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Financiers' Perspectives on Wooden Multistory Construction in Finland

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ABSTRACT

This study explores the investment funding process and financial professionals' perceptions of wooden multistory construction (WMC) projects, with particular focus on risk assessment and sustainability. Through ten thematic expert interviews, we examine: 1) funding criteria for residential construction projects, 2) the role of sustainability as a decision-making criterion, and 3) the risks and opportunities for WMC projects as perceived by financiers. Applying the lenses of prospect theory and a property investment decision model, our findings show that financiers prioritize traditional monetary criteria like profitability, competitiveness, and risk-return ratios over building materials or sustainability. Key non-monetary criteria include location, energy efficiency, and premarketing. Perceived risks of WMC financing include uncertainty over life cycle costs and contractor expertise regarding the new technology. Despite acknowledging WMC's potential benefits for sustainability and profitability, our study suggests that finance sector professionals emphasize negative risks over positive opportunities for WMC. This leads to a preference for financing traditional construction projects.

JEL Codes: D81, G21, L73, L74, Q01.

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1 Introduction

Wooden multistory construction (WMC) has experienced increasing interest globally, including Europe and the Nordic countries, due to its perceived climate- and environment-friendly impacts, and esthetic appeal, which challenges the use of conventional building materials. This study explores financial decision-making criteria affecting the construction of wooden residential buildings from the financiers' viewpoint. Emphasis is placed on which aspects these experts perceive to favor or hinder investments towards WMC. Moreover, opinions of opportunities and risks of WMC as an alternative investment option are compared to traditional building materials, such as concrete and steel. Despite growing interest in the market potential of WMC, limited knowledge exists for understanding the perceptions of investment financiers, who, however, are crucial stakeholders and gatekeepers in the development of the wood construction value chain, including WMC. Conducted in the context of Finland, our research investigates how financial organizations make funding decisions and which criteria are used in the process regarding residential construction project investment. In particular, we study how experts in financing organizations (banks, investors) perceive wood material and WMC, as relatively novel building types, the related risks and opportunities, and explore the significance of sustainability considerations in investment financing decision-making.

Due to climate change, environmentally friendly and climate change mitigating actions are needed in the construction industry. Several policies are aimed towards a sustainable world, which guide these actions toward more environmentally friendly solutions. According to the European Commission (EU), more consideration should be given to the lifetime costs of buildings. Notable solutions for reaching this goal include more sustainable materials, higher waste recycling, and improved design. Specific policies and exchange of best practices regarding construction are also important, along with training and investment regarding construction methods and practices (European Commission, 2020).

This study examines WMC from the standpoint of investment financing actors (financiers) within the construction business ecosystem, where organizations collaborate, compete, and evolve together (Moore, 1993; Toppinen *et al.*, 2022). However, despite growing research on WMC development, the perceptions of financing organizations regarding WMC buildings as investment options have been overlooked so far (Jussila *et al.*, 2022), despite the noted impact on the realization of WMC sector growth. By incorporating insights from prospect theory, this study addresses the above-identified research gap. Thus, our paper first reveals financiers' decision-making criteria in the case of construction project investments, then how sustainability is perceived and

what role it has in the process, and finally how the risks are assessed in WMC projects. For this purpose, we propose three research questions:

1. Which monetary and non-monetary criteria do financiers use when making decisions over companies applying investment funding for WMC projects?
2. What is the role of sustainability among financing criteria in the case of residential multistory construction projects, and particularly how are WMC projects perceived?
3. How do financiers assess risks and opportunities (negative and positive risks) in financing WMC projects?

This study further contributes to prospect theory (Kahneman and Tversky, 1979; Ossokina and Arentze, 2022; Tversky and Kahneman, 1992) by examining how financiers' perceptions of risk and opportunity in financing wooden multistory residential buildings align with prospect theory principles. By investigating how financiers evaluate the potential gains and losses associated with WMC investments, this study provides insights into how prospect theory aligns with their investment decision-making process and criteria. Additionally, analyzing the role of sustainability considerations in investment decisions through the lens of prospect theory can offer a nuanced understanding of how psychological factors shape attitudes towards environmentally friendly investments in the construction industry.

Contextual Background: Finland as a Case

The construction industry accounts for approximately one-third of the total carbon emissions worldwide (United Nations Environment Programme, 2024). Thus, there also is a growing emphasis on adopting environmentally friendly practices in construction. Researchers, such as Franzini *et al.* (2018), highlight the industry's shift towards utilizing eco-friendly products and raw materials.

Finland was chosen as a case for the study, given that the country is generally seen as a stable and open society that has a long history with wood construction and, more recently, with WMC buildings (Ilgin and Karjalainen, 2022; Jussila *et al.*, 2022). As an Arctic nation, Finland is vulnerable to climate change impacts, including extreme weather events that can impact buildings (Wang *et al.*, 2023). Finland has also established ambitious climate targets, which legally obligate the nation to attain carbon neutrality by 2035, and has adopted a national bioeconomy strategy to foster the growth of domestic forest industries (Toppinen *et al.*, 2018; Wang *et al.*, 2023).

