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DOMINIKA SOBOLEWSKA

CLUSTER AS KEY ARCHITECTURAL CONCEPT OF EXPO 2015

Research processes and the practice of
collaborative design

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ABSTRACT

The article presents an innovative concept of the exhibition environment, the so-called Cluster, born in the context of the World Exhibition Expo Milano 2015. The plot focuses not only on the originality of the architectural model, but also on the specific course of design development. The content describes the following topics: the idea and definition of Cluster pavilions, the organization of architectural space, collaborative design processes, as well as contemporary theories relating to socio-cultural phenomena important for today's design. The aim of the article is to consciously compare the design practices carried out in connection with the development of Clusters with contemporary cultural trends and new design paradigms.

KEY WORDS

Cluster; Joint pavilion ; World's fair; Expo; Milan; Collaborative Design; Multidisciplinarity; Pavilion; Theme; Model; Process; Politecnico di Milano/ Polytechnic University of Milan; Research; Cluster International Workshop; Design; Techne; Integrated design; Concurrent engineering; Krebs Cycle of Creativity; Krebs Cycle; Intellectual digestion; Paradigm; Luisa Collina; Carlo Cracco; Buckminster Fuller; Matteo Gatto; Walter Gropius; Marti Guixé; Kengo Kuma; Stefano Mirti; Neri Oxman; Michael Radtke

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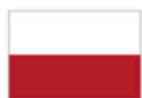
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Cluster as key architectural concept of Expo 2015

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Idea and definition

Cluster¹ is a spatial grouping or a systemic combination of smaller objects into the larger one. In the context of Expo 2015, from one hand it is an innovative model of multifunctional architectural environment, enabling multidimensional promotion and involvement of participating countries, from the other: the effect of innovative design process, the so-called **collaborative design** engaging in the creative process a group of entities from different fields.

The cluster treated as a new model of participation in Expo is a hybrid born on the basis of two needs of the World Exhibition 2015:

¹<https://dictionary.cambridge.org/dictionary/english/cluster>

- Organizing space for countries that for various reasons cannot afford SELF BUILT PAVILION, an alternative to JOINT PAVILION
- Emphasizing the theme of Expo 2015: 'Feeding the Planet, energy for Life' (through the theme of individual clusters).

The cluster developed as part of Expo 2015 is an area of promotion of poorer countries that did not have a chance to appear on the previous World Exhibitions, or - as it was in the case of Expo 2012 in Shanghai - they were presented in one unrepresentative, so-called. Joint Pavilion.

Organizers of the Milan edition, trying to learn from mistakes made by their predecessors and in order to meet the global problems of the exhibition, they decided to design a space that will visibly display less developed countries. Especially those that have a significant impact on the global economy and the ecological balance of the Earth globe.

The keystones complementing this idea were thematic threads given to individual cluster units, developed thanks to cooperation between Expo and the Faculty of Agriculture from Università degli Studi di Milano. The committee, selected for this purpose, following the spirit of the 2015 World Exhibition according to which all initiatives were built around the main theme², generated the



following 9 topics: *Rice, Cocoa, Coffee, Cereals&Tubers, Fruits&Legumes, Spices, Biomediterranean, Islands and Arid Zones.*

The hosts of the Clusters were grouped according to a type of food production, which has been identified here as *energy for Life*. In this way countries were united in their diversity.

Cluster thematic motifs can be divided into 2 groups. The first, referring to the problem of global planet nourishment, also including cultural issues, contains the following topics: *Rice, Cereals and Tubers, Fruits and Legumes, Spices, Coffee and Cocoa*. The second, indicating the specific

² The TOPIC played the primary role in Expo 2015. The best testimony to this is the fact that the Expo S.P.A. established The Thematic Space Department (DTS) and the Theme Guide for the participating countries.

