SHARED LOGIC FOR CREATING VALUE-ADDED IN WMC:

COMPARISON OF 3 PROJECTS FROM FINLAND

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Kuva: Anne Toppinen

BUSINESS ECOSYSTEM (BE) AS A CONCEPT

Why?

- Creating value jointly, for own organization, partners and end-users
- Arena for co-creation and innovating
- Continuity vs. project-based approach
- Competitiveness and efficiency needed
- End-user needs - how about their role in BE?

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ORIGINAL ARTICLE

Collaboration and shared logic for creating value-added in three Finnish wooden multi-storey building projects

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ABSTRACT

Increasing societal interest towards sustainable and low-carbon materials contributes to demand for wood-based materials and modern solutions for urban construction. Wooden multi-storey construction (WMC), however, is a relatively new phenomenon in the construction business, and collaborative business models in projects that adopt such novel building techniques are yet to develop. Shared logic is a key concept shaping the development of well-functioning business ecosystems, even though actor priorities may vary between the WMC business ecosystem members. This study examines the applicability of business ecosystem concept based on actor perception involved in three Finnish WMC projects. The results suggest that elements from the business ecosystem thinking can be identified in all the cases. Moreover, network collaboration created benefits to the ecosystem, such as reference value and new insights from research and development. For some companies, engagement in the business ecosystem created financial and employment benefits, while some interviewees perceived these projects also to create immaterial value, such as awareness on sustainability issues in their business, marketing gains, or in the form of mutual learning effects.

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KEYWORDS
Business ecosystem; wood-based materials; sustainability; value; collaboration

1. Introduction

Increasing societal interest toward more sustainable and low-carbon materials paves way for the use of wood in construction as a modern way of urban living, and as a part of bioeconomy and circular economy development (e.g. Toppinen *et al.* 2018, Lazarevic *et al.* 2019). According to Bourdeau (1999, p. 364), the main challenge of construction business is "to transform the demand for sustainable development into an opportunity, to create and access new markets, and innovative responses which satisfy traditional industry demands and the new societal demands for sustainable development." However, in comparison to product and process innovations, there are few sustainability-related business model innovations in the wood products-sector (Hansen 2016) that could be used to speed up the growth of modern, low-carbon wood construction in the cities.

Modern timber building solutions include industrial wooden multi-storey construction (WMC), which is often characterized by a high level of pre-fabrication (e.g. Brege *et al.* 2014) and hybrid building solutions combining wood with other materials, such as steel (e.g. Loss *et al.* 2016). In spite of the fact that both of these types are increasingly associated with the green building concept (e.g. Wang *et al.* 2014), the WMC business has developed relatively slowly. For example in Finland, despite an intense promotional work and a significant change in building codes in 2011, and the increase in the market share of completed wooden multi-storey apartment buildings from 1% to 6% between years 2010–2015, WMC still represents a marginal niche in total volume of residential construction.

According to Nordin *et al.* (2010), re-structuring and intensifying of business cooperation is needed to break free from a niche level of WMC. This would essentially comprise changing both internal (e.g. increasing collaboration with suppliers, on-site contractors and engineered wood product manufacturers to develop off-site construction methods) and external factors (e.g. better implementation of R&D efforts with organizations and associations developing technical standards) affecting the WMC business. Pulkka *et al.* (2016) have shown the applicability of the business ecosystem concept in the construction industry setting, and that positive impacts on value creation can be achieved through collaboration, which extends beyond traditional collaboration such as project-based subcontracting (for traditional project-based organization of work see Toppinen *et al.* 2019). However, the business ecosystem concept, or its practical implications, have not yet been studied in the context of WMC business. According to previous research, there is also a research gap in eliciting project level insights on actor values, norms and belief systems as well as the constitution of WMC as a business ecosystem (see Toppinen *et al.* 2019).

