CSO HOUSING PLATFORM: CREATING A VIRTUAL PROCESS SUPPORT TOOL FOR THE INITIAL PHASE OF CSO HOUSING DEVELOPMENT

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Abstract *For a non-professional client, developing a building, for instance his or her future house, is no sinecure. , let alone if the client is part of a group of individual clients who are developing a housing project or retrofitting an existing building in a collective way. Collective Self Organised (CSO) Housing is a trend that becomes more visible all over Europe, and clearly represents the contemporary civil society movement. Many of these so called grass roots housing movements, are characterised by a long term dialogue and discussion among the future home owners, about where to live, , how to organize the design and building process, how to form a community, establish common values etc.*

In recent years, many process supporting agencies emerged in the market, establishing a bridge between the non-professional clients and the professional world of architects, contractors, building codes, structural engineers and energy performance consultants. To further diffuse this novel approach to housing a virtual platform could be of use. This platform could offer the kind of support for starting CSO groups in the initial phase.

This paper further sets the ambition to establish a virtual platform that supports future home owners by providing background knowledge on what a CSO Housing process will look like e.g. how to start a project, how to form a community of end users, how to finance and formalize that organisation etc. Additionally, the platform would support the interaction between site or building owners of possible interest to CSO's or individuals looking for housing. With these functionalities we aim at a substantial decrease of the process time of the time consuming initial phase of a CSO development project in order to make CSO housing a more established housing development process.

1. INTRODUCTION

Collective Self Organised Housing is referring to a group of individuals that acts in association to organise and commission the process of formation, requirement definition, planning, design, implementation and/ or maintaining their own housing project. A CSO housing project is typically characterised by a mutual dependency between the individual participants [1].

Extensive desk and market study has provided strong indication that an increasing share of housing projects nowadays are the result of (a collective) individuals that organise and commission their own building project. A relative new market-segment is indicated by local authorities and contractors, to offer particular products (building sites, tailor made houses) to make this private commission and CSO type of housing project possible. This market segment is recognized both in new construction as well in sustainable refurbishment of existing building stock.

It is indicated that the future will consist more of the CSO housing type of solutions, and the times of large scale new urban sprawl kind of construction are over [2]. Observing the changes in the field of construction and housing provision in this way, an urgent need for some process supporting tools is identified. End users for instance, are typically characterized as non-professionals, having no particular experience or affiliation with the construction practice. This situation in itself already requires a particular kind of information flow from the experts towards to the end users in this case, to allow them to understand what it is they are getting themselves into.

A transition from top down directed housing projects towards bottom up initiated and led project affect the current practice of planning, designing, building and managing building projects as a whole [3]. Not the local government or urban planner decides how to build, or what the buildings will look like, rather the collective of people intended to live there are becoming empowered to decide and design within certain limitations what the neighbourhood will look like. Architect and or contractor are not managed and directed by a professional RE advisor or developer, but instead are hired and expect to work with individuals motivated and inspired to develop their own living environment.

In the next sections, we elaborate some further on the main differences between conventional and CSO type of housing projects. To what extent does it require a different way of working, from architect, installer, structural engineer to urban planner? We further highlight the main challenges that are encountered in CSO Housing projects. These range from the relative long preparation time, and long initial stage of housing development, which increase the risk of discontinuation of participants; up to miss match between information need and decisions to be made. Hereafter we introduce the CSO Housing platform, as instrument to support the process of developing a CSO Housing project, with relevant functionalities. The eventual appearance of the CSO Housing platform is undecided yet, we have limited ourselves to describe and discuss the features, purpose and functionalities of it. Future implementation and validation needs to confirm that what we have suggested has been successful.

2. HOUSING DEVELOPMENT PROCESS

An ordinary market and purchasing mechanism of products (a loaf of bread, a book, a cell phone) requires that seller and buyer come to an agreement with respect to the item (what is been sold, the product), and the returning favour (most cases a financial compensation). For more complex type of products, like a car, a computer mainframe, or building, there are typically dangers for information asymmetries (the seller often knows much more of the product, than buyer), uncertainties (not aware of all characteristics, and impacts of a certain decision), and accompanied risk of consumer dissatisfaction (different expectation of the product, than what is been delivered by the suppliers).

Often a dwelling is compared to a consumer good, but on closer inspection some striking dissimilarities can be identified.