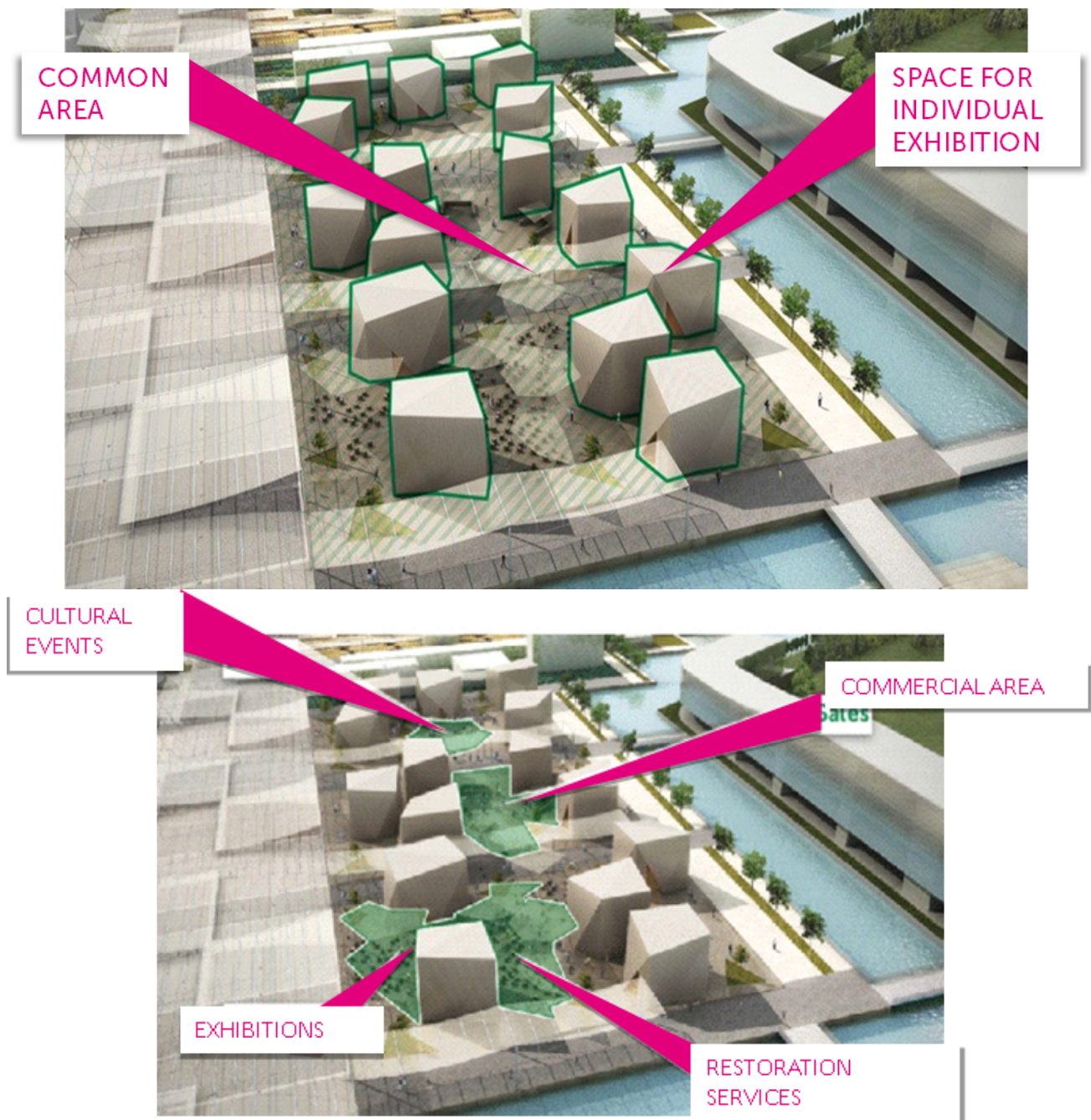
climatic conditions of the Earth includes: Biomediterraneum (understood as referring to the Bio-Mediterranean climate), *Islands and Arid Zones*.