An important further aspect is the project-level nature of highly sub-contracted construction business, which calls for a good fit and coordination between interdependent and non-simultaneous tasks implemented within strict project timelines (Gann and Salter 2000). Matinaro and Liu (2017)

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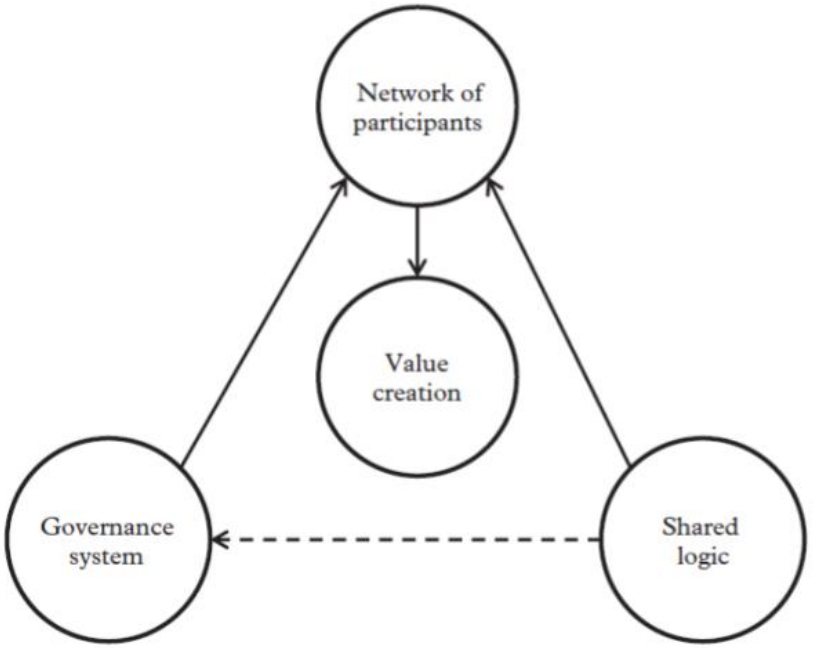
BUSINESS ECOSYSTEMS IN CONSTRUCTION PROJECTS?

Esim. Thomas & Autio 2014, Pulkka et al. 2016

- Connection between well functioning BE and business outcomes (value created) (e.g. previous study from construction industry by Pulkka et al. 2016)
- Shared logic and ways of operating, effective governance of collaboration, specialized, complementary participants focal for value creation



(Pulkka et al. 2016)

WHAT WAS STUDIED?

Functioning of the BE

- How is BE taking shape and functioning in industrial wood construction projects? (Participants, roles, governance, communication, etc.)
  - How do the partners see the common goals as part of their own operations (shared logic)?
  - What are the benefits of being a member in BE and what are the key factors for its success?

