PAPER ABSTRACT With their long-term investment horizon and participative approach, cooperatives are naturally inclined towards the Open Building concept, and the according principles are practised in different degrees. The case of Switzerland shows how these different degrees are employed in accordance to the involvement the users themselves were and are willing to provide, as well as a result of experiences made with building stocks over time. It is the aim of the paper to investigate the question how this long history of advancement can be continued in the future. Through an assessment of a project currently in development by the authors and a number of other examples from Switzerland, the paper identifies challenges and potentials for the Open Building principle in the cooperative housing culture in Switzerland for the 21st century on both the architectural and the urban scale.

KEYWORDS: Cooperative Housing, Self-built housing, incremental development

1. Introduction

1.1 The Renewed Significance of Cooperative Housing in Switzerland

Since the turn of the Millennium, cooperative housing has steadily gained in importance in Switzerland. This is partly due to several popular votes. In Zurich, for instance, the proposal “Bezahlbare Wohnungen für Zürich” was accepted in 2011, a proposal that had been worked out by the city’s municipal council to take account of three related petitions. Among
other goals, the proposal determines that in 2050, one third of all of the housing in the city is to consist of non-profit apartments. Another case is Berne, where an “Initiative for Affordable Apartments” was accepted in May 2014. It determines that if zoning is changed for a site (especially if it is over 5’000 m2), at least 1/3rd of the development should be let for economic rent. Both votes have been interpreted as a call for more cooperative housing. Especially in Berne, cooperatives have since gained substantial in political momentum. More initiatives can be expected in other cities and cantons in the future.

This development goes along with an increased building activity of cooperatives due to demographic growth. In Zurich, for instance, most cooperative projects (around 25’000 apartments) were constructed in the city’s major growth phase between 1919 and 1960. Parallel to demographic development, building activity declined to 6’000 cooperative units between 1960 and 1980 and 2’000 between 1980 and 2000. At the end of the 1990’s, Zurich began to grow again, and the municipal authorities initiated an active policy of encouragement of cooperatives. As a result, cooperatives built around 5’400 apartments between 2000 and 2011 alone. The activity continues with strong intensity. (Durban, Koch et al. 2007)

This building activity is increasingly related to the theme of densification, which has come to the fore caused by other popular votes and sustainability concerns. Cooperative and municipal housing projects play an important role in these densification efforts. They usually have a big grain size and are easier to change than other urban structures, such as single-family districts. Accordingly, many developments that had been built according to garden city ideals and did not conform to today’s levels of comfort have been replaced by buildings with twice the original density. (Städtebau 2012; Henz and Henz 1995) Although in a remarkable number of cases, cooperative housing projects were redeveloped by merging flats and implementing other changes on the fill-in level. (Durban, Koch et al. 2007)

There are a large number of buildings, however, that cannot be adapted to today’s needs. This means that another important challenge is to enable apartment buildings to flexibly react to future changes. The scenarios for how people live in 50 or 100 years are very diverse: It is possible that there will be the necessity for more people to live in smaller flats again, or that the surface of living will increase. In any case, buildings that can flexibly react to all of these scenarios and thus enrich the spectrum of possibilities will probably have a more sustainable future than those oriented towards one single program/occupant configuration. It is to be expected that cooperatives, with their long-term view on the housing stock, will play a central role in this.

1.2 The example of the Warmbächliweg development in Berne

The authors came into direct contact with these issues while working on the

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1 In 2004, the proportion of cooperative housing in Switzerland was 5,1%, in the city of Zurich 19%. In absolute numbers, almost 1/3rd of all apartments in cooperative housing projects (60’000) are located in the Kanton Zurich. Overall, 70% of all cooperative housing apartments are located in five Kantons: Zurich, Berne, Lucerne, Basel Stadt and Geneva. (Wohnungswesen 2004)
Warmbächliweg project, for which they won the ideas competition in 2012. The site of the former Warmbächli Waste Incineration plant, which will be reused for dwelling and commercial spaces, is in several ways typical for the process sketched above. It is located in a very central location, about 2 km from the historical centre of Berne. The development is very dense in comparison to the surrounding quarters: With a total of 40’000 square meters of floor area, the planned FAR ratio is 1.6, including a public square. (Bern 2012) (See Figure 1) During the planning phase, the Warmbächliweg project was also directly affected by the vote on affordable apartments. The initiative’s success triggered a political process that resulted in the extension of cooperative housing share on the site from 50% to 100%.