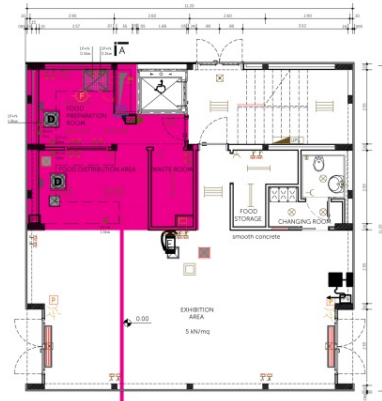
The idea of a story, a plot interwoven with the construction of architectural artefacts was the main dominant feature of Expo 2015, so it easily found its place in cluster spaces as well. Being a reference point for large-scale promotional activities it was also a driving force for all creative activities and design decisions, as evidenced by the unconventional architectural realizations of individual Clusters (attachment Architectural realizations of individual Clusters - photographic documentation).

Model of the organization of architectural space in Clusters

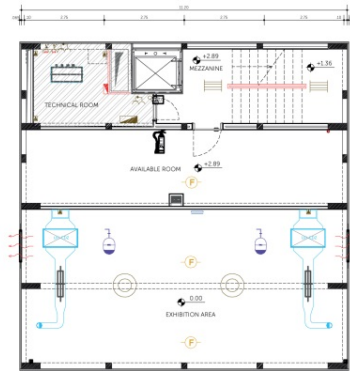
CLUSTER is an architectural space focusing on specific modular pavilions dedicated to the countries that are directly involved with the keynote of Clusters. The idea of organizing the space was inspired by the model of social housing with a well-organized common space, where residents have the opportunity to organize various activities. The architectural model of the Clusters offers the participating countries great opportunities for self-promotion. The largest area of maneuver the participant gains in the inner space of his own pavilion, where apart of the space for individual exhibition (about 60 sqm) there was also a tasting-restaurant (20sqm) and office zone (80 sqm). In addition, there are a number of areas with a variety of functions available to the participants, including: promotional and commercial zones, restaurants, relaxation, cultural events and exhibitions.



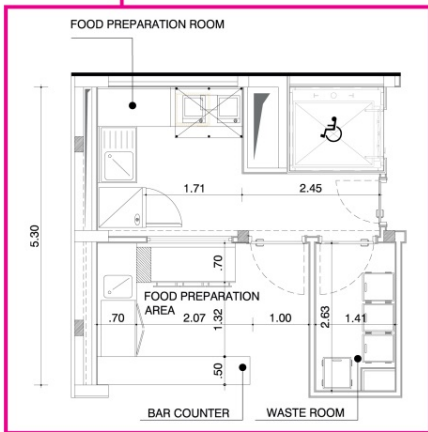
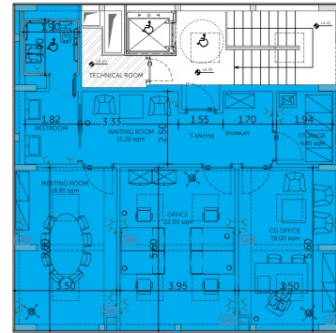
PLAN - GROUND FLOOR (0.00)
EXHIBITION AREA



PLAN - MEZZANINE FLOOR(+2.89)



PLAN SYSTEM + 5.78
OFFICE LAYOUT



KITCHEN AREA

Approximate 20 sq.m space divided into 3 main areas:

1. Food preparation
2. Food distribution
3. Waste deposit

OFFICE AREA

Approximate 80 sq.m space divided into 5 main areas:

1. Waiting room
2. Deposit
3. Meeting room
4. Office for 4 operatives
5. Office of the Commissioner General

FIRST FLOOR PLAN

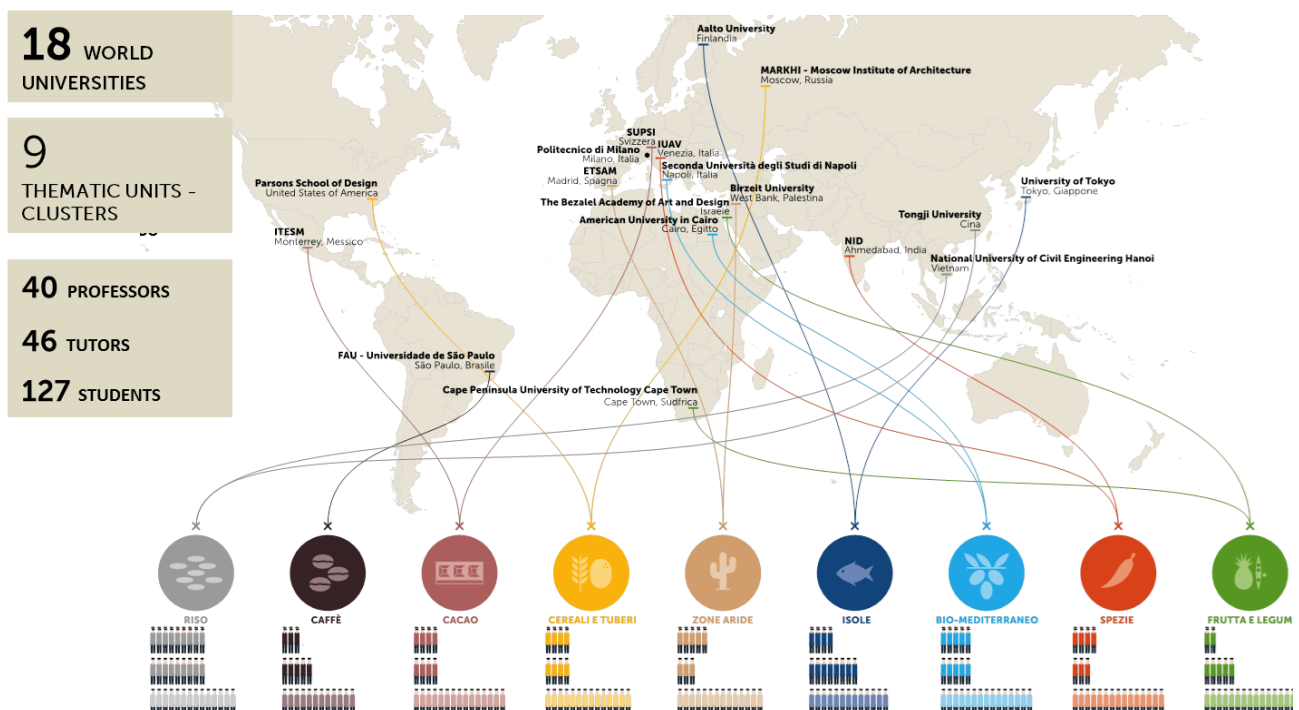


The origin of Clusters – creative processes on the platform of the collaborative design

The principle of organizing activities around the construction of specific ideological and functional aspects of individual cluster entities, so called design of designing from the beginning was based on the principles of collaborative design.

