IN[no]BOX

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ABSTRACT

The starting point and the motto of this research is: “Designing for all”. Using anthropocentric values and tools, seeking for the optimal design solution, with a limited footprint on the environment, is developing an innovative method of exhibition design and a state of the art, three-dimensional holistic exhibition system. IN[no]BOX is the development of a design methodology of a modular exhibition system based on archetypes and the "archetype" production process of recording, analyzing, and reconstituting data. Starting and aiming to develop a "Rule" of design that will achieve the "Order", i.e. organizing the anthropogenic environment in equilibrium, developing a holistic method of sustainable exhibition design for the management of indoor and outdoor exhibition environments, based on a geometric rule that can control and reduce the design footprint. Through repetition, expansion and sequence of a uniquely defined geometric element it is possible to create spaces for the presentation of all types of content, such as ideas, values, memory and products, generally understood as “experience spaces”. IN[no]BOX is funded within the framework of the RTDI State Aid Action support measure 'RESEARCH - CREATE - INNOVATE' (project code T1EDK-04015) operated by the Operational Programme Competitiveness, Entrepreneurship and Innovation 2014-2020. It is a research procedure dealing and aiming at the description of the characteristics of a holistic exhibition system, potentially a product, where substance and design services are related and interact as equal parts of the design process in order to achieve design comfort in parallel to the reduction of the design footprint, minimizing design wastes.

KEYWORDS

Archetypes; Design method; Exhibit system; Geometry; Modularity; Sustainable exhibit design

1. INTRODUCTION

IN[no]BOX is a research for the development of an innovative method of exhibition design and a state of the art, three-dimensional, holistic exhibition system [1]. Through elaboration and synthesis of elements or theorems from mathematics, literature, methodologies, modular systems or other seemingly desperate evidence, that may be complementary and related to the subject, like Golden Ratio (φ) and the Fibonacci Sequence (Fn) to Leonardo da Vinci’s “Vitruvian Man” these groundbreaking ideas of human history evenly approach analogy and measure, with nature and man as points of reference. They comprise a diachronic

value in design, a rule for the definition of a desired geometry which guarantees whole visual analogies and symbolises “order”. In IN[no]BOX, the assumptions are redefined and 'why' and 'how' are re-evaluated in the design process. It's an attempt to connect the values of modern European design from the beginning of 20th century (e.g. Bauhaus), with geometry archetypes, even with contemporary project and strategy processes like “design thinking”. It is a re- elaboration in order to form and describe a sustainable design method and potentially an exhibit design entity that could be a sustainable path for promoting ideas, values and products, minimising the common design “waste” and the environmental footprint of the design process.

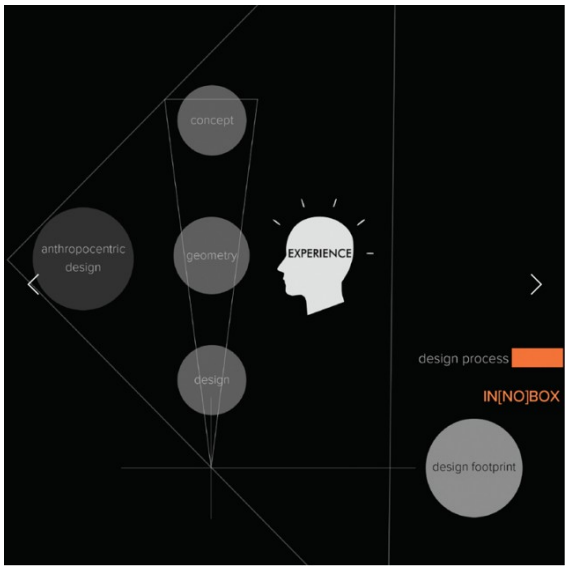

Figure 1. IN[no]BOX design process

There, the elements of innovation are sought by introducing them into the design equation. The result is the intriguing - interesting correspondence between two -quite- equals procedures in order to define the space and the relationship between the “part” and the “whole”, as expected, but also to be the critical factor that could be used to achieve low environmental footprint of any kind exhibition design activity.