- The repetition of a (potential) sale between a consumer and a company is less to non-existent. While a person buys maybe up to 40 mobile phones/ devices or 10 cars in a lifetime, one buys probably only once or twice a new built house. Therefore the need to create a satisfied customer is much smaller. This is further increased by the following argument.

- The construction industry is highly fragmented, and a building is not clearly 'branded' like many consumer products are. There is not one entity who claims to be the 'maker'. It is even for professional difficult to identify this. Is it the contractor, developer, architect? And who are these parties?

- Series are small to not existent. While a consumer product is sold in high numbers dwellings are sold in very small series. This leads to very small development budgets. For example: a series of 1000 mobile phones would be impossibly expensive, while a series of 1000 unique dwellings is almost unheard of in the western world.

Therefore it is impossible to compare a dwelling to a consumer product, and use similar market and purchasing mechanisms. These typical characteristics of the construction industry are overcome by a full professional supply chain, through RE developers and RE agents. Professionals that know the construction sector well, can anticipate on typical segmentation dangers, and require a full responsibility of the main contractor for the end result.

Here below the conventional building process is described, in terms of who is taking the initiative, what activities come after the other, what information is required where in the process. We will slowly introduce the CSO Housing process characteristics accordingly, and provide the main pretentions of the novel process to develop a grass rooted housing project.

2.1. Conventional building process

Current building methods are characterised by a sequential process, where process steps are clearly defined and determine the phase a building project is in. The steps can be simplified to the following sequence:

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1. Developer/ RE agent writes business plan to develop housing project, based on a plot
2. Architect creates design, based on own insights and business plan of the developer
3. Design is checked and calculated by consultants/engineers
4. Building permit is issued by the municipality
5. Procurement phase
6. Contractor builds housing block
7. People obtain finished product from developer/ RE agent

Although this is an oversimplification it becomes clear that the real estate developer is an influential party in this process and the end-user has limited influence and is not known from the start of the development. This sequence leads by definition to the situation where a RE developer must develop a dwelling for 'the market' i.e. a generic solution that fits a certain size of the possibly interested end-users. It is common that the sales of the dwellings starts around the time of the procurement. By then the end-users are getting involved, but as will be shown in paragraph 3.2., the possibility to influence the design is very limited by then.

Another consequence of this pattern is that the RE developer has very limited interest in the long term. By the time the dwellings are handed over to the home-owners a period of service and warranty may or may not start, but there is little (positive or negative) effect of a successful or unsuccessful use/exploitation phase for the Real Estate developer.

2.2. CSO Housing process

Most CSO Housing processes take a very different approach in the development process, leading up to the building stage. Since the initiative is taken by the end-user(s), they have a strong opinion on what the project should look like and how it should function. Most CSOs are formed based on certain values (e.g. community, sustainability, age) that they would like to see reflected in the resulting building. Also, since a CSO, by definition, consists of multiple people, that all are part of the decision making process. Also the design process is (usually) a more democratic process compared to a traditional approach with a developer.

The result is that the design process can take much longer compared to traditional building processes. Most of the times, workgroups are formed within the CSO that each deal with different aspects of the project: finances, social structure, design and construction, communication, etc. Often the decisions are based on the consensus model, i.e. there are no objections from anyone involved in the process in that particular workgroup. It is quite understandable that this process can take much longer compared to a traditional process, as a group of people, each with his own preference and taste, has to come to a unified decision, rather than a single individual. The upside of a process like this though, is that the ultimate outcome is the result of the hard work and commitment of a large group of people, who all feel partly responsible for the end result, and are committed to make it

work. User satisfaction, as a result, is much higher, and anecdotal evidence shows that the turnover rate in these projects, i.e. the average period of time people live there before they move away, is much longer than in traditional projects. Moving ratio and individual willingness to move is low.

During the design process in CSOs, there is often a feedback loop based on information. Design decisions are made, but may change once new information becomes available. This can be in the form of a new technology that is being presented to the group, a change in budget, or group dynamics, as some people may decide to leave the CSO and are replaced by someone new. Once the design process is complete, most of the time with the help of an architect, the rest of the building process shows strong similarities to traditional building processes, with the difference that the commissioner is not a developer, but rather the CSO workgroup concerned with the construction phase.