In Finland, the construction sector holds not only financial importance but also plays a crucial role in the country's economic landscape. This

industry encompasses both housing construction production and infrastructure development, employing around 500,000 individuals. In 2018, its total value reached approximately 35 billion euros, with 28.2 billion allocated to houses and 6.8 billion to infrastructure (Junnonen and Kankainen, 2020). Major contributors to this value include the forest industry, steel industry, mineral product production, and various services, involving both new constructions and reconstruction projects. Despite the supportive landscape and the positive attitudes of consumers, wood use in construction has not been growing for the past two decades in Finland (Kim *et al.*, 2023; Viljanen *et al.*, 2023). Urbanization and transformation in the construction sector have led to reduced volumes of single-family homes and increased the number of apartments in major cities (Ilgin *et al.*, 2024). The WMC business ecosystem still has a long way to becoming a viable alternative for mainstream construction, and one important part of this development is attracting investments to WMC projects (Pulkka *et al.*, 2016). WMC buildings in Finland have represented less than 10% of the apartments completed in the past few years while, for example, neighboring country Sweden has seen their respective market share growing to over 20% (Bahrami *et al.*, 2023; Toppinen *et al.*, 2018).

The fundamental purpose of the construction industry is to meet the human needs for shelter, services, and infrastructure. Housing projects provide essential living spaces, while production buildings facilitate the creation of goods and services. Furthermore, the industry is responsible for maintaining existing structures and undertaking necessary reconstructions. Infrastructure construction contributes to the development of crucial elements such as road networks, energy and water supply systems, green spaces, and waste disposal (Junnonen and Kankainen, 2020).

Despite the industry's essential role, the environmental impact of construction activities is undeniable. Buildings and construction processes contribute significantly to carbon emissions. However, there is an opportunity for improvement by enhancing processes to efficiently reduce emissions. The carbon footprint of a building encompasses the materials used, energy consumption throughout its life cycle, and land use. Efforts to improve energy efficiency and transition to less-polluting energy sources can effectively decrease the carbon footprint in construction. In the Nordic region, including Finland, a proactive climate policy has been established, focusing on emissions reductions and on bolstering carbon sinks (Häkkinen and Kuittinen, 2020).

High-emission materials, such as concrete, steel, aluminum, and plastic, are commonly used in construction, with estimates indicating an increase in their usage until the end of the century. Embracing circular economy principles becomes crucial, aligning with the goals of the Paris Agreement to recycle or reuse materials. Häkkinen and Kuittinen (2020) present a compelling illustration, comparing the carbon footprints and carbon sinks of wooden and concrete elements in a four-story residential building. Concrete

elements exhibit larger carbon footprints and smaller carbon sinks, while wooden elements showcase smaller carbon footprints and larger carbon sinks (Häkkinen and Kuittinen, 2020).

Finland was also chosen as the case area for the study due to its traditions in wood construction and strong public interest to enhance wood construction particularly in the urban context, which often presumes modern multistory buildings. However, WMC has been slow in gaining market share in Finland, despite earlier research indicating that residents mainly harbor positive attitudes regarding the experiences of living in WMC dwellings. Furthermore, consumers generally perceive WMC positively and consider sustainability to be important.

Emerging Wooden Multistory Construction

In the bioeconomy era, wooden multistory construction is a growing business opportunity (Jussila *et al.*, 2022; Nagy *et al.*, 2024; Toppinen *et al.*, 2018). Wood as a building material has several positive characteristics: it is renewable and a natural material that binds carbon for a long time (Hynynen, 2016). It is considered a pleasant material, improving the esthetics and ambiance of residential buildings (Aguilar *et al.*, 2023; Jussila *et al.*, 2024; Roos *et al.*, 2010). Existing research on wooden multistory construction covers themes such as policy narratives regarding WMC (Toivonen *et al.*, 2021), WMC and institutional frameworks (Vihemäki *et al.*, 2019), the business ecosystem approach and knowledge sharing in the construction, living, and use of building segments (Nagy *et al.*, 2024; Toppinen *et al.*, 2019; Viholainen *et al.*, 2021), benefits and barriers of WMC (Gosselin *et al.*, 2017; Riala and Ilola, 2014), and civil servant viewpoints (Franzini *et al.*, 2018; Salmi *et al.*, 2022). The attitudes of architects and engineers towards wood as a structural material in WMC have also been studied (Ilgin and Karjalainen, 2021; Markström *et al.*, 2018; Roos *et al.*, 2010).