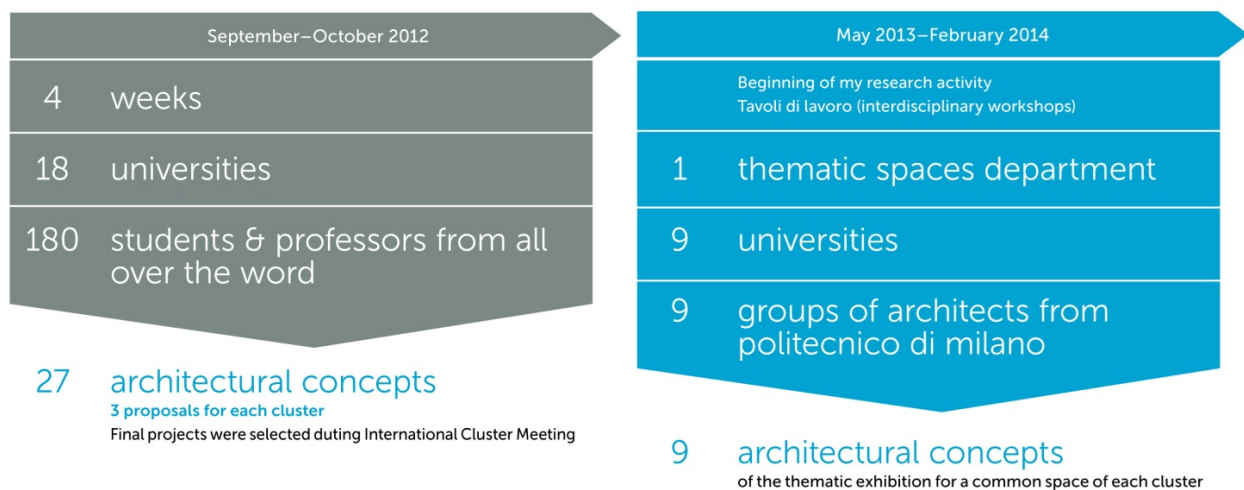
Collaborative design is a notion which emerged on the basis of a contemporary theory in relation to a new way of conceiving project assignments. This paradigm applies to research conducted in this field as well as multidirectional design strategies. The research on collaborative design go beyond the traditional frames of conceiving its function only in a technical sense, being open to unconventional methods of observation and creation of new design processes. In an academic context it means the collaboration with researchers representing different disciplines, merging them into research teams and also being open to interaction with external units.

INTERNARIONAL WORKSHOP CLUSTERS FOR EXPO 2015, (19 September – 9 October, 2012)



This methodology was fully used by the organizers of Expo 2015. The organizers of Milan world Exhibition set out to implement an experimental, multilevel design scenario involving not individual architects but groups of students and teachers of architecture from all around the world. To this end, by formally cooperating with the Polytechnic in Milan, in summer 2012, they organized a three-week workshop involving 18 universities from different parts of the globe, selected not only with regard for their reputation, but also for their geographic affinity with the subject of Clusters.

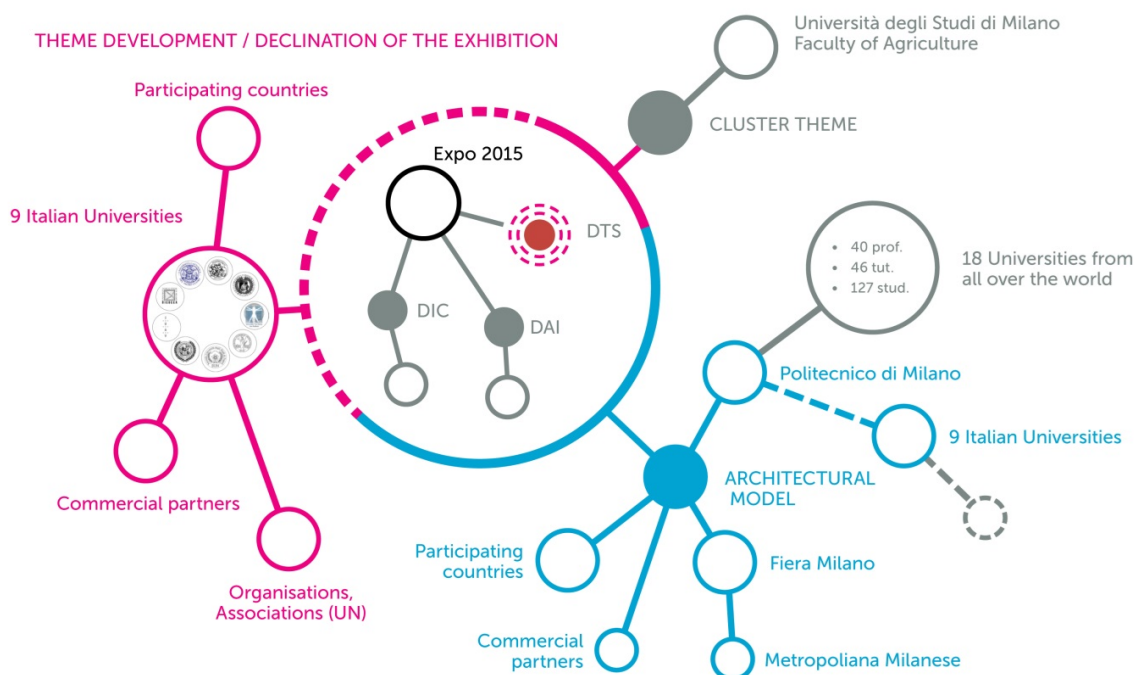
During the workshops, as part of the multidirectional cultural exchange, the individual participants mixed, which resulted in the formation of 9 project teams consisting of students and teachers of different nationalities, including the lecturers from the Polytechnic Institute of Milan. In total there were about 200 participants (127 students, 40 professors and 46 other instructors). The task of distinguishing project groups supported by various experts (Marti Guixe, Kengo Kuma, Carlo Cracco, Davide Rampello, Michael Radtke, Stefano Mirti) was the development of architectural concepts for individual Clusters. As a result, 27 projects (3 for each cluster) were presented during the Cluster International Workshop which took place between the 10th and 12th of October of 2012. During this time, the international jury (composed of professors and architectural experts) selected one project for each cluster in the competition. The winning ideas were afterwards processed by 9 teams of architects from Polytechnic Institute of Milan and Fiera di Milano.