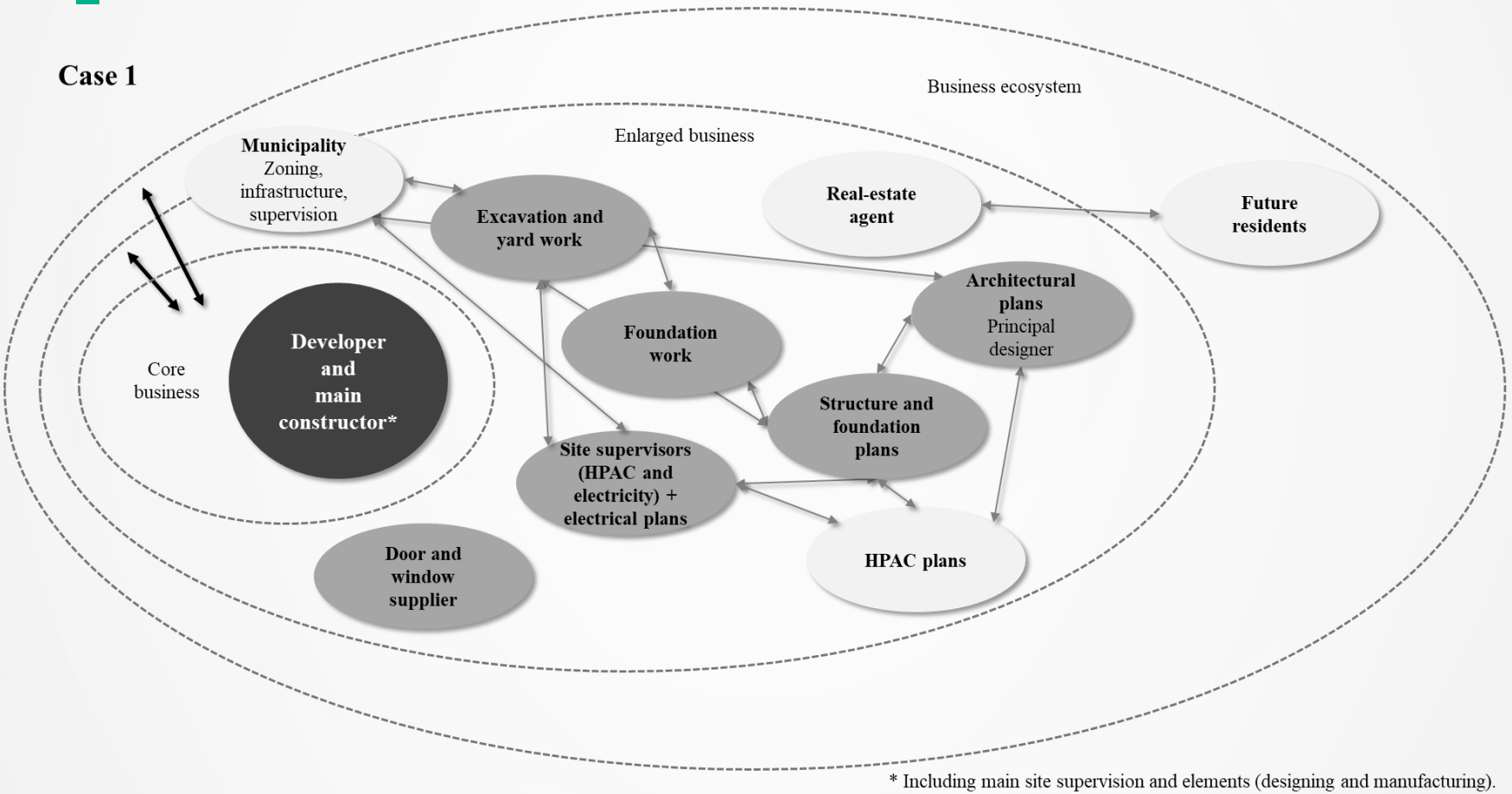
CASES & INTERVIEWS

- 3 novel, pioneering case projects, with wood as main structural material
- 23 semi-structured interviews (2017-2019)
  - Face-to-face when possible, otherwise via phone
  - Length 27-120min (65min on average)
  - Recorded and transcribed