Fig. 1. Model of the Warmbächli site development with the former Tobler Chocolate building in the centre, 2014

A key aspect of the plan is the re-use of a former warehouse, which raises specific questions about Open Building principles in cooperative housing. To reduce grey energy and to keep a connection with the history of the site, the former Tobler Chocolate storage building at Güterstrasse 8, built by Eduard Helfer in the 1960’s, will be preserved and transformed into a laboratory for innovative housing forms, studios, workshops and small businesses. This transformation provides an interesting case of Open Building: The 6 by 6 m grid with ceiling

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2 The according ideas competition was won by BHSF Architects and Christian Salewski in 2012.
heights of 3.7 to 4.7 m was initially laid out for storage purposes. The static system is designed to load great weights and can thus be used in a very flexible way, although the depth of the floor plan of around 24 meters poses some difficulties as to being reconfigured for dwelling purposes. (See Figure 2)

![Floor Plan](image)

**Fig. 2.** 2nd floor plan of Güterstrasse 8 in Berne

The Güterstrasse project also represents an interesting case of user appropriation and self-initiative, for which cooperatives seem to be the best legal form. When it was clear that the building would be kept in the urban plan, a previously existing interest group of private persons evinced interest in taking over this project and developing it into an experimental residential building. In the course of the year 2013, these persons formed a cooperative (Warmbächli Genossenschaft), which currently has around 150 members with a high variety of ages and backgrounds.

Through a first survey, the cooperative built up a space allocation plan for the building (calculating with about 190 inhabitants) which shows the current spectrum of ideas and demands in cooperative housing: The underground floors, lit with daylight only from the courtyard, are dedicated to various communal, cultural and commercial functions. The upper floors and the three-storey roof-top extension combine standard apartments of various sizes with maisonette types, large shared and cluster apartments and a 560-m²-space for “Hallenwohnen”, meaning self-build apartments. The programme is complemented by communal spaces like a recreation room, workshops, a sauna, “community loggias”, and a roof top terrace.

The Warmbächli development as a whole also shows the varying interest of cooperatives in terms of architectural innovation. While the Warmbächli cooperative is extremely engaged in innovative forms of living, user participation, and open to experiments, first reactions from the currently bidding other cooperatives interested on the site communicate a different stance. The main driving factor for them is cost, and unconventional solutions seem to endanger keeping them within bounds.
1.3 Objective and Methodology of the Paper

Starting from the Warmbächli project, several questions related to Open Building appeared to the authors. How can long-term flexibility be argued and introduced in such a project, especially to conservative cooperatives? What ways of user appropriation are possible outside of the reused Güterstrasse building? Is the singular position of the Warmbächli Genossenschaft on the site a special case, and what can be made of it? Can the Open Building principle also be applied on an urban scale?

The strong relation of Open Building principles and cooperative housing is obvious. Cooperatives place a strong emphasis on user involvement, they develop projects with a long-term time horizon, and they are often confronted with adaptability issues in their building stock. Consequently, flexibility in general is a major theme in the literature about Swiss cooperative housing.

To assess the above questions, this paper aims at a twofold examination of Open Building as a principle of cooperative housing in Switzerland. First, it attempts to understand how Open Building principles were and are employed in the cooperative building culture. The main sources of information for this examination were a series of publications about cooperative housing projects. Second, it attempts to understand how Open Building principles could be helpful given the current challenges on the housing market, especially inner-city densification, and how they could be better implemented in new projects to further encourage implementing adaptability in cooperative housing projects.