From the moment of defining the architectural concepts for individual Clusters, the attention of the organizers has been focused on exploring particular design problems within the common space of each of the 9 modules (modular pavilions, common space).

Also this time they focused on multi-disciplinary cooperation with scientific units. The Polytechnic Institute of Milan played a significant part and after setting relevant agreements with Expo 2015 it undertook to provide the staff needed to coordinate research on the various project themes of Clusters. The university set up a competition for 4 research positions under the supervision of prof. Luisa Collina – each with a different task profile.

According to the previous methodology, the organization of all processes was based on the guidelines of collaborative design, with the constellation of task teams focused around the Department for Thematic Spaces. DTS (Department of the Thematic Spaces) under the direction of Matteo Gatto served as a buffer, moderator of all creative processes. Research groups from 9 Italian universities were responsible for the substantive aspect of the research, while teams of architects from the Polytechnic Institute of Milan were to handle the technical aspect (one for each Cluster). The participating countries represented by the Department of International Affairs (DAI), Fiera di Milano, various associations (eg. UN) and commercial partners of individual Clusters (eg. Illy) constituted the additional units involved in the project.



Clusters in the context of contemporary civilizational and cultural phenomena - new design paradigms

Multidisciplinary design methodology of Clusters can be treated as a model of good practice, study case for the emerging definition of collaborative design. Analyzes of the applied procedures and project mechanisms lead to contemporary theories describing the socio-cultural phenomenon relevant to contemporary design.

What characterizes today's reality is a return to the Greek *techne* identified with both crafts, art, technology and the skill itself³. This is by no means a tendency from recent years, but rather strengthened by the intense development of civilization, the result of postulates already announced at the beginning of the 20th century.

One of the initiators of restoring the old meaning of *techne* was Walter Gropius. In his lecture in 1923, *Art and Technology: a new quality*, he drew attention to the values that flow from the synthesis of art, science and technology⁴. He dreamed about ubiquitous aesthetic functionality for many users. It is thanks to Bauhaus' achievements that attempts at multidisciplinary approach to teaching were born, where design was to obtain the status of artistic activity⁵.

Today, the impact of technology on art and design is even stronger and more obvious. Initiated in the 1960s, it created a solid foundation for the birth of the so-called New Renaissance. The ubiquitous occurrence of online communication platforms, simpler technological solutions with accompanying software, give new room for maneuver when it comes to creative activities. Hence new design paradigms, such as *integrated design* or *concurrent engineering*. This methodology, focused on optimizing solutions while reducing production and operating costs, although slightly different from experimental *collaborative design*, is also based on multidisciplinary teamwork.