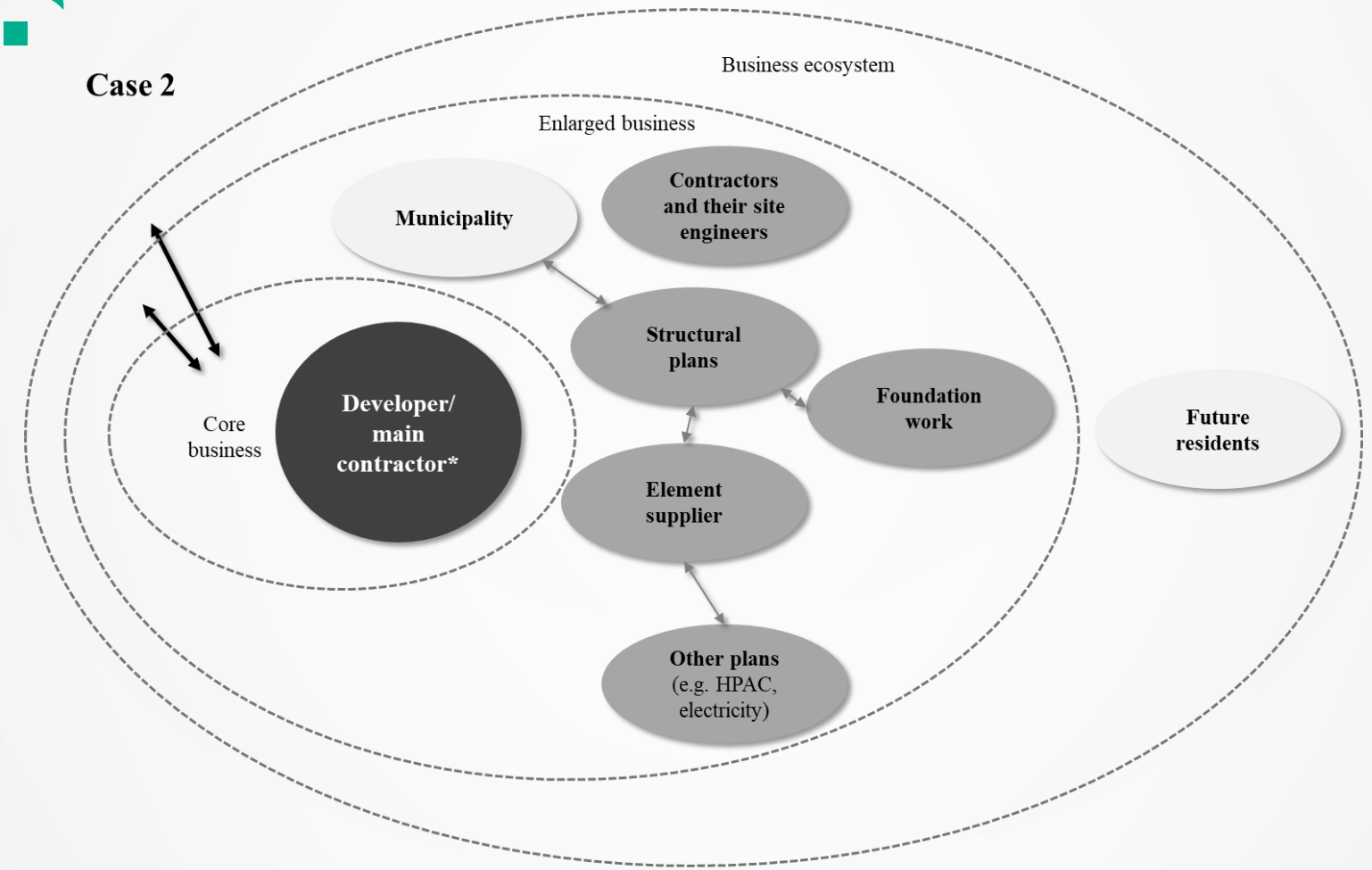
TYPE OF MEMBER IN BE	NUMBER OF INTERVIEWS	ADDITIONAL INFORMATION ON PROFESSIONAL BACKGROUND
CASE 1: a two-storey multi-family building with 14 apartments		
Developer/ main contractor	3	Director of planning, R&D and IT Element designer Main site supervisor
Project actors	9	Architect Structural engineer (structures) Structural engineer (foundations) HPAC engineer Excavation and yard work Foundation work HPAC and electricity site supervisor (x2) Real-estate agent Door and window supplier
Municipality representative	1	Zoning architect
CASE 2: a three-storey building with 27 small-scale apartments		
Developer/ main contractor	3	CEO Architect/main designer Main site supervisor
Project actors	2	Planning and R&D manager of wood element supplier Structural engineer
CASE 3: a twelve-storey student housing project		
Developer	1	Construction manager
Project actors	4	Project manager (consultant) Architect HPAC engineer Electrical engineer