In the business ecosystem approach within the construction sector and housing markets, financial institutions play a pivotal role as key stakeholders that influence, facilitate, and shape the dynamics of the ecosystem (Jussila *et al.*, 2022; Pulkka *et al.*, 2016). Their involvement extends beyond traditional lending functions, encompassing a range of financial services, risk mitigation strategies, and support mechanisms to sustainable practices and the adoption of new technologies and innovations. Despite the rather extensive research on various stakeholder roles in the WMC business ecosystem, the multifaceted role of financial institutions is underscored in fostering a resilient and sustainable business ecosystem within the construction and housing sectors (Jussila *et al.*, 2022).

Economic costs are one of the key factors when selecting construction materials. Costs include construction costs, maintenance, and a risk factor

(Roos *et al.*, 2010). In Riala and Ilola's (2014) research, the interviewees mentioned the expensiveness of wood as a key barrier for market development. In some cases, wood was not a primary option for large buildings, despite e.g. glulam and cross-laminated timber (CLT) nowadays being suitable products for large industrial buildings. The construction sector often favors concrete as a main building material, mainly because of the conservative culture but also due to corporate policies and existing platforms for materials that should be used in places where wood is usually not an option. On the other hand, education should increase teaching and knowledge in timber use and wood construction. Innovations in engineered timber products are creating more opportunities for the construction industry and reasons to select wood as a main building material. Additionally, prefabricated timber construction methods develop wood construction at a more industrial level (Nagy *et al.*, 2024; Roos *et al.*, 2010).

2 Theoretical Background

Investment Decision-Making in the Housing Markets

The investment decision-making process in property markets encompasses both objective and subjective perspectives, shaping how investors assess risks and opportunities. From an objective standpoint, investments are analyzed rigorously, considering potential outcomes and calculated payoffs. However, the subjective perspective, influenced by investors' individual preferences and perceptions, also plays a crucial role in decision-making (Virlics, 2013).

Risk is a fundamental aspect of investment decisions, defined as situations where certain events are uncertain (Chavas, 2004), as is almost always the case in construction projects already during the planning phase (Dubois and Gadde, 2002). Situations devoid of risk are acknowledged to be challenging to conceptualize, underscoring the omnipresence of risk in decision-making contexts (Chavas, 2004). Virlics (2013) further highlights that subjective assessments of risk and uncertainty are affected by emotional and psychological factors influencing investors' perceptions. Despite the inherent uncertainty, these subjective factors provide valuable insights into the decision-making process.

Roberts and Henneberry (2007) have outlined a comprehensive five-point model depicting the property investment decision-making process (Figure 1). The model begins with setting a general investment strategy, followed by property search, analysis, and trade-off, consultation with clients or management, and concludes with investment selection. In this research, we have applied the model by Roberts and Henneberry. However, the model is redefined showing that phases 3 and 4 (Analysis and trade-off and Consult clients and

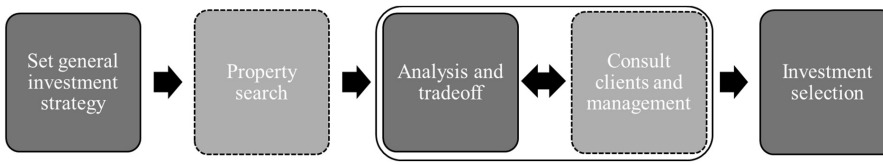

Figure 1: The property investment decision-making process adopted and remodeled following Roberts and Henneberry (2007).

management) are iterative rather that purely chronological. Since this paper focuses on financiers that provide funding for builders and construction sector investors, the Property search phase is not relevant and thus is marked in light gray.

In recent years, sustainability has emerged as a pivotal consideration for real estate investors, alongside traditional factors like location and tenant creditworthiness (Jackson and Orr, 2021). While sustainability has gained prominence, its integration into investment decision-making remains uneven across the industry. Jackson and Orr (2021) argue for the integration of sustainability into investment strategies and policies, noting a cultural shift towards broader environmental, social, and governance (ESG) considerations. In the EU, policymakers have initialized mechanisms for directing financing toward greener options via the Green Deal (2019) program and by fostering sustainable business (and considering e.g. biodiversity-related spending) via EU taxonomy (Fetting, 2020; Nabuurs *et al.*, 2024; Schütze and Stede, 2021). Christensen *et al.* (2022) emphasize the financial implications of sustainability decisions, with companies increasingly aligning ESG policies with expected financial outcomes. Moreover, they highlight the incorporation of cost-benefit analysis in asset-level decision-making among companies guided by ESG principles (Christensen *et al.*, 2022).

Understanding investment decision-making in the construction industry therefore requires a nuanced approach that considers both objective analyses and subjective perceptions of risk, alongside emerging factors such as sustainability and ESG considerations in investment decision-making. In this paper, building on prior literature, we hypothesize that economic considerations may outweigh sustainability aspects in investment decisions for WMC, particularly due to perceived risks and expenses associated with the niche industry sector and limited policy support (Franzini *et al.*, 2018; Gosselin *et al.*, 2017; Hynynen, 2016). Therefore, financiers may perceive WMC projects as riskier and more expensive than traditional concrete and steel buildings, and thus financing terms for the investment may be stricter for wood construction.