It is beyond the scope of this paper to trace the multiple and complex ways of this history of ideas of Open Building in Switzerland, let alone internationally. Since the discussion launched by John Habraken and the SAR in the Netherlands, Open Building in Switzerland has undergone a complex history of ideas. There are many actors, projects, and currents that are partly contradictory. Offices such as A.D.P. and Atelier 5 pioneered adaptability and the inclusion of user feedbacks into design processes from the 1960’s on. Since then, several principles of Open Building can be said to have become part of the mainstream, especially in cooperative housing projects. Radical alternatives also reappear. Another point that cannot be dealt with in this paper is that Open Building has historical predecessors before the 1960’s, most notably the speculative apartment buildings from the mid- to late 19th century.

2. Four Principles of Adaptability

The examination of existing projects led to the conclusion that three basic principles for more adaptable buildings, and one for more adaptable urban surroundings, are currently employed in cooperative housing projects. All of them can be put into relation with Open Building principles, as for example explained in (Kendall and Teicher 2000):

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3 For instance, it has been shown for Turkey and Japan that there is a strong relation between Open Building principles and cooperative housing. (Fukao 2008; Pecar 2004)

4 The following sources served as an empiric basis for this paper: (Hochbauten 2002; ETH Wohnforum 2003; Caduff and Athanasiou 2000; Durban et al. 2007; Städtebau 2012; Henz and Henz 1995)
1) The provision of floor plans that can be reinterpreted by their inhabitants through different furnishing arrangements in an exceptional number of ways;

2) The provision of additional rooms that can be used in combination with the existing apartments to provide for more flexibility;

3) The provision of base buildings with reduced load-bearing structure and flexible household installations for easy (re)arrangement of floor plans with light separation walls;

4) Applying Open Building principles on the urban scale as described in the SAR tissue method, creating a structure where single buildings can be replaced without disturbing the composition as a whole.

2.1 Principle 1: Re-interpretable floor plans

The first principle of re-interpretable floor plans is practised in cooperative housing since many decades. The competition entries by the Zurich-based office EMI (Edelaar Mosayebi Inderbitzin) from the last years can be regarded as an example and further development of this approach. They combine economic efficiency with ground floor plans composed of similarly-sized rooms of 13-16 sqm that can be configured in a number of ways. (see Figure 3) The main difference between these floor layouts and the apartments built in Zurich during the 1930’s, which were mainly constructed as closed perimeter blocks or building rows, are: a) More complex building forms (and, as a result, more complex spatial relations inside of the apartments), b) the inclusion of recessed balconies, c) an altered status of the kitchen in the floor plan. It now seems to be commonly accepted that the “Wohnküche” (eat-in kitchen) is a place for the family/community to gather. As it can serve as the principal room of the whole apartment, this eliminates the need for an assigned living room, making the apartment more flexible as a whole. (PWG 2015)

Fig. 3. Edelaar Mosayebi Inderbitzin Architekten, competition entry for the Freihofstrasse Ersatzneubau, 2015.

2.2 Principle 2: Additionally rentable rooms

The second principle, offering additionally rentable rooms, has been employed in individual projects during the last decades. It can now be found in more and more projects and
competition briefs. It seems to be a simple way to provide for a more flexible usage of a building, without any structural changes having to be made. The layout and size of additionally rentable rooms ranges from simple single rooms over small apartments to the “white rooms” of the Kalkbreite project (realized by Müller Sigrist Architekten 2012-2014) in Zurich. These rooms are open to the whole community and can, in coordination with the whole community, be adapted for certain purposes such as meditation rooms. (See Figure 5) Long-time experiences with this principle have yet to be made.