Analysing partial data and using the knowledge produced by elaborations upon different research fields such as geometry and mathematics, architecture and design, engineering, lighting, multimedia, branding, visual and verbal ID, etc. the research focuses and highlights the elements that define the meaning "sustainable" exhibition design with anthropocentric features through sustainable practices, where common but outdated production methods that use chemicals, glues, on-site paints and construction procedure, which make the recovery and the reuse of the original material almost impossible, are rejected. On the contrary in IN[no]BOX research, as far as the part of its material existence is concerned, various compatible types of aluminium profiles with certified connectors and materials or textures for dry fit assembling are examinated, avoiding -by default- to examine any glueing or onsite/on demand construction method, that they have extremely limited reuse potential and a high percentage of waste rejection.

2. METHODOLOGY

Following a rational and interdisciplinary approach, redefining what is essential, almost unchangeable in any common exhibition structure, what is changeable as it is influenced by the needs of each cultural or commercial content, proceeding to the logical “deconstruction” of the structure in “layers” are emerging the elements that could remain stable and potentially reusable, like its skeleton, what is restless and changeable, like the “skins” (covering elements) and the “add-ons”, generally known as objects or furniture.

It can be argued, that searching for a design method with specific module – *εμβάτης* and rule – *Κανών* for the reproduction of an exhibition structure in space, it will always ensure perfect proportions and visual effect. When the above mentioned are integrated into the system, it will be possible to produce a low environmental footprint and less design -material- wastes, compared to any other existing modular exhibition system that the market offers and relies solely on the identification of an arbitrary basic material unit – module without any other theoretical or scientific background. Moreover, than any other on demand or on-site constructed exhibit

entity like booth, stand, etc.

As any modular exhibition system is well known, which in theory, through the repetition of their elements can achieve consistent quality and rapidity in the implementation of a structure, limitation of material wastes, etc. so a priori could be considered environmentally friendly, have existed for decades. It is a dynamic and evolving sector of industrial production which is available to produce structures used to display “exhibits”. However, the creation of custom-made exhibition structures and the generally reckless and without rules adaptation of the systems to the exhibition needs, known as customisation, leads to a peculiar situation where the system, instead of leading the design, is what is ultimately altered by it, so we lose any added value that can offer us.

So, in IN[no]BOX the key point and the innovative approach was to define a “universal” design method based on geometry archetypes and in decomposing the structure in layers, as for skeleton (load bearing system), skins (covering elements) and add-ons (furniture). In this hypothesis it was possible to re-propose the elements constituting the exhibit system in a way that almost any design concept can adapt to the system, that could offer a variety of geometries from the single wall element to the entire exhibit entity that looks like a box of scaffolds, flexible and adaptable to a variety of spaces or purposes. In the and the skeleton. Skins and add-ons are part of the system, but only under view of “the care” and not as formatting elements of it. In other words, the system offers design and material “tools” to produce them, but they are not part of that.

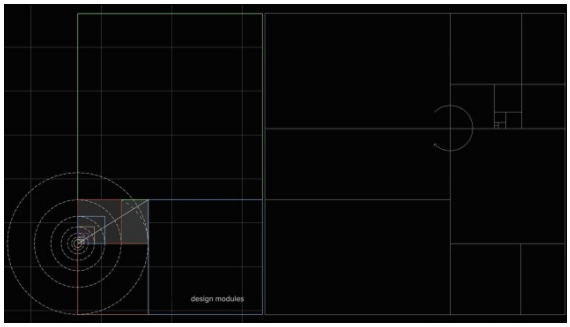

Figure 2. IN[no]BOX geometric rule of proportions

IN[no]BOX as design entity pre-exists to the concept and the needs, because it is a method that emerges -by default- to be a tool for the satisfaction of various indeterminate and general assumptions that are summarised in the *Triptychon*: for the unknown purpose – space – usage.