Adapting Prospect Theory in the Risk Evaluation of Financiers

Prospect theory is a psychological theory that provides insight into how individuals navigate decision-making in uncertain situations. Proposed by Kahneman and Tversky (1979) and further developed by Tversky and Kahneman (1992), the theory posits that people assess potential outcomes based on perceived gains and losses relative to a reference point, rather than focusing solely on the final outcome in absolute terms. Moreover, it suggests that individuals exhibit risk-averse behavior when confronting gains and risk-seeking behavior when confronting losses. The theory also introduces the framing effect, illustrating how the presentation of information can significantly influence decision-making processes. Prospect theory has been mainly applied by behavioral economists (Barberis, 2013).

Central to prospect theory is the concept of reference-dependent choice behavior (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). According to the theory, individuals evaluate the outcomes of their decisions relative to a specific reference point, often the status quo. They categorize these outcomes as gains or losses and exhibit a tendency to avoid losses more than acquiring equivalent gains. In situations involving risk, individuals' risk-taking behavior is influenced by the framing of outcomes as either losses (risk seeking) or gains (risk averse) (Ossokina and Arentze, 2022). The theory has been tested in several quantitative studies (Barberis, 2013), and e.g., based on results of a large multinational dataset, Ruggeri *et al.* (2020) suggest strong empirical evidence for prospect theory's main hypotheses.

The theory also provides insight into the phenomenon known as the status quo bias in decision-making (Kahneman *et al.*, 1991). This bias reflects individuals' inclinations to maintain the current state rather than opt for change. Samuelson and Zeckhauser (1988) argue that individuals perceive the losses associated with switching to a new alternative as larger than the gains, making the status quo appear more appealing. Experimental studies consistently demonstrate this bias through findings such as the endowment effect, where individuals exhibit a higher willingness-to-accept value for an owned item compared with their willingness-to-pay for the same item (Masiero and Rose, 2013).

Particularly in the context of housing decisions, Kahneman (2011) suggests that individuals use their existing location as a reference point when evaluating alternative choices. Morrison and Clark (2016) apply prospect theory to housing decisions, identifying factors influencing households' migration choices. They propose that loss aversion may prolong the duration that households stay at their current location due to the perceived risks associated with moving. Subsequent studies by Clark and Lisowski (2017, 2019) support this hypothesis, revealing a significant effect of households' risk attitudes on migration decisions, consistent with loss aversion and the endowment effect (Ossokina and Arentze, 2022). Furthermore, a correlation with high housing

prices and sales volumes emerging in the housing markets have been explained by sellers' aversion of losses, causing a mismatch between buyers' offers and sellers' reservation prices during peaks and busts of economic cycles (Genesove and Mayer, 2001). Overall, prospect theory provides valuable insights into decision-making processes under uncertainty, shedding light on how individuals evaluate and respond to gains, losses, and risk in various contexts, including housing decisions. In this study, the financiers' perspectives to decision-making in WMC construction are viewed through prospect theory lenses, providing new empirical knowledge into the role of risk assessment in the financial decisions.

Developing an Analytical Framework for the Study

Our study specifically investigates the perceived risks for WMC construction and financiers' views of risk-aversion strategies. To study the funding of the decision-making process, relevant criteria, and risk perception in the WMC context, an analytical framework (in Figure 2) was developed. The framework applies concepts of prospect theory and the property investment decision-making process presented in Figure 1.

First, emphasis was placed on understanding the investment criteria by distinguishing between organization-specific factors (factors related to the company seeking finance) and project-specific factors, as focus on individual

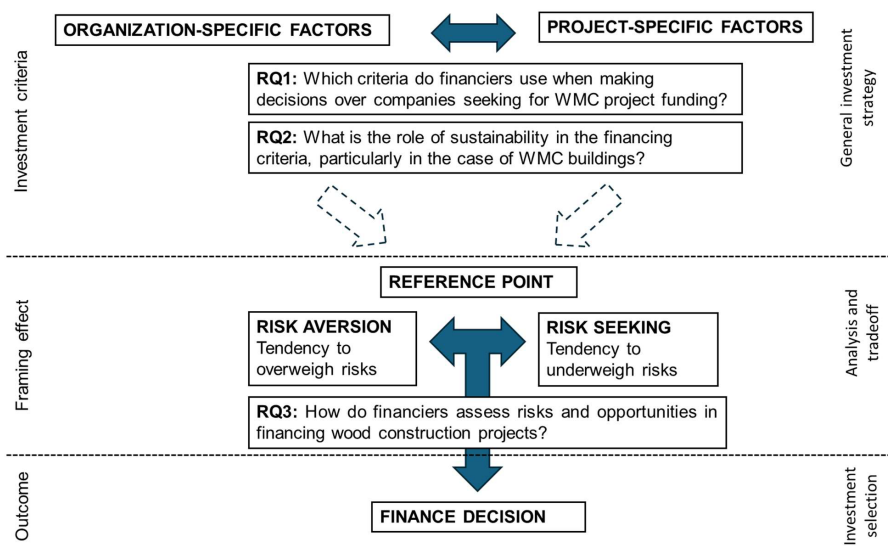

Figure 2: Analytical framework for investment decision-making in the WMC context.

