IS DESIGN PLAYING A ROLE IN THE REALISATION OF CIRCULAR ECONOMY PROJECTS IN EUROPE? A CASE STUDY ANALYSIS.

Chiara Battistoni
Department of Architecture and Design, Politecnico di Torino. Viale mattioli 39, 10125, Torino (IT). Chiara.Battistoni@polito.it
Silvia Barbero
Department of Architecture and Design, Politecnico di Torino. Viale mattioli 39, 10125, Torino (IT). Silvia.Barbero@polito.it

ABSTRACT

Thanks to the strong push coming from the European Union to fight waste production, the Circular Economy (CE) has gained an important role in Europe. Following this trend, many institutions nowadays state to work on the CE implementation or supporting the transition to a CE. However, are they including design approaches and practices? The design phase is starting to be considered the crucial point to obtain a CE as it required a profound radical change from the beginning of the process and at system levels. After framing the CE concept, we performed desk research to identify which are the players in the CE projects implementation. Afterwards, a multiple case study analysis were performed to the most proper one to understand the presence and the role of design in the implementation process. The results placed the actors in a very fragmented framework and seem to lack almost completely the design presence.
Keywords: circular economy, Europe, design, implementation

1. DESIGN AND CIRCULAR ECONOMY

Since 2014, with the relevant statement about the Circular Economy (CE) from the EU with the document EU (2014a), the scientific literature about CE has seen an exponential increase in contributions over many aspects as definition (e.g. Millar et al., 2019), implementation barriers (e.g. Kirchherr et al., 2018), case-studies (e.g. Principato et al., 2018). What seems to miss in this literature review are the actors that are working to support the CE implementation. One of the reason can be little interest by the academic/research sector on this topic or the not involvement of the academic/research sectors. However, the innovation model expects the involvement of three actors: industry, government and academia (triple helix model).

Another gap is the role of design (D) in the transition from the linear to a CE. However, the decision made by designers (Der) can influence all the value chain, so it is the base of the manufacturing sectors. As stated by Garetti and Taisch (2012), the manufacturing sector currently is one of the most involved in this transformation to meet the requirement of sustainability. The D phase is starting to be considered the crucial point to obtain a CE as it required a profound radical change from the beginning of the process and at system levels. As the Ellen MacArthur foundation stated, CE is 'is restorative and regenerative by design" 1. This foundation, which is playing a very important in the training and in the spreading of the CE concept, with a collaboration with IDEO, an international known D company, has well recognised the role of D as an essential building blocks of CE2 , along new business models, reverse cycles and enablers and favourable system conditions.

They developed in 2017 the Design Circular Guide following this reason: " Who we're designing for has expanded from a solitary user to an intimately connected web of people, spanning the globe "3 . However scientific literature seems to be concentrated in the role of D only related to the product D process and closing circular resources loops (Lieder and Rashid, 2016; Bocken et al., 2016). D has more times demonstrated to the worlds its role in the creation of new opportunities and innovation (e.g Bertola and Teixeira 2003; Franzato and Celaschi, 2017). In the last years also its role in the creation of eco-innovation as demonstrated by different approaches to D for sustainability and the recent review by Ceschin and Gaziulusoy (2016) showing its evolution from product innovation to product-service system innovation to spatio-social innovation and to socio-technical system innovation.

As stated by Go et al. (2015) in fact the D practice in sustainability area has passed from D for life cycle, to the D for environment (preventive) to the whole systems D.The result is that D has changed its role, providing skills and capabilities to sustainability and CE (De los Rios and Charneley, 2017). Moreover, as stated by Celaschi (2008) Der can have the role as mediator between the competences thanks to his/her competences in dealing with many actors for the success of the project.

2. IMPLEMENTATION ACTORS

Arguing about who are the ones that support project implementation nowadays, the most recognized are the Business incubators (BIs). This recent phenomenon, mainly American, has emerged in the European framework. They are promoted as accelerators of entrepreneurship and able to create economic development with a bottom-up approach (CSES, 2002) focusing on the creation of new ventures (start-up). Although they are mostly focused on the technological aspects and the economic sustainability of the project, and not the environmental one (Battistoni and Barbero, 2019). Among them, in recent years, many other actors have emerged which performed similar services to BIs as business model review and providing fundings, addressing new projects implementation in existing enterprises.

One example are the regional innovation poles (referring to Europe) which are clusters of innovative start-ups, SMEs, big enterprises and research institutions, and are supporting innovative projects among existing enterprises, but with top-down approaches through institutions of calls. All these actors, are playing an important role in projects implementation, although is not clear enough their role in CE implementation and environmental sustainability. However, its clear the role of the eco-parks, mainly mentioned in the scientific literature, which represent the Industrial Ecology in action.