Kuvat: Juho Pöyhönen

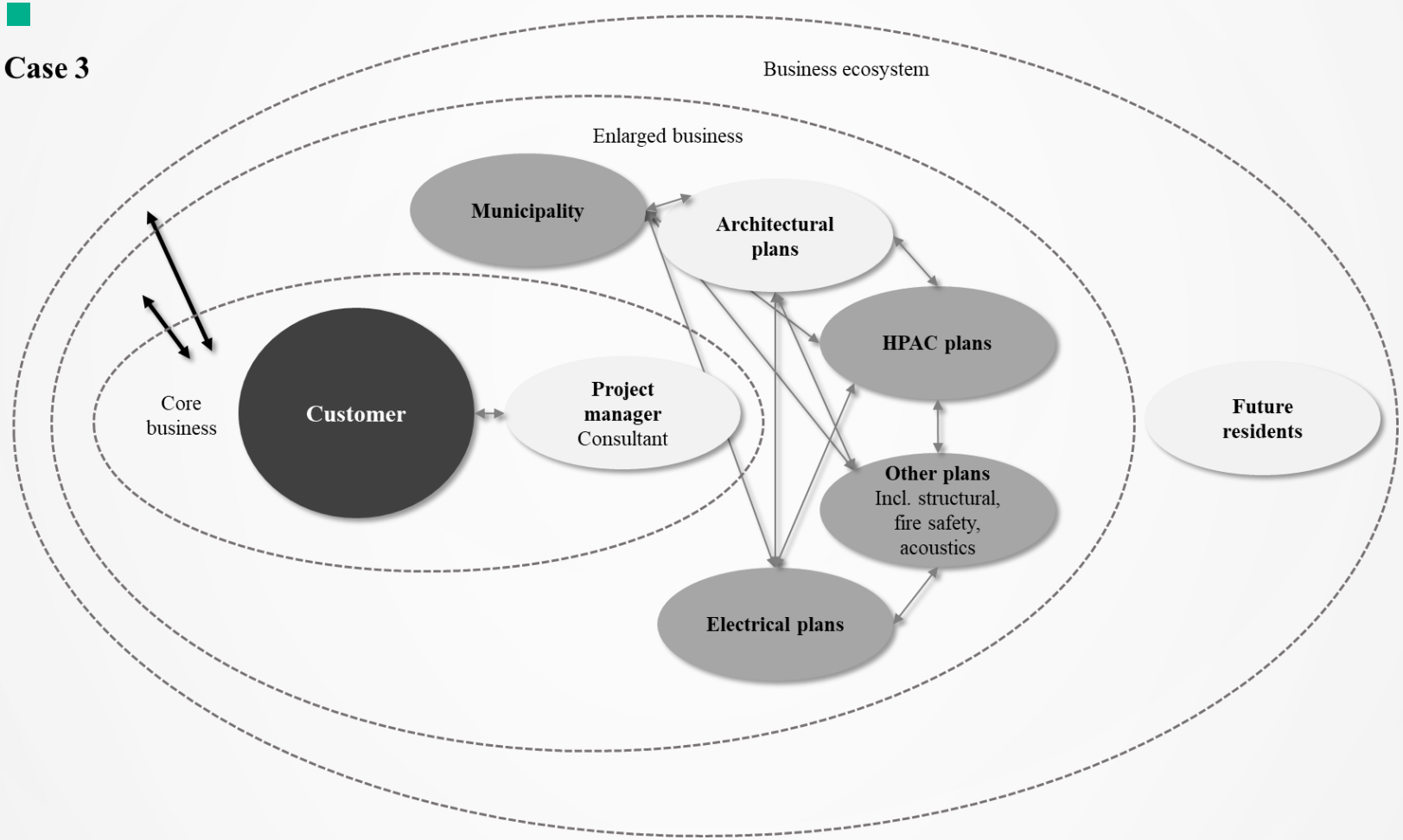
MAP OF BE IN CASE 1



MAP OF BE IN CASE 2



MAP OF BE IN CASE 3



RESULTS AND REFLECTION (1/3)

Trust was indicated to strengthen long-term collaboration…

"We have of course aimed towards long-term collaboration in designing and [choosing] contractors, so that projects would be such that all [designers and contractors] can manage…we refine the collaboration all the time when we move forwards…You quite often see that that the aim is to find the cheapest price and then the partners change every time, especially when business conditions are good…Building these wooden multi-storey constructions is a bit of a special field, so if you have trust you should [hold on to good partners]."

- Architect/main designer, Case 2

…which is important for co-learning and accumulating knowledge on WMC.