projects is a central feature of construction (Dubois and Gadde, 2002). The study particularly explores which monetary and non-monetary criteria financiers use when making decisions over companies applying for WMC project funding. These dimensions are central to addressing which criteria financiers use when making decisions over companies seeking WMC project funding (RQ1).

Second, specific emphasis is placed on the role of sustainability and green financing during the process. According to previous literature (Christensen *et al.*, 2022; Jackson and Orr, 2021), sustainability is an emerging decision-making criterion and a key driver for WMC. Furthermore, sustainability may function either as a mitigating factor that reduces the perceived risk or as a value-adding criterion aligned with ESG goals of financing companies or shifting financiers' investment preferences. We therefore examine how financiers evaluate sustainability among other investment decision-making criteria within the WMC context (RQ2).

Third, these factors contribute to the reference point — a cognitive benchmark used by financiers to assess a project's relative risks and opportunities. The study applies the concept of reference-dependent choice behavior (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992) to form the basis for studying how financiers assess risks and opportunities when financing wood construction projects (RQ3). Depending on how a wood construction project is positioned relative to the reference point, financiers may demonstrate either risk-averse or risk-seeking tendencies (Ossokina and Arentze, 2022). Applying these principles, risk aversion is characterized by a tendency to overweight perceived risks, potentially leading to the rejection of a construction project. Conversely, risk-seeking behavior involves a tendency to underweight such risks, favoring opportunities with long-term potential for a construction project, even in the face of uncertainty. Our goal of understanding how financiers perceive risks or opportunities for WMC stems from the interpretation that individuals are more likely to take higher risks when opportunities for gains are perceived as salient (Barberis, 2013; Ruggeri *et al.*, 2020).

Finally, the outcome of these interconnected elements is the finance decision itself. The analytical framework posits that the decision to fund a WMC project is shaped by an interplay of objective evaluation criteria, subjective risk perceptions, and the influence of construction project sustainability.

3 Materials and Methods

Design of Interview Data Collection

This study employs qualitative interview data and the semi-structured interview method, which is a dynamic interview approach, where questions are

categorized into themes, allowing interviewees the flexibility to respond openly. Following the dynamic approach to the interview process, unlike structured interviews, the questions are not posed in the same order for everyone, and specific questions may not be predetermined. This method, as described by Hirsjärvi and Hurme (2004), fosters a conversational atmosphere, encouraging interviewees to share their perspectives freely. Confidentiality is maintained, and interviewees' identities remain undisclosed unless explicitly requested otherwise, aligning with ethical considerations of agreement, reliability, and privacy (Hirsjärvi and Hurme, 2004). The interview questions were developed based on existing literature and a comprehensive understanding of the subject matter and underwent multiple revisions before reaching their final form.

The interview data collection design follows the analytical framework of the study (as presented in Figure 2). The first two interview themes covered the aspects of monetary and non-monetary criteria in financing decisions, and both were also designed to reveal understanding of organization- and project-specific factors. A third theme covered questions related to wood construction, applying concepts of prospect theory (framing of the decisions and perception of risks). Furthermore, a fourth theme was included to understand the role of sustainability in financing decisions, also covering sub-themes for revealing potential monetary and non-monetary aspects. The questions were organized under five thematic categories (finance models, decision-making criteria, wood as a building material, and sustainability in construction and regulation) aligned with the research objective (Appendix A: Interview Questions).

Data collection involved interviews with key individuals employed by organizations providing funding for residential construction project investments, such as commercial banks, private capital investors, public housing financiers, and pension insurance companies. The identified organizations were well-recognized contributors to funding for construction projects in general in Finland, including residential apartment building investments, and many of these had several office locations across the country. While representing their organization on the one hand, the focus of the interviews was on each individuals' subjective opinions, as their individual preferences and perceptions are seen to play a crucial role in decision-making (Virlics, 2013). The interviewed persons were in various cities across Finland and participated in remote interviews facilitated through the Microsoft Teams platform.

To identify potential interviewees, first a list was compiled of financial organizations that are active in financing residential housing and wood construction projects, with the target of having a comprehensive coverage of the potential commercial organizations active in Finland and a good coverage of public organizations. A combination of purposeful sampling and snowball samplings best describes our sampling strategy (Creswell and Poth, 2016). Our initial list included both known entities and those identified through online

research, e.g. by including a list of credit institutions operating in Finland, provided by the Bank of Finland (2023).