3. METHODOLOGY

Initially, to find the actors playing a role in the CE implementation was performed a literature review on Scopus database with the keywords "business incubator*" and "CE" in 2018 and, unfortunately, has zero results. For this reason, was also conducted research with more informal methods as desk research on Google and the social media Facebook to find the actors and both the main events related to CE to individuate more actors. A snowball approach was applied. Once the main actors were identified, we perform a multiple case study understanding their central role and which typology of actors they are. Besides, the actors that are focusing mainly on the business implementation

[1].https://www.ellenmacarthurfoundation.org/circular-economy/concept).

[2] https://www.ellenmacarthurfoundation.org/circular-economy/concept/building-blocks

[3] https://www.circulardesignguide.com/

on CE where selected for further studies. A format with few answers were sent to them by emails to collect the data that are not present in the website of each actor to understand better their role, the services provided to support the implementation and the presence and the role of D in their services and staff/mentors.

4. RESULTS AND DISCUSSION

4.1. CE IMPLEMENTATION ACTORS

During the review on the CE concept in the document by the EU commission, EU (2014b) mention that the main actors which were just started before the 2014 to support CE implementation in companies are: the Ellen MacArthur Foundation (supported by McKinsey) that were presented some case studies and reports; the cradle2cradle Products Innovation Institute, which was giving the certification on cradle2cradle products considering their entire life-cycle. Another important source of information to find out cases was authors' experience as involvement in BE networks, Systemic D research network44, RETRACE project5. In addition the event 'Circular Economy Hotspot'(CEH), which took places from 2016 in various places: the Holland in 20166, Luxemburg in 20177 and Scotland in 20188 (SCEH).The last one was attended by authors. The results are represented in figure 1.

The 24 actors, for their principal goal can be divided into main categories:

- Business Incubators for new start-ups: Ville Durable Programme[9] by Paris&Co. (Google); Blue City 010[10] (authors involvement in BE Network); Circular Economy Transition[11] (CEC[12] Group); 2i3t[13] - university BI (Authors'city); Green Garage[14] (EIT Climate Kic - Europe's leading climate innovation initiative);
- Organizations with services to support existing enterprises: Zero Waste Scotland Limited[15] - Government's Lead Agency (SCEH); Clever [16]- Innovation Pole (Authors'city); Advance London[17] - programme by LWARB (contact in SCEH); Fit 4 Circularity[18] (LCEH) -programme by Lux Innovation cluster; Circular Economy Lab[19] (Authors'country - Not Yet In Action);
- Consultancy: Metabolic[20] (Climate Kic summit 2017); Copper 8[21] (contacts in NL); Circle Economy[22] (SCEH) - Circle Design Programme and Nederland Circulair!;
- Communication and training: Ellen Macarthur Foundation[23] (EU, 2014); C-Creators[24] (contacts in NL); Circular Glasgow[25] (SCEH); Circular London[26] (LWARB); Circle Lab[27] (mentioned by Circular Glasgow); C-Beta[28] - ex Circular Valley[29] (RETRACE);
- Network Creation: Circular Change30 (SCEH); Circul'r31 (mentioned by Circle Lab);

Particular Cases: Cradle To Cradle Innovation Institute32 (EU, 2014; Braungart, 2003) focus on product certification; Symbiosis Center Denmark33 (Focus On Industrial Symbiosis).

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[4] .https://systemic-design.net/sdrn/

[5] .https://www.interregeurope.eu/retrace/

[6] https://hollandcircularhotspot.nl/en/

[7] http://circularhotspot2017.lu/#ui-id-53-148093256354091

[8] http://www.circulareconomyhotspot.scot/

[9] http://villedurable.parisandco.paris/Economie-Circulaire/Startups

[10] www.bluecity.nl

[11] https://www.cetransition.ch/?fbclid=IwAR23kZVD42Iux2N_pAc8XHR8gvzi9B2uyOPyIyvoQQ_Qadso1tF_YUATG1

[12] Circular Economy Club

[13] http://www.2i3t.it/

[14] https://eit.europa.eu/newsroom/climate-kic-green-garage-germany%E2%80%99s-first-climate-innovation-incubator-opens-door

[15] www.zerowastescotland.org.uk/

[16] https://www.poloclever.it/it/polo-energy-and-clean-technologies/

[17] https://www.lwarb.gov.uk/what-we-do/advance-london/

[18] https://www.luxinnovation.lu/innovate-in-luxembourg/performance-programmes/fit-4-circularity/

[19] https://www.cariplofactory.it/intesa-sanpaolo-e-fondazione-cariplo-lanciano-il-primo-laboratorio-per-la-circular-economy-in-italia/