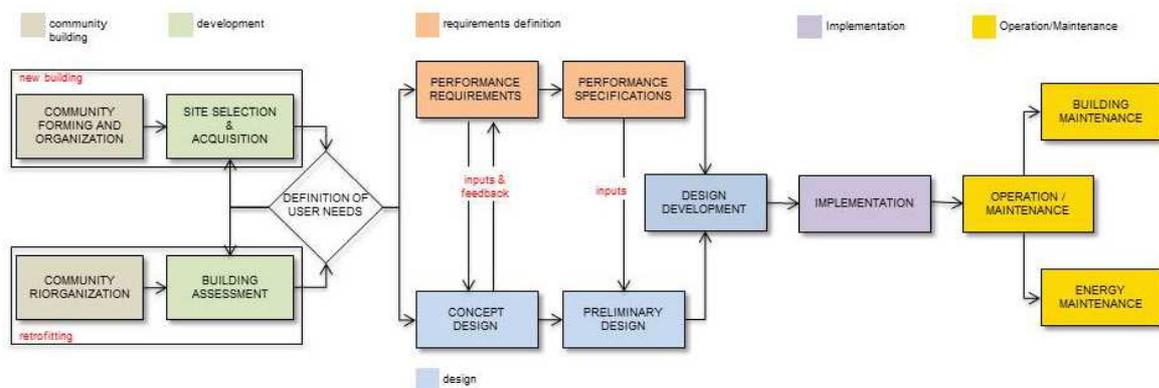Fig.1 represents the process flow corresponding with the CSO Housing process model [4].

Figure 1. Illustration of the CSO process flowchart (Source: [4])

2.3. Stakeholders in the housing development process

Considering the wide range of stakeholders that are directly or indirectly involved or affected by a CSO Housing project, it seems an endless and above all for each project specific list of partners and organisations involved. For that reason, a classification system is been used to group the stakeholders along their perspective and characteristics. Cultural Theory [5] offers such a classification instrument for identification and addressing a number of typologies to group people, culture and politics.

In the Cultural Theory (CT), we found three typologies (out of five) that are strongly corresponding with the identities of the main groups of stakeholders in a CSO Housing project. These are: Egalitarians for End-users; Individualism for Supply side businesses; and Hierarchism which stands for Authorities (from local to national bodies of authorities). In the next section, each of the stakeholder groups will be elaborated upon and expressed in terms of their cultural nature from the corresponding perspective.

End user group, consists predominantly by a variety of individuals that are working together to realize both their individual as well as their collective intentions (i.e. a group of houses, with a strong individual character besides a particular extent of collective

elements). The nature of the group of individuals, the mutual dependency in continuation, their shared dreams and commitment to the process make the group also vulnerable. Where in principle, each individual participant is equal to the other, the group is best availed by continuation of the project. Each potential interruption contains a risk of this continuation, and should be avoided if possible. This illustrates both the Egalitarian perspective, which is characterised by a strong group effect, the extent to which an individual is bound in a unit [5].

Typical decision making is done through consensus, the accent is found in bottom up initiates, where people find themselves in a grass roots movement, having a long term time horizon, and often a rather local geographical level of orientation. Read here, the typical description of the CSO Housing project group, consisting of peers, individuals with a commitment to generate an inspiring living environment for the future together.

Supply side type of organisations, are the largest group of partners and businesses that offer products and services to the CSO Housing initiative. This group ranges from banks (loans and mortgages), process supporting consultants, up to more clear professionals like architect, contractor and technical suppliers of solar energy systems or wooden front-doors.

In the traditional form of supply driven organisation of housing projects, the characterisation of the supply side is often proclaimed to be fragmented and individualistic by nature. Cooperation is only a necessity to assure ones individual profit. The extent of information sharing is limited to just that what is relevant for connecting the individual parts of the picture. Decision making attitude is based on business tradition, looking for the best win – win solutions. Economic reasoning is by far the best instrument to manage this group of partners in the becoming of a CSO Housing project. Strong parallels can be identified with the perspective of Individualism, that consist of short term time horizon (< 4 years), a regional geographical level of orientation and a strong accent on the marketplace (trading and dealing).

Last but not least, the Authorities, on the local as well as on the national level. This group forms a grid of rules, laws and procedures to structure and control the process of planning and building. It is this nature of the so called Hierarchists, characterised by a continues demand for more information, a strong ratio / science driven decision making process and laws / procedures being their strongest policy instrument. A local municipality is by far the best representative for this perspective if we consider the stakeholders in a CSO Housing project. Local municipalities have the power of offering building plots for sale, set the price, pre-scribe the limitations and degrees of freedom with regard to what is allowed to be built on the plot. Authorities decide on the permission for planning and building. They further control the procedures to be followed, check if the building codes and regulations are respected etc. In other words, this stakeholder is very much driven by a top down approach, refers to a 4 year time frame (due to elections), and corresponds with the regional geographical level of orientation [5].