In particular, the search was focused on financial institutions that had promoted their role as financing housing construction projects or funding wood construction projects. The search was based on media coverage, organizational websites, or other secondary data sources, which also provided us with the initial contact information for potential respondents. Contact was then established through email, introducing the research topic and soliciting participation, with proposed time slots for the interviews or suggestions for more suitable respondents within the organizations. Individuals were identified through company websites, articles, and referrals from other interviewees, with specific focus on those experts who are making the financial decisions in their organization and have experience in housing or wood construction project financing. Not all contacted individuals responded and some declined participation, citing that they were not the appropriate persons or suggested another person to participate in the study.

The initial target number of interviewees was 15, with a range of 10–15, supported by Hirsjärvi and Hurme (2004) in qualitative research. However, Tuomi and Sarajärvi (2018) propose a more focused approach, suggesting that 6–8 interviews can be sufficient. Anyhow, employing the saturation method until no new information emerges is important.

Empirical Data and Analysis

The actual empirical data consist of 10 interviews with 12 respondents in total. Notably, a discernible pattern emerged around the sixth or seventh interview, as respondents consistently shared similar perspectives on financing multistory apartment buildings and the use of wood as a building material. This observation indicated a saturation point in the data, revealing a substantial level of consistency in participant responses (see e.g. Saunders *et al.*, 2018; Tuomi and Sarajärvi, 2018). Recognizing this trend, data collection was concluded after the tenth interview. This decision was made with the assurance that the gathered information encapsulated a diverse range of companies and organizations, contributing to dataset comprehensiveness.

The interviews were conducted during August–October 2022 through Microsoft Teams online meeting software. Each session was recorded and subsequently forwarded to an external service provider for accurate transcription. The interview durations ranged from 28 to 58 minutes (Table 1), with one exception lasting only 20 minutes due to the respondent feeling that certain questions did not apply to their organization (private non-profit investor). All interviews were conducted in Finnish, and the responses and quotes have been translated from Finnish to English for analysis. Respondents encompassed a diverse range of professionals from both the public and private sectors. Their

Table 1: The interviewee's professional position in their organization and interview durations.

Interview	Organization	Role of the respondent	Length (min)
1.	Public financier 1	Finance Specialist	45
2.	Private investor	Director	51
3.	Bank 1	Chief Customer Officer	31
4a.	Public financier 2	Director	58
4b.	Public financier 2	Architect	58
5.	Bank 2	Chief Customer Officer	56
6.	Private investor (non-profit)	Finance Specialist	20
7.	Pension insurance company 1	Portfolio Manager	29
8.	Bank 3	Director	37
9.	Pension insurance company 2	Director	32
10a.	Bank 1	Chief Customer Officer(a)	28
10b.	Bank 1	Chief Customer Officer(b)	28

organizations included commercial banks, public organizations, investment firms, pension insurance companies, and a student housing organization.

The data analysis process commenced with the transcription of the original recorded interviews by an external service provider. Following this, a content analysis method was employed, as outlined by Tuomi and Sarajärvi (2018). Initially, the researchers familiarized themselves with the data using notes taken during the interviews. Subsequently, a decision was made regarding which segments of the data required deeper analysis, while others were excluded from the final analysis, in accordance with the guidelines by Hyvärinen *et al.* (2010).

Next, the data underwent coding to identify and categorize thematic elements. Coding involved highlighting words or terms present in the material and grouping them based on subject matter. Following interview themes and research objectives, five main categories were formed: 1) investment criteria, 2) wood construction, 3) framing effect, 4) risks and opportunities, and 5) sustainability and EU taxonomy. The analysis phase incorporated results derived from the coded material, with analytical observations and conclusions kept distinct, following the methodology suggested by Hyvärinen *et al.* (2010). Atlas.ti software was utilized for coding themes identified in the interviews.

4 Results

Evaluation of Organization-Specific Characteristics

Generally, trustworthiness (regarding an organization's financial position) and professional skills of construction companies play a crucial role for respondents'

when they assess and make decisions to finance a construction project (Interview 3). Construction companies to be funded are rated by the funding organizations based on their internal rating methods, which vary between the organizations. However, specific rating criteria remain internal for the respondents, limiting detailed disclosure. Based on the financing organization's internal rating criteria, the risk status and financial trustworthiness of the organization or actor to be funded vary e.g. due to the size and previous experience in similar actual construction projects. Larger construction companies are generally seen to exhibit greater ability to manage costs and projects compared with smaller companies with fewer references (Interview 3).

Additionally, commercial banks also evaluate construction companies applying for investment funding for specific projects based on the company's project portfolio, i.e., ongoing projects and the status of unsold apartments (Interview 8). Notably, one respondent in interview 5 highlights separate evaluations of the construction phase and housing occupancy phase (especially in the case of rental property developers), emphasizing the market situation, management capability, financial reporting, indebtedness, and profitability of the organization as critical factors in both phases.