Figure 3. IN[no]BOX spatial rule - expansion.

Methodologically, in IN[no]BOX, a holistic interdisciplinary approach[5] is followed which leads to the formation of a variable -liquid- geometry exhibition system, a tool that could be useful for managing the system are belonging the design method_most of widely understood as exhibition environments, where in a framework production process "A to Z", that means from design conceptualisation and materialisation of an “exhibit” to its rejection, it is potentially possible to display products, ideas, personal or collective memory, generally known as exhibits, with limited environmental footprint.

3. RESULTS AND DISCUSSION

First of all, for IN[no]BOX research, the key point was to redefine the Ontology of a modular exhibit system, so that it could be afterwards easier to define what we are searching for. It is not a sterile research that at any cost it is important to find the way to

[5] https://www.innoboxproject.com/about

define another “innovative” design method, moreover, a modular exhibit system. It was more an emerging necessity that came out before the formation of this research. Through a multidisciplinary, almost holistic procedure and approach, is rather an effort to highlight, define, control and reject the unnecessary customisation procedures that every designer or producer affront in the design process, especially in cases where the target to be achieved is the display - effectively- of cultural or commercial content. In parallel, is to find how to achieve the reduction of the material wastes and human fatigue produced by the design process effort. Regarding the process, the articulation was based on the following topics.

3.1 Vision

The starting point and the motto of this research is “Designing for all”. Inspired by the values of 20th century European design, combined with diachronic design “archetypes” that are used for the definition of the relationship between the "parts" and the "all", the vision was how to describe and define the elements of a "universal" language in exhibit design with sustainable characteristics. Using anthropocentric features and tools, searching for a method, more than a system that creates comprehensive proposals for modern architecture and exhibition design, seeking for the optimal design solution with a limited footprint on the environment. Not for fashion. A sustainable self-standing and self- luminous modular exhibit system with unprecedented flexibility for the user who wants to minimise the process of "customisation" in exhibit design, and consequently design wastes. Obviously, even for scaling or balancing the economic footprint of any design action for “promotion” that is reflecting to his “wallet”.

3.2 Positioning

As a research, as well the conclusions that it reaches, are belonging to the broader field of adaptive architecture and adaptive reuse. Prefabrication and assembling, instead of glueing or on-site and on- demand procedures. It is an analytic - holistic procedure leading to a service that re-proposes a re-elaborated version of the archetype design process of proportions that seem to be "contemporary" and valuable even in nowadays, as the sustainable path to manage every kind of space and content. A design method that focuses and highlight the characteristics of a "self-luminous" material exhibition entity, minimal and independent from the geometric commitments of different spaces, one size product, a flexible system, that provides the greatest possible freedom and flexibility for the display of individual ideas or concepts.

3.3 Design thinking

It’s an upside-down design process that could be transformed and identified with a modular exhibit system, in the broadest sense of the term, to display ideas, personal and collective memory, values, products. Because in this case, the design method and the system are leading the design process, and not, as commonly happens, any individual – ephemeral concept.

3.4 Design

It is well known that, to communicate a story effectively, exhibition structures should be clean-cut, neutral and rhythmically repeated. Human brain has a scientifically proven limited capacity of attention for approximately 20-30 minutes; during this time, it processes thousands of stimuli but only few of them are memorised. When design is plain, neutral and repetitive it doesn’t compete with the exhibit and doesn’t confuse. The brain will promptly process the information and focus on the exhibit, avoiding the visitor’s fatigue. Even more because we know that in design, *“less is more”*.

3.5 Configuration

Analysing the exhibition market’s needs, the common design attitude and the various configurations of custom-made modular systems used as exhibitions structures, despite and against them, the basic module of the IN[no]BOX system is a «perforated» box of mountable «scaffolds», “rectangles” and leading “proportions”. A versatile and user-friendly object, even a concept that provides a

basic useful exhibition area of 36,00sqm, 48,00m perimeter and exhibition surface of 120,00sqm.