Design, art, science and engineering are approaching each other in search of common areas. Targeted on multidirectional cooperation, they constitute new patterns regulating both artistic and

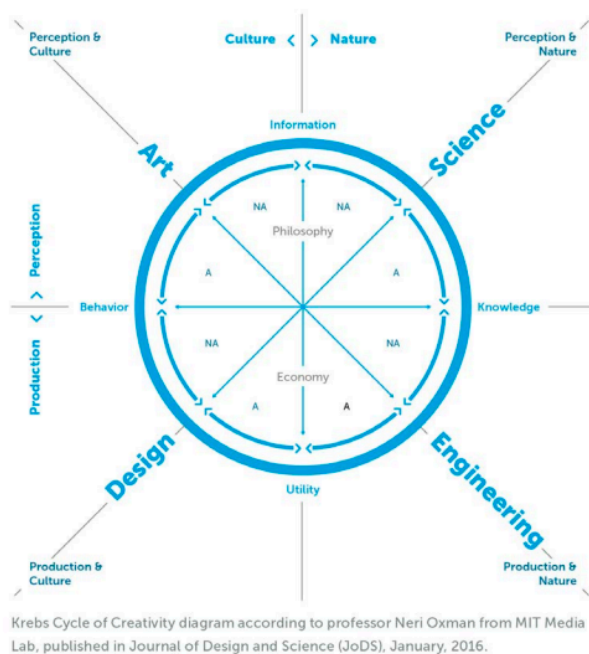
³ K. Krzysztofek, *Zdekodowane kody*, [in:] *Kody McLuhana. Topografia nowych mediów*, ed. A. Maj, M. Dery-Nowakowski, Wydawnictwo Naukowe ExMachina, Katowice 2009, p. 24.

⁴ M. Oslislo, *Old and New Dreams*, [in:] *Kody McLuhana...*, *op. cit.*, p. 230.

⁵ K. Krzysztofek, *Zdekodowane kody*, *op. cit.*, p. 25.

scientific strategies, as well as all activities related to new technologies used both in one and the other area. Inspired by each other, they often change the point of view of a given issue.

This phenomenon can be called **intellectual digestion**, and to confirm its presence on the ground of contemporary scientific theories it is enough to refer to the idea of the Krebs Cycle of Creativity developed by prof. Neri Oxman from MIT Media Lab. Referring to the assumptions of the Krebs Cycle, it describes the contemporary dependencies between the main areas of human activity and the resulting profits⁶. **The Krebs Cycle** is a series of biochemical reactions that are the final step in the metabolism of aerobes, oxygen-breathing organisms. Without it, these organisms would not be able to function. Within the Cycle through the oxidation of nutrients, chemical energy is produced, carried by the cell in the form of adenosine triphosphate (ATP) which can therefore be treated as a molecular currency unit for energy transfer. The Krebs Cycle is a type of metabolic clock that first generates, then consumes, and eventually (additionally) regenerates the ATP currency. Putting it shortly, the better the metabolism, the better the results.



However, following this trail, moving on to the plane of widely understood multi-disciplinary design, we can assume that the aforementioned so-called intellectual digestion, (often requiring a total change of point of view), carries an invaluable potential for creation. As proof of the validity of