The process demarcation of stakeholders and addressing the groups by their typical characteristics is been subject of multiple studies in both academia and EU research. Some

interesting illustration can be found in the case of stakeholder involvement in river base sediment management [6].

When it comes to information demand (what stakeholder group needs what kind of information), instrumentation pallet (controlling mechanisms, decision making) and communication means, each stakeholder group has its particular set of parameters to be addressed. This brings us to the point of differentiation in the CSO Housing Platform accessibility. First of all, the intention is not to allow the Structural Engineer X to freely enter the space of formulating the end user requirements, or the formation of the CSO community in the first place, nor do we plan to grant access of any CSO group to play freely with the building restrictions that belong to a particular building plot in the realm of the Municipality Y. Separated access is allowed, per stakeholder identity, to a source of information, toolsets, frames, decision and offers, that contribute in the end to the functioning of the CSO housing platform, in match making between the end users and the supply side, or the municipal building-plot offers to be matched with an supply oriented offer for a CSO housing project (and everything in between).

Having identified the main differences between conventional and CSO Housing development processes, enriched by means of the three cultural perspectives that correspond to the main stakeholder groups in the process; we like to further analyse the challenges to be overcome for making CSO Housing more appealing and responsive choice for end-users.

The latter stakeholder group is for that reason identified as the key target for fostering change and support in the course of developing the CSO Housing platform. End-users are the main player new in this planning and building process, that needs encouragement and support.

3. CHALLENGES IN CSO-PROCESSES

Most pregnant challenges for end-users in the course of a CSO Housing project are dealt with in this section. Identifying the functionalities and kind of support mechanisms necessary to overcome the challenges is our primary intention.

3.1. Non-professional clients

As mentioned earlier in the first paragraph, in a CSO Housing project, the client is often a non-professional and has little experience or affiliation with the construction practice. But by getting involved and initiating such a CSO Housing project the client group does have the responsibility of the project results ultimately, whatever support third party consultants and/ or process support agencies may commissioned to do. Therefore the CSO initiative group should be able to bridge or compensate for the information asymmetry and enable itself in effective self-organization. To do so, this requires a variety of support functionalities in order to overcome, or deal with the non-professionalism in the client-ship:

- *Information* on what is a CSO Housing project, how does a development and building process looks like, what steps are necessary etc.

- *Formation* support. How to organize a CSO, what legal entities are common and how to create an effective type of self-organization?
- Operational/ *project management* support. A CSO Housing process is to some extent similar to a 'conventional' project in which common project management activities take place. Like project planning-, budgeting-, communication and file version control instruments.
- *Professional* client-ship support. A CSO group needs to make formal arrangements and close agreements with a wide variety of supply parties (like consultants, contractor or energy advisor) and authorities in many stages of the project (the perspective of the Individualist or the Hierarchist). This leads to the need for support in setting up the best strategy for selecting and contracting the right party (i.e. by bidding, auctioning and procurement) [7].

3.2. Multiple 'clientism'

A CSO end-users group is, by definition, a community of individuals who take on a collective challenge with many mutual (inter-)dependencies between the individuals as been already highlighted in paragraph 2.2. Therefore decision making processes, consensus building and (cost) apportionment aspects are of an immense importance to be able to effectively organize and manage this CSO Housing development process successfully. Support mechanisms to overcome this challenge is typically found in instrumentation to depict a particular decision making mechanism, help in terms of informing about different cost – apportionment strategies and their consequences in terms of accountability.

3.3. Design support.

Looking back on the CSO Housing process flowchart (see fig. 1), two parallel streams of activities can be identified. On top, you find performance requirements formulation and performance specification, which runs in a iterative parallel with the concept design development. The illustrated iteration between demand formulation on the one hand, and visualization of how supply side interprets this, starts already back in the community formation process, and continues through to the site selection procedure.

