as cyber-physical-social space that "*involves human intelligences and social organizations (e.g. communities) to enable social interactions and organic connections between prosumers and socialized resources (e.g. machine tools, design software, measurement equipment and sensors) to co-create individualized products and services*" (Jiang et al., 2016) the DIT strategies would enable the development of connected open innovation networks coordinated by multi-sided digital platforms. These platforms support co-creative communities in the form of distributed value networks in a collaborative economy context (Gandia, Guy, 2020). The DIT networks link consumers, makers, micro-factories and small local producers, making their production capacities available to the local ecosystem and forming regional poles of industrial innovation that could disrupt the functioning of the current production systems.

The emergence of the Do-It-Together approach could be integrated within the EU's Factories of the Future (FoF) strategy that aims at a transition of the European manufacturing industry towards a more flexible, digital and demand-oriented industry. It is in this context that the INEDIT⁴ H2020

⁴ open INnovation Ecosystems for Do It Together process, European Union's H2020 research program - Agreement N 869952, <http://www.inedit-project.eu/>

research project seeks to set the conceptual and experimental basis for the understanding of the DIT concept and to explore its potential for the transition of the industrial systems towards a disruptive change inducing radical innovations (Dedehayir et al., 2014). To this purpose, this special issue calls for interdisciplinary research to deepen the analysis of this novel approach. The different disciplines in economics, management and engineering of innovation could be mobilized in order to:

- Enrich the conceptualization of the DIT approach and study its potential for the development of different forms of innovation.
- Study the impact of the innovation processes generated by the DIT on organizations and territories.
- Examine the different types of co-creation values generated by the DIT collaborative approach.
- Analyze the potential for reorientation of design and manufacturing practices.
- Study the role of the implementation of the DIT processes in the emergence of new business opportunities and the creation of innovative entrepreneurial activities
- Analyze the prospects for environmental sustainability.

The topics addressed in this issue could include among other the following reflections:

- The role of the implementation of the Do-It-Together processes in the emergence of open innovation ecosystems and the creation of actors' networks based on the exchange of value and new forms of collaboration.
- The new values created through the integration of the consumer/user or open community in the co-creation, co-design and co-production phases and the transition of the consumer/user from a value user to a value creator.
- The role of the new technologies developed around the involvement of users in co-creation processes such as immersive technologies and artificial intelligence and their ability to accelerate both creativity and innovative conception in companies.
- The impact of the introduction of disruptive technologies, machines and open production methods (additive manufacturing methods, open-hardware approaches...) usually used by the Makers and Fablabs communities on the innovation capacities of companies and their role in the optimization of production and the increase of economic, technological, organizational and environmental performances.
- The role of new digital technologies in the development of open innovation networks and in the integration of structural changes on the process of co-creating, co-designing and co-producing.
- The emergence of new business models and the necessary changes for their implementation within the Do-It-Together processes.

Timetable for submission and acceptance of papers:

- Deadline for complete manuscripts through online paper submission: **01 November 2020**
<http://www.editorialmanager.com/innovations/default.aspx>

Guideline for authors: http://www.cairn.info/docs/Instructions_for_authorsGB110816.pdf

- Final notification for acceptance: **30 November 2021**

Submit abstracts or questions to:

References

- Bauwens, M. (2005). The Political Economy of Peer Production. *CTheory Journal*.
- Boutillier, S., Capdevila, I., Dupont, L. & Morel, L. (2020). Collaborative Spaces Promoting Creativity and Innovation. *Journal of Innovation Economics & Management*, 31(1), 1-9. doi:10.3917/jie.031.0001.
- Capdevila, I. (2019), Motivating Participation in Collaborative Spaces, *Journal of Business Strategy*, 40(2), 14-21.
- Capdevila, I. (2015). Les différentes approches entrepreneuriales dans les espaces ouverts d'innovation. *Innovations*, 48(3), 87-105. doi:10.3917/inno.048.0087.
- Cullmann, S., Guittard, C. & Schenk, E. (2015). Participative creativity serving product design in SMEs: a case study. *Journal of Innovation Economics & Management*, 18(3), 79-98. doi:10.3917/jie.018.0079.
- Dedehayir, O., Ortt, J. R., & Seppanen, M. (2014). Reconfiguring the innovation ecosystem: An explorative study of disruptive change. *2014 International Conference on Engineering, Technology and Innovation (ICE)*, 1-9. <https://doi.org/10.1109/ICE.2014.6871553>
- Dupont, L. (2019). Agile innovation: Creating value in uncertain environments. *Journal of Innovation Economics & Management*, 28(1), 1-5. doi:10.3917/jie.028.0001.
- Fox, S. (2013). Paradigm shift: Do-it-yourself (DIY) invention and production of physical goods for use or sale. *Journal of Manufacturing Technology Management*, 24(2), 218-234.
- Fox, S. (2014). Third Wave Do-It-Yourself (DIY): Potential for prosumption, innovation, and entrepreneurship by local populations in regions without industrial manufacturing infrastructure. *Technology in Society*, 39, 18-30.
- Gandia, R. & Parmentier, G. (2020). Managing Open Innovation through Digital Boundary Control: The Case of Multi-Sided Platforms in the Collaborative Economy. *Journal of Innovation Economics & Management*, 32(2), 159-180. doi:10.3917/jie.032.0159.
- Hirscher, A.-L., Niinimäki, K., & Joyner Armstrong, C. M. (2018). Social manufacturing in the fashion sector: New value creation through alternative design strategies? *Journal of Cleaner Production*, 172, 4544-4554.
- Jiang, P., Leng, J., & Ding, K. (2016). Social manufacturing: A survey of the state-of-the-art and future challenges. *2016 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI)*, 12-17.
- Kohtala, C., & Hyysalo, S. (2015). Anticipated environmental sustainability of personal fabrication. *Journal of Cleaner Production*, 99, 333-344.
- Kostakis, V., Latoufis, K., Liarokapis, M., & Bauwens, M. (2018). The convergence of digital commons with local manufacturing from a degrowth perspective: Two illustrative cases. *Journal of Cleaner Production*, 197, 1684-1693.
- Kostakis, V., Niaros, V., Dafermos, G., & Bauwens, M. (2015). Design global, manufacture local: Exploring the contours of an emerging productive model. *Futures*, 73, 126-135.

Mohajeri, B., Nyberg, T., Karjalainen, J., Tukiainen, T., Nelson, M., Shang, X., Xiong, G., (2014) The impact of social manufacturing on the value chain model in the apparel industry, IEEE, pp. 378-381.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.

Pearce, J. M. (2014). *Open-Source Lab How to Build Your Own Hardware and Reduce Research Costs*. <https://www.elsevier.com/books/open-source-lab/pearce/978-0-12-410462-4>

Toffler A. (1980) *The third wave*. New York: William Morrow and Company

Waldman Brown, A. (s. d.). (PDF) *Exploring the Maker-Industrial Revolution: Will the Future of Production be Local?* Berkeley roundtable on the International Economy, Berkeley University of California