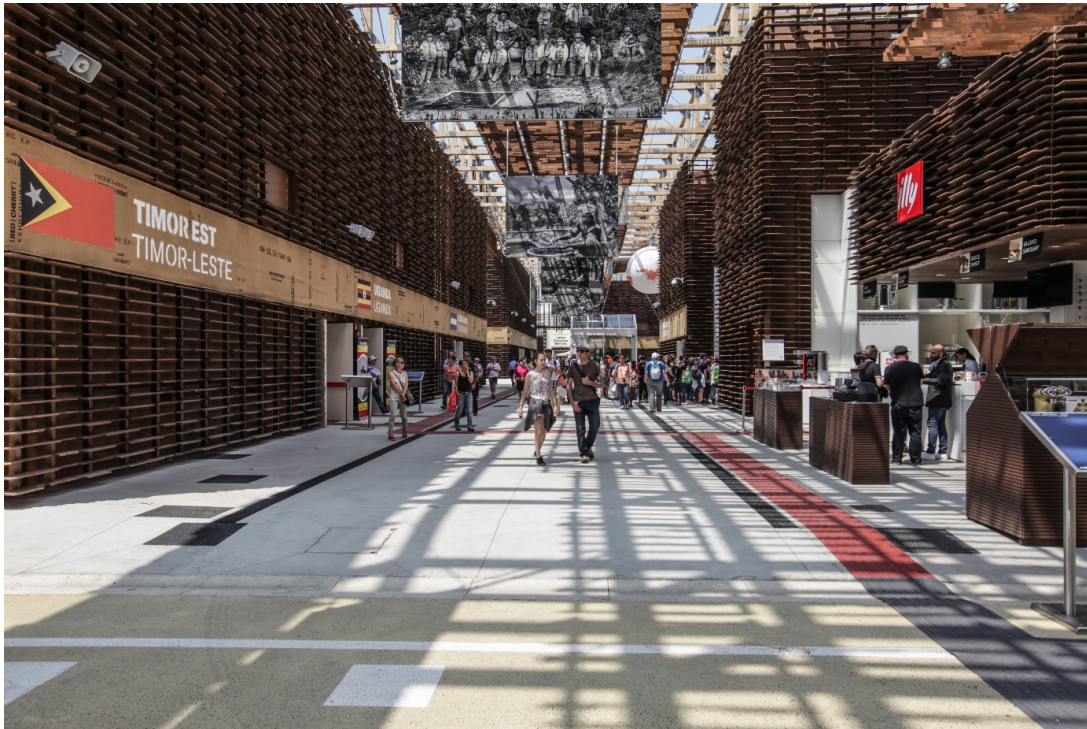
⁶ <http://jods.mitpress.mit.edu/pub/AgeOfEntanglement>.

this claim may serve the work of Buckminster Fuller, a “versatile anticipating scientist and designer”, whose “geodesic” dome (developed in 1967 for the American Expo pavilion in Montreal) has played an important part in identifying the third carbon molecule⁷. The opportunities arising from the dialogue on art and design on the one hand, and science and engineering on the other, are increasingly tempting not only for individual artists but also larger organisms, such as scientific or commercial institutions.

A manifestation of such ambitions implemented on a global scale is the above-described process of building Clusters. Rooted in the idea of collaborative design is a reflection of contemporary hypotheses, born in connection with a new understanding of design tasks. The organizers of Expo 2015, and all entities involved in building the Cluster concept using collaborative design research have demonstrated an open attitude towards multi-directional design strategies. A new design paradigm practiced during the elaboration of the Clusters’ architectural model is the expression of the demand for unconventional methods of observation and modeling creative processes.

Clusters themselves, being a symptom of global problems of modernity and collective responsibility for overcoming them, are a kind of forum for social debate. Design in this case is nothing else than building a multidimensional language between society and the surrounding reality. It is a design capable of shaping thought patterns, behaviors and even arranging all kinds of services and political systems.

⁷ K. Pakuło, *Interaktywne przestrzenie – pomiędzy sztuką, technologią i nauką*, „Arteon”, 2011, issue 5, p. 13.



Internal hall in the Cluster of Coffee. Photo by Pietro Baroni, 2015



Internal room in the Cluster of Biomediterraneum. Photo by Daniele Mascolo, 2015



Internal room in the Cluster of Arid Zones. Photo by Daniele Mascolo, 2015



Cluster of Rice. Photo by Pietro Baroni, 2015



Internal room in the Cluster of Cereals and Tubers. Photo by Pietro Baroni, 2015



Cluster of Islands. Photo by Pietro Baroni, 2015



Internal room in the Cluster of Cocoa. Photo by Pietro Baroni, 2015



Internal room in the Cluster of Fruits and Legumes. Photo by Daniele Mascolo, 2015



Frontal facades of the Cluster of Spices. Photo by Pietro Baroni, 2015

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