As the element of differentiation is considered, the use of a unique design rule of proportions, modules and axes, produced by combining (φ) the Golden Section ratio and Fibonacci sequence (Fn), where arise a geometrically defined expandable three-dimensional material environment based on the one size aluminium extrusion design element, a system with clear, strong ID, and contemporarily a flexible entity.

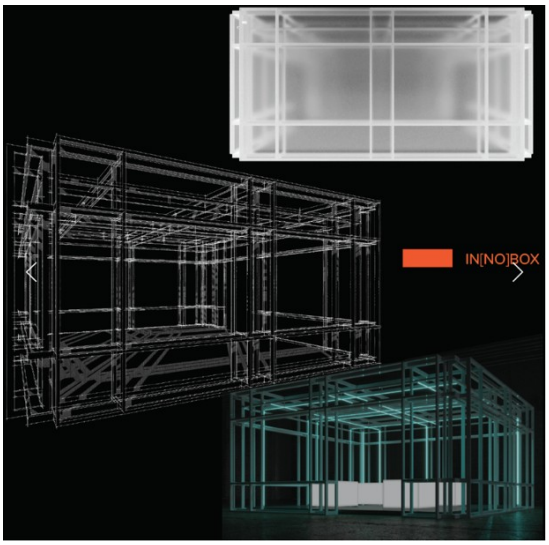

Figure 4. IN[no]BOX configurations

According to different design ideas or concepts, the system can be easily assembled, to be placed and fit -not strictly- in a variety of exhibition spaces/environments, or easily disassembled -even- in four self-standing basic «scaffold» modules, for using it in small scale events displaying cultural or commercial content. With skins (covering elements) and add-ons (furniture) produced by the same design rule, or even without them, as a scaffold and reference exhibition point, can create new configurations of the exhibition environment or simply could be used as proportioned letter-like sub modules I, Γ, Π, Πs, to manage every kind of space, displaying a variety of concepts.

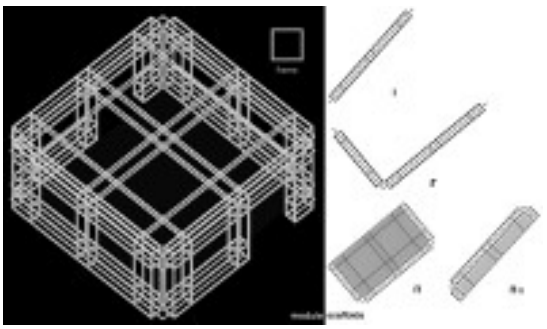

Figure 5. IN[no]BOX. Module and Scaffolds.

The key issue is that in this case and from the beginning, we are almost sure that it could provide us a geometrically and visually balanced result, because it is based on an archetype design method that diachronically "works" as a guaranteed factor of "elegant" and balanced proportions. Even more because from the beginning it exists as a care of the system, and as such must be considered, the provided possibility to use it as undersised or expanded modules, to occupy or display in a larger exhibition area various types of concepts and geometrical configurations, without altering or losing the system's integrity.

Because IN[no]BOX is produced from the beginning, following a holistic approach, to be a design service and a tool, more than a system, ignoring the purpose, the place and who or for what it can be used. This is what we define as an upside-down design process that creates an exhibition reference point and potentially an experience space. So, it is easier and almost possible to use it in its integrity - design rule/services and substance- or even as independent 'supporting" design elements – scaffolds (I-Γ-Π-Πs) to promote and display cultural or commercial "exhibits".

3.6 Design topics – Decalogue

The "decalogue" of design topics and general needs under which the method/system was investigated and tested, through model simulation, even on site, are the following regarding how to "use", what is to "use" - materials and assembling operations-or the "handling" procedures. The scope, all of them that are mentioned below was, how to achieve human or design comfort, effective communication of content, and at the same

time low environmental footprint of these design actions.