Its been furthermore elaborated upon in paragraph 2.3, in typical housing projects, a strong information asymmetry is present, between the non-professional client who needs to make a particular design decision, without having a well evolved idea of the consequences. Implications as a result of design choices can be related to costs, construction time or even quality in the end. How can the non-professional be best informed as early as possible in the process, to make the best decision in the design process? [8], states further, that the earlier in the development process, the influence on the project is largest, and costs of changes are lowest (see fig. 2).
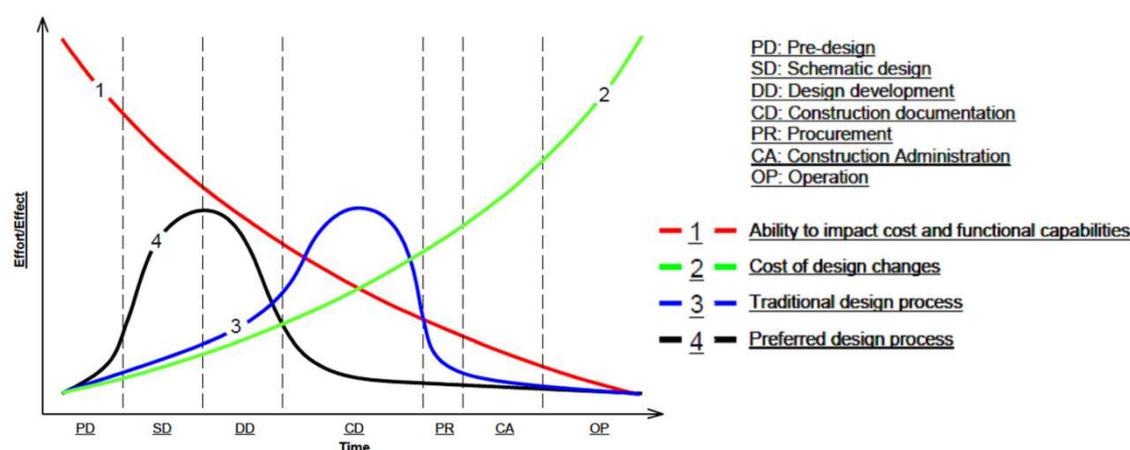
Figure 2. McLeamy curve (Source: [8])

Therefore understanding and supporting the most early (requirement formualtion and design) phases in the CSO Housing process should be the key for supporting the end users in the design of a CSO Housing proect. To strengthen this statement, study of current CSO type of housing projects show that participants are very 'design to budget' oriented [1]. Meaning, that often the budget is defined by savings and mortgage of the participant, and as a result the dwelling should fit this budget. The particpant is looking for the best value for his budget. This is in contradiction to the common understanding that end-users' needs/ requirements are leading. Requirements scale with budget, but accurate construction cost information is, usually, only available in a very late stage in the design process. If the budget does not suffice this leads to a to design changes in a relatively late stage in the design, which is un-desired. Changes in this stage turn out to be more expensive (time and money wise). In overcoming these identified challenges again, further support is appreciated in:

- A tool to articulate the demands, in such a way that requirements respond to the level of professionalism of a CSO member and the CSO group as a whole.
- A tool to create a quick iteration process between a design solution and the consequences in functionalities, time, investment/ Total Cost of Ownership which are the result of a particular design solution.
- A tool to support the site selection and envisions the design limitations or degrees of freedom corresponding to the site selection.

4. RESULTS AND DISCUSSION

CSO Housing is yet a novel approach, but also rising star in the future of sustainable housing development. With a clear potential in increasing communal values and creating a mechanism which drives the construction industry to become more end-user oriented. Current endeavors CSO Housing groups need to overcome are large, to a large extent the result of the fact that the development process is not organized to accommodate CSO's (yet). To overcome this a CSO Housing platform can be of great use. The platform

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envisioned here should provide three target groups, oriented alongside the CT typologies of Hierarchists, Individualists and Egalitarians. In the attempt to bring down the average preparation and preconstruction time of CSO Housing project significantly, the CSO Housing Platform is designed to offer primarily those functionalities that accommodate this goal.

- Informing. Information for the CSO to overcome the information asymmetry, but also for the other actors to understand a CSO process and how to efficiently interact with a CSO.
- Tools. Tools to support the development process. Functionality for demand articulation and communication, design performance feedback in the early design stage/ site selection phase, decision trees for more complex decision making processes, (cost) apportionment tools
- Project management suite. Planning, budget, information sharing tools
- E-marketplace. A CSO will need to source a multitude of services and products. A platform for the articulation of the CSO's demands to the professionals and the following bidding, negotiation and/or procurement process.

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