[20] https://www.metabolic.nl/our-work/ventures/how-we-work

[21] www.copper8.com/en/

[22] https://www.circle-economy.com/

[23] https://www.ellenmacarthurfoundation.org/

[24] https://c-creators.org/

[25] https://circularglasgow.com/

[26] https://www.lwarb.gov.uk/what-we-do/circular-london

[27] https://circle-lab.com/

[28] c-beta.nl

[29] https://www.circularvalley.com/

[30] https://www.circularchange.com/news/

[31] https://www.circularchange.com/news/

[32] www.c2ccertified.org

[33] https://symbiosecenter.dk/en/

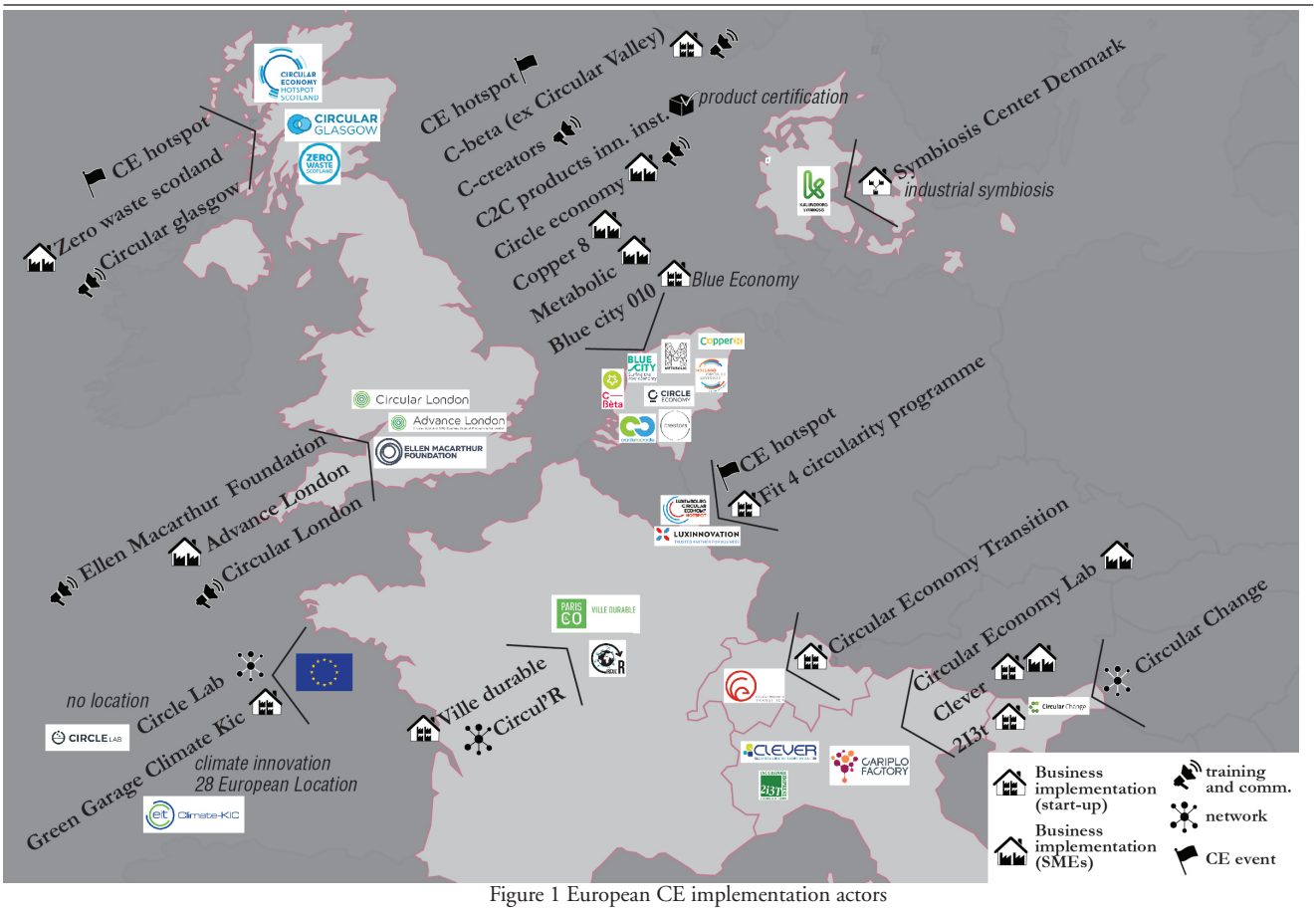

Figure 1 European CE implementation actors

The actors identified (img 1) show a very fragmented framework however, the one in the first two categories can be defined as 'business implementation' actor for their goals, although someone concern SMEs and other new ventures/start-ups. Moreover, some actors have a larger focus than CE: 2i3T on technology transfer but has a section on environment and energy; Green Garage on climate innovation; Metabolic on systemic thinking; Copper8 in sustainable breakthrough; Clever on energy and clean technologies however they have a particular section on CE. They were included in this analysis as their goal represent a subsection of CE however, many other realities as they can be present in Europe.