2.3 Principle 3: Base Building with flexible subdivisions

The third principle, flexible subdivisions, has been realized in a number of projects in Switzerland since many decades. One more recent of these projects is the Hegianwandweg project by EM2N, built for the FGZ cooperative in Zurich between 2001-2003. The floor plans of this project are extremely adaptable for future changes in terms of the subdivision of rooms and flat sizes – the FGZ had made bad experiences with the inflexibility of their existing buildings partly dating from the mid 1920s. This resulted in a very simple building layout principally similar to an office building. All the infrastructures (staircases and elevator, sanitary rooms, and kitchen) are concentrated in the core of the building, while the zone around the façade can be rearranged according to new demands. The large balconies serve as additional rooms in the summer, as they can be closed off with large blinds. (See Figure 4)

Fig. 4. EM2N Architekten, Regular floor plans of the Hegianwandweg project (detail), 2001-2003.

High flexibility and modularity for future adjustments was also an important requirement in the brief of the Kalkbreite project in Zurich. The building is executed with a simple constructive principle of columns and floor slabs. Walls are only poured in concrete where
statically necessary. Other Open Building principles encompass easily accessible utilities, simply arranged utility shafts, and ceiling heights that allow for later changes. The Kalkbreite building also features flexible floor plans for commercial uses on the lower floors. (See Figure 5)

Fig. 5. Müller Sigrist Architekten, 3rd floor plan of the Kalkbreite project, 2012-2014.

The Kalkbreite development combines the social and programmatic approaches of different precedent projects (i.e. Kraftwerk 1), some of them redevelopment of existing buildings (i.e. Kraftwerk 2 or the Karthago cooperative) with a coherent structural and technological concept for flexible floor plan layouts. Therefore, it is regarded as a prototype for many innovative cooperatives across Switzerland. It is probable that Open Building principles employed here will radiate beyond the project towards other developments.

The concept of provision of base buildings with an (guided) infill determined by the future inhabitants, is more common to private investment schemes. However, the legal form of the cooperative is sometimes used to realize such projects as the Siedlung Baumgarten in Berne (1992-1996, Aarplan Architekten). Here, the Burgergemeinde Bern (a large semi-public body owning large plots of land) founded a cooperative in which the future inhabitants could become members as a scheme to finance the planning and basic construction costs. The inhabitants were then financially responsible for their infills, which were realized in very different ranges of costs. The initial cost estimates could not be kept in all cases. Although the development stayed a cooperative, many of the houses were realized without the financial benefits that can be claimed by cooperatives. (Walker 1997) (See Figure 6)
Fig. 6. Aarplan Architekten, Siedlung Baumgarten, 1992-1996.

An earlier example that points towards the viability of this approach, and its relation to the cooperative principle, is the Davidsboden project in Basel by the architects Erny, Gramelsbacher and Schneider (1986-1991). Here, two parallel developments were realized for an insurance as well as a foundation. While the insurance chose an inflexible solution, the foundation (Christoph Merian Stiftung) opted for a flexible solution. The arrangement of the apartment spaces could be co-determined by the future inhabitants – to a certain degree, as the apartments were to be rented out afterwards and not necessarily changed again. (Baumgartner, Gysi, and Henz 1993) The direct cost comparison of the two projects showed no significant difference. (Henz and Henz 1995)

Another example for this approach is the Grüngasse Buildings realized by Andreas Zimmermann Architekten in 2009. Through moving the walls, inhabitants can transform their respective flat into both loft apartments and cellular flats (See Fig. 5). While the buildings costs are comparably high, this is not attributable to flexibility. The effective costs for flexibility are less than 1.5% of the building costs. (Wohnungswesen 2009)
The idea of self-completion of the interior structure by the future inhabitants most directly corresponds to the Open Building principle. This form of dwelling is comparably rare. It has until now mainly been practised in temporary habitation in squatted industrial buildings. The discussion about these temporary projects led to the inclusion of such dwellings into the competition brief of the Kalkbreite follow-up project, the “Zollhaus”. In the brief, 600 m² are determined for “Hallenwohnen” (“hall dwelling”), for which a basic structure (sanitary cells as well as basic kitchen installations) is provided, with the rest to be built by the future inhabitants. (Hochbauten 2014)