Financing criteria for public sector organization projects diverge from those for private construction companies with market-based approaches. Public sector construction actors often enjoy nearly zero-risk status and consequently also enjoy easier terms and lower financing costs for their projects. Nonetheless, financiers maintain rigorous project analysis and risk-control systems to ensure financial sustainability (Interview 1). One respondent (Interview 3) highlights that both the financial performance and building knowhow of the organization to be funded are evaluated first, before the planned costs of the project, to ensure that the construction company has the capabilities to be successful with the project (Interview 3). In case of a rental housing project, the final decisive factor for funding is whether the rents are planned to be kept at the market-based rent level.

Evaluation of Project-Specific Characteristics

According to respondents, project profitability is a crucial criterion. It is evaluated based on certain pre-determined assumptions, and both short- and long-term risks are considered. These can relate to macro-development of the building location, the selected construction technique, or the construction costs, as noted in Interview 2. The financial viability of the construction company and project are assessed by examining the return on equity and the impact of specific financing arrangements or changes in project yields to these return on equity levels (Interview 7). Financiers evaluate construction projects as a whole, prioritizing a construction company's track record, competence, and financial performance. A respondent from the banking sector further

highlights the comprehensive examination of a project, including '*type of the building, its location, and the quality standards'* (Interview 10b).

Location emerges as a paramount criterion, highlighted by nine out of ten interviews (Interviews 2–10), as shown in Table 2. While one respondent in Interview 1 indicates that location importance is mitigated by early project design decisions (highlighting their specific role as a public financier), most address the significance of both macro- and micro-location aspects within Finland. Factors such as transportation access, road infrastructure, shops, and recreational activities (as mentioned in Interview 6), together with future municipal development and micro-location (Interviews 2 & 8) are seen as critical. Moreover, the construction company's own location is also considered, not merely the location of the building site. Generally, larger, national or foreign-owned firms are viewed as less risky compared with local ones (Interview 3). As one respondent summarizes: *'it is very important to notice that when asking for loans, financiers are interested in location, location, location'* (Interview 6).

Existing demonstrated demand for apartments is an important criterion for funding terms. Thus, smooth pre-selling of apartments, with at least 60% reserved, is crucial for a bank to consider project funding for a construction company (Interviews 3 & 8). As one respondent highlights: *'Of course, besides the construction company, the important aspect is the location of the project, and for that usually first there is pre-marketing of apartments; we examine the salability of the project building, which will affect [decision-making]*' (Interview 10b).

According to respondents, preferences of future residents are not usually examined in the process of assessing funding terms for a construction company and project. Instead, the main contractor and the possible real estate company typically address these during the designing phase of the project (Interview 10a). On the other hand, in a case where a housing cooperative is the future owner of a building, the future residents' preferences are valuated differently compared with situations where a building is owned by an investor. One respondent in Interview 8 explains that '*in the case of housing cooperatives, the liabilities are longer for the banks than [they are with] construction companies, and therefore greater emphasis is placed on long-term demand and the financial feasibility of the project'*. In one respondent's organization, accessibility and meeting the needs of diverse populations are additional considerations for every real estate investment made (Interview 9).

According to respondents, public housing actors (organizations with public ownership such as municipalities) are perceived to prioritize societal impacts in their construction endeavors more than private actors do. Public actors focus on rental buildings and municipal infrastructure such as schools, hospitals, and elderly homes. For them, societal location is important and community structure should be versatile (Interview 4a).

Regarding the life cycle of the construction project, the construction phase is seen as the riskiest time for the financiers because project value is a small guarantee for banks. As one respondent explains: '*in the eyes of a banker, this is the time when something might go wrong, . . . mostly in the first two years'* (Interview 5). If a construction company were to encounter financial difficulties during this phase, or even face insolvency, the unfinished building may not hold sufficient value to cover any outstanding debts (Interview 10b). After the actual construction phase, the project loan provided for the construction company is usually converted into a housing cooperative loan and, further, into loans of the dwelling owners, which mitigates this risk and reduces risk exposure for financiers. However, risks may persist as long as any unsold apartments remain, particularly as long as all or the majority of apartments remain unsold (Interview 10b). Moreover, elevated financing expenses through potentially higher construction costs or project delays and the possibility of insufficient profitability relative to financing costs are additional risk factors (Interview 7).

Wooden multistory residential buildings are increasingly viewed as ecological and sustainable, aligning with the growing emphasis on these themes in financing markets. One respondent highlights that such buildings also contribute to diversifying the building stock (Interview 10a). According to the respondents, there is growing interest among financiers in funding more sustainable and green construction projects, which could enhance the appeal of WMC (Interview 5).