From a first analysis on the services performed by the actors, seems to lack almost the D presence, except for particular cases as the Cradle2Cradle innovation institute (the one that released the cradle2cradle certification for product and materials); Metabolic as a D studio and the Circle Economy which, with its particular programme, spreads circular D thinking. For this reason, was conducted a deeper analysis of the 'business implementation' category.

4.2. CE IMPLEMENTATION ACTORS AND DESIGN – DEEP ANALYSIS

To investigate the role of D and Ders in CE implementors, the 10 actors on business implementation were selected and contacted directly by authors. Unfortunately, 6/10 never reply or were not available or did not show any interest in responding. In this case, information wes collected from websites. Results are shown in tab 1. The phenomenon, in general, seems to be very recent as the one only focuses on CE were founded after 2014, reflecting the EU behaviour. The results prove that all the actors provided many services to support business, although D is considered just by few actors. However, projects (PR), as the literature demonstrates, should be designed from the beginning to meets really the sustainability requirements of the world current environmental situation, before being implemented. If this is not checked or stimulated by implementation actors, the risk is to support businesses which are not providing a good impact at environmental level. Many Ders have received the education for sustainability, as the Lens conference[34] wants to demonstrate, and have the skills both to contribute in eco-D for products both for services and systems. The Ders which are providing services are mainly working in traditional roles as user experience and prototyping, although many answers are missing. Moreover, their presence among the staff is only in 4/10 and between mentors almost. Unfortunately, this answer doesn't say anything about Der role because only 1 actor specify it as required by the question. Moreover, it wasn't find any evidence of Der presence in mentors. Another interesting result is the almost wholly unawareness about the presence of Der in the PR implemented. One reason can be found in the not interest shown by actors to map the skills involved in PR. However, this aspect is very interesting to be analysed in the CE phenomenon as it is a multi-disciplinary concept.

[34].by the LeNSin, the International Learning Network of networks on Sustainability European project (2015-2019). Lens conference https://lensconference3.org/index.php#about

Actor	foundation year	n° PR supported	Is D a service?	Is there any service provided by Der	Is there present in staff?	Is Der present in mentors?	Is Der Present in PR founders?	Is Der present in PR team?	Reference
Ville Durable	2016	>28 startups	No	n.d.	No	n.d.	n.d.	n.d.	website
Zero waste Scotland - business support service (depper focus)	2014	13 cases	Yes, improve current product D processors	n.d.	Yes*	n.d.	n.d.	n.d.	website
Advance London	2018	50 SMEs	No	n.d.	No	n.d.	n.d.	n.d.	website
Copper 8	2013	25 PR	No	No	No	No	No	No	contact*
Metabolic (depper focus)	2012	3 ventures	Yes	Yes*	Yes*	n.d.	n.d.	n.d.	website
Blue city 010	2013	8 stratups	No	n.d.	Yes, from Superuse Studios*	n.d.	n.d.	n.d.	website
Green Garage (deeper focus)	2010	> 1500 start-ups	No	No	No	No	No	No	contact*
Clever	2016 (2009 polight)	29° inn. PR	No (Yes from 2009-2015)	Support in new product development *	No	No	Don't know	Don't know	contact*
213t (depper focus)	2007	8 startups/ 82coal startups	Yes	Testing activities, usability. Service and Product implementation on prototyping	Yes, 1 with communication role	PD,C, UX	Don't know	>25 (PD,C, UX)	contact*
Fit 4c.	2014	4 inn. PR (1 in 2017, 3 in 2016)	No	n.d.	No	n.d.	n.d.	n.d.	Website and annual report*

[Table 1] results of the investigation part on business implementation actor

* information deducted

5. CONCLUSIONS

The actors identified show a very fragmented framework, both in their goal and in their categories: from governmental agencies and cities board, to innovation clusters and traditional business incubators, to consulting agencies and digital platforms. However, everyone can be defined CE implementors for their goal, although someone concern SMEs and other new companies/start-ups, someone have a broader goal. An exception is presented by the digital platforms which have the goal to increase the visibility and the relationships between the actors and the exterior. Although also their role its very important in increasing awareness on CE concept about citizens, which seems to lack in many cases. Another research by authors is focused on this aspect (Battistoni et al., 2019).

Although many answers from the deeper analysis are missing, the results show a very interesting picture of the D role. Der in the last years were educated for an active role in meeting sustainability requirements. However this aspects seems not clear outside academia, and in the business world they remain known as the one that can only create beauty (both in product than in graphics).

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