While this form of habitation is coherent for the re-use of former factory buildings, its inclusion in a brief for a new building casts some doubts. The results of the Zollhaus competition show that the spatial possibilities are limited, and that this form of habitation consumes more area per person than other forms of dwelling. (See Figure 8)

It is interesting to note, however, that this is the only form of Open Building principles where ideology still seems to play an important role. One of the remarkable aspects is that the individual appropriation in coordination with others is viewed as a main quality of the “Hallenwohnen” principle and seems to be regarded as an ideological counterpoint of the individualization of society, epitomized by the appropriation of individual space in single-family housing in the suburbs. (Bracher 2014)
2.4 Principle 4: Re-interpretable urban tissue

The fourth principle is an urbanistic one and has been employed in the recently completed Hunzikerareal development in Zurich. It was built by the “Mehr als Wohnen” cooperative, which is a joint project for innovation and experiments of around thirty different cooperatives. The basic competition proposition of the winning team Futurafrosch/Duplex Architekten proposed an urban structure that consists of similar-sized, deep buildings framing a network of outdoor spaces. The actual buildings were realized by five different architectural offices. In principle, every building can be replaced individually, without disturbing the quality of the whole development. (See Fig. 9) However, while being acknowledged as an important testing ground for new ideas, the project “Mehr als Wohnen” also drew criticism, especially in terms of its architectonic appearance. The different facades of the five offices produce a very heterogeneous image of the whole building complex, (Knüsel 2015) in spite of the fact that the appearance of the buildings was closely coordinated in between the architects.
3. Conclusions: The Future of Open Building in Cooperative Housing

From the examination of the examples, a number of conclusions can be drawn for the future of Open Building in Cooperative Housing in general as well as such projects as the Warmbächliweg development in particular:

- Open Building needs incentives – either through promoting the principle by an institution or through providing a specific site or building. As many of the examined projects show, Open Building in both the broader (meaning participation) and more strict (meaning structural flexibility) sense mostly needs the “top-down” incentive of the respective cooperatives, which is normally well accepted by inhabitants.

- Innovative cooperatives interested in Open Building principles can proliferate in buildings and sites that are difficult to develop. Some cooperatives were formed because the authorities put special (and difficult) sites to bid. In the future, cooperatives could be used as innovators by authorities even more.

- The level as well as the flexibility that is provided on the respective level is normally directly related to the grade of user involvement in the respective cooperative. Cooperatives have different degrees of participation, ranging from indirect participation through committee work over direct co-determination of allocation plans and competition briefs to a direct determination of the own dwelling. This
usually mirrors in how Open Building principles are applied.

- Flexibility is usually not more cost-intensive, with the exception of the Hallenwohnen principle. Open Building is in fact a principle that should be strongly embraced by cooperatives, as it accords to their long-term economic and ecologic goals.
- The history of cooperative housing has produced a rich set of built examples of how to implement Open Building principles. There should be a solution for every case and every demand.
- Open Building is not a question of ideology any more. The only exception is the Hallenwohnen principle, which is still very much ideologically loaded.
- Formal expression and Open Building are usually not related. Most examined projects are very inconspicuous in terms of their outer appearance.
- Open Building principles on the urban scale are difficult to implement, especially with cooperatives, as their developments usually have a large grain size. This point is not discussed very frequently, although it is an important goal to design “Open Cities”. (Rieniets 2009)
- In some instances, the concentration on cost issues hinders Open Building, especially concerning ceiling heights. Especially flexible ground floors that can accommodate commercial as well as dwelling uses can be viewed critically, as experiences in the Warmbächliweg planning project show.
- The appropriation of exterior spaces is mostly in the background of the discussion. Given the restrictions in terms of grain size, this factor could play a more important role in the future.

It seems that the Future of Open Building in cooperative housing will be diverse and often unspectacular, and probably not going to be expressed formally in a recognizable way. The main challenges for the future seem to lie in the communication of solutions, cost factors, as well as in the discussion of how Open Building principles could be made more influential in urban design.

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