Decalogue:

- standard -potentially recyclable- material sheet sizes only,
- smart dimensions for every kind of "cuttings", as for skeleton, skins, add- ons, based on design canvas and sub modules produced by IN[no]BOX design rule of proportions,
- near zero cutting losses and rough cutting only,
- no edging or polishing operations,
- no 45^{o} cutting angles,
- no drilling or any on-site construction processes,
- no manual painting,
- no glueing with silicones or expensive polymers, only dry fit assembling,
- no carrying waiting time,
- no need for extra storage or workspace.

Figure 5. IN[no]BOX tested on site. Travelling Exhibition: "Archaeology in times of war. From the war trenches to the excavation trenches".

Geni Tzami – Thessaloniki

3.7 Targets to achieve

The approach was from the beginning, how to satisfy at maximum some of the following key themes:

- **R**eduction of required material through standardisation,
- resilient and sustainable **R**euse of the system (design method and substance) for endless future transformations, in non-corruptive ways for the system's features, load bearing system or any additional material,
- ability to **R**euse the bearing structure material in 100%,
- ability, as last chance, to **R**ecycle the bearing structure material in a (±) 95% percentage and the non-bearing elements (skins and add-ons) in a (±) 80%,
- use of viable methods and non-toxic materials,
- widespread use of the so called "new technologies" (programming, lighting, multimedia etc.) for displaying and visualising any cultural or commercial content, avoiding or minimising the quantity of prints, heavy wooden or still structures and any other non-reusable material or techniques.

3.8 Applications

IN[no]BOX design method – system could be a tool with a broad variety of applications. From a simple self-standing scaffold and exhibition point reference to a complete pop-up store, the possibilities are infinite, as for exhibitions and trade fairs, museums, architecture and interior design.

Figure 6. IN[no]BOX simulation.

4. CONCLUSIONS

As for the results and remarks, we can summarise them in the following main topics:

- regarding to the material footprint, the waste produced by the "cuttings" and the skeleton of the basic module, the range of them varies from 0,2% to 2,0%, depending, while the reduction projected to the total of the basic unit on average corresponds to 0.5%, because a lot of this "waste" could be used for add-on elements or supporting

structures for skins,

- regarding to the multiply reuse of the system for a specific concept -content- exhibit and indifferent as for the physiognomy exhibition environments (museum or monuments), which are in a distance of 100km from the industrial production, the cost of production (design services and substance), transportation, installation and dismantling, records a decrease of 50% for the first reuse - installation to 70% for the second one, in relation to the initial cost of production.

- in the above real condition test, the skeleton and the substructures of the system (e.g. electricity supplies, lights, multimedia equipment etc.) even the covering elements (skins) and the furniture (add-ons) were reused in their integrity (100%),

- the estimation, regarding the cost of the system reuse in case of production for different but equivalent concept - content- exhibit, the expenses would relate only for the visualization of the content, probably for prints, and obviously for transporting, assembling and dismantling the "exhibit" that are corresponding to 15-20% of a common exhibition production and mainly of the initial investment.

Figure 8. IN[no]BOX. Material wastes for the skeleton based on "cuttings".

According to all that have been mentioned above, especially regarding to the methodology and the characteristics that absolutely must have in nowadays, not for fashion, a modular exhibit system of variable –liquid- geometry, so that it could be considered as environmentally friendly, coherent to its existence and the design values it carries. After various tests and simulations, even in real/physical conditions, there are a lot of encouraging results and remarks, to think that it is possible to evolve a theoretical – research approach in a real system and potentially a product proposal.

REFERENCES

[1] IN[NO]BOX [Internet]. Innoboxproject.com. 2019 [cited 27 September 2020]. Available from: https://www.innoboxproject.com