"In my opinion this has been learning for everyone still… Always new things. So now that we would build such a building next time with the same crew, it would be quite a lot clearer."

- Main site supervisor, Case 2

RESULTS AND REFLECTION (2/3)

While it seemed that the hubs had difficulties in disseminating the larger goals as well as keeping the ecosystem "connected"…

"Well I do not know, of course the contractor has their own clear goals for the whole project, to build a successful and financially profitable project…"

- Representative of wood element supplier, Case 2

"There was no proper project management, which would have dealt with the schedules and made sure that everything fits between the different actors."

- Foundation work, Case 1

…most actors were aiming towards similar targets (high-quality and cost efficiency) both in their own work, but also when thinking about the final product created together.

"Sure, this here is teamwork… Meaning that everyone works together for a common goal."

- Structural engineer 2, Case 1

RESULTS AND REFLECTION (3/3)

Finally, the improved sustainability as a shared benefit (or vision) was not heavily discussed, yet other shared benefits were seen to emerge from the case WMC projects:

"I would think building a completely new kind of wooden multi-storey construction has been the benefit for all [participating in the project], above all it provides visibility and interest. And maybe some boldness from the organization to do new things. That is the biggest [benefit].

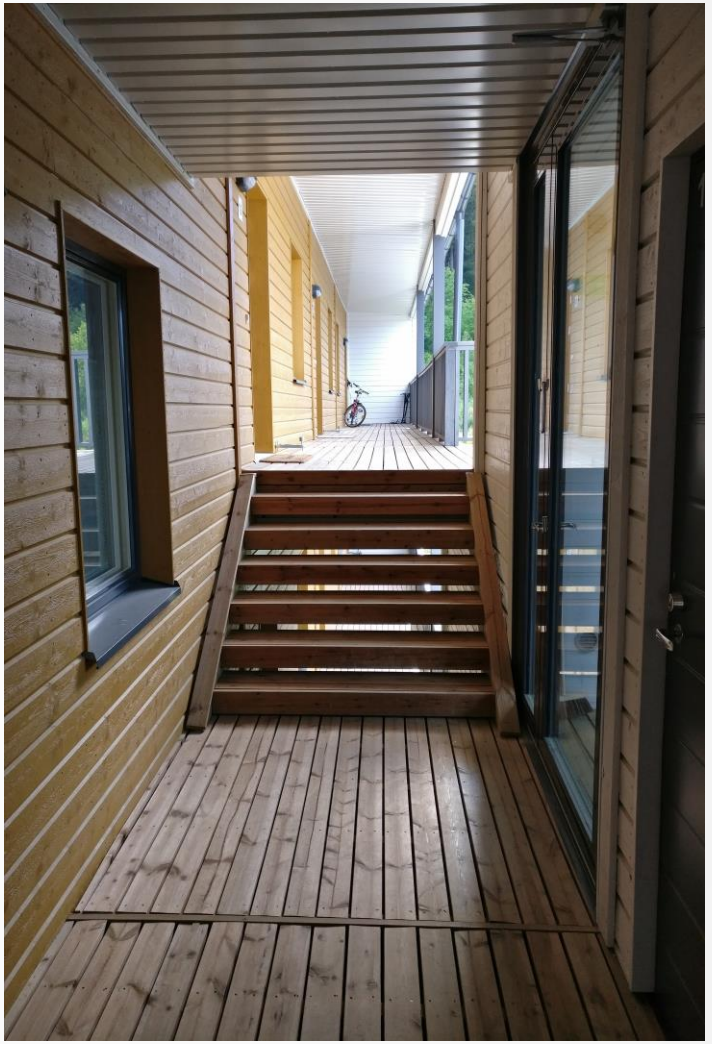
- Architect, Case 3





CONCLUSIONS

- **realized models of co-operation** between the different actors during the projects and the **accumulated experience** create various benefits for the partnering companies (reference value, R&D, trust and familiarity…)
- But no sign of integrated collaborative teams…
- Future research needed on usefulness of sustainability based benefits beyond C-storage



BUSINESS FINLAND