Summary: Monetary and Non-Monetary Criteria Impacting Decisions Regarding WMC Project Financing

Findings related to the utilization of monetary and non-monetary criteria in investment funding decisions for WMC projects in the respondents' organizations are summarized in Table 2. As for monetary criteria, financiers base their decision-making mostly on a two-fold evaluation: assessment of the financial profitability of the project and the financial position and history of the construction company that applies for funding.

The evaluation of financial position and competence of a construction company includes risk assessments related to the investment case: individuals preferring options that they perceive as offering a higher likelihood of positive monetary returns lead to perceptions of increased risk levels connected, e.g., to less-known in contrast to well-known technology or to financially weaker firms over those that are financially well off. Risk management, such as cash flow forecasting, is applied to mitigate potential losses and maintain a sense of control over financial outcomes. Overall, our results provide insights on financiers prioritizing projects that offer a certain rate of return or include risk–guarantee-type characteristics. These include a potentially perceived zero-risk

Table 2: Financiers' decision-making criteria for funding WMC projects (organizations investing in residential construction projects).

MONETARY CRITERIA	NON-MONETARY CRITERIA
Organization-specific characteristics: • **Company credibility:** financial state, credit ratings, project portfolio (3,4,5,7,8,10): • **Organization type:** public/private, large/small (1,3 4): Project-specific characteristics: • **Project profitability:** construction costs, cash flow, expected returns (1,2,4,5,7,8,9): • **Lifetime costs:** operating costs, rent level, maintenance (4,3,6): • **Pre-selling rates:** reservation and sales as indicators of project viability (2,8): • **Subsidies:** potential public support (6)	• **Location and municipal context:** area attractiveness, accessibility and local municipal decisions (All: 1–10) • **Building life cycle:** understanding long-term performance and neighborhood (2,3,6,8,9,10): • **Market demand:** consumer interest, pre-marketing insights (3,4,10): • **Sustainability:** carbon neutrality, energy efficiency, green financing (6,8,9): • **Strategic design:** site planning, architectural design and attractiveness (4,9,10): • **Regulatory standards:** accessibility, safety, legal standards (4,9)

status of publicly owned organizations or competitive profit expectation due to the perceived high opportunity of gains, as suggested by prospect theory.

Regarding the non-monetary funding criteria for a construction project investment, the location of the planned residential building is the most important investment funding criteria besides monetary factors. Decisions over municipality (macro-location) and micro-location (location within the municipality) for housing projects, and the general and location-related prospects for future market demand of the apartments, may be perceived as opportunities for gains or risks for losses; thus, financiers prioritize locations and projects that offer potential for high profitability and security of profitability. Occupant needs, such as accessibility, health safety, and architectural considerations, may be viewed as mitigating potential losses by ensuring regulatory compliance and reducing liability risks or increasing the potential gains through added value to future homeowners.

Role of Sustainability Among Financing Criteria

Respondents emphasize the importance of sustainability assessment when considering future climate development and related risks. Sustainability is considered important by most of the interviewees (Interviews 1–9), although one respondent's organization did not include it directly in their financing

criteria (Interview 10a). It is believed that construction project designs that consider sustainability aspects are inherently less risky (Interview 1). With EU taxonomy criteria related to the finance sector, there is an expectation that economic and environmental sustainability will be increasingly integrated and will provide notable guidance on financing towards more sustainable objectives (Interviews 8 & 9). Key themes in green financing principles include circular economy questions, energy efficiency, material efficiency, material safety, adherence to land use plans, and circularity (Interviews 1 & 8).

***'Circular Economy Will Be a Big Deal'* (Interview 8)**

Respondents highlighted the role of the finance sector in driving sustainability forward (Interview 3). As one respondent (Interview 8) explains: *'This [sustainability] will be a good thing, it is not very difficult to be on this side, [it would be] harder to be against it'.* Most of the organizations differentiate between general financing and green financing projects, with green financing-eligible projects characterized by goals such as decreasing emissions or achieving carbon neutrality (Interviews 1,4–9). EU banking regulations are expected to further increase the focus on environmental efficiency and carbon footprint assessment in the financing terms for organizations' investments (Interview 1). As one respondent explains the logic: *'the real estate sector and construction have a significant impact on emissions and, in that sense, we, along with our biggest actors, actively consider how they could decrease their carbon emissions. -. . . - the biggest [companies] first because their impact is the most effective and the fastest way to influence.'* (Interview 9)

In some cases, sustainable practices, such as wooden-based projects, may justify the higher costs of a construction project issued by the funding organization (even 10% higher) if proven beneficial in the long term (Interview 4b). These monetary criteria are said to be relevant across various types of construction projects, extending beyond multistory apartment buildings (Interview 4b). However, this is still not nearly always included in the actual criteria based on which funding (and funding terms) are decided.

In addition to climate/environmental impacts, other dimensions of sustainability are seldom relevant. One respondent in Interview 7 noted that, while non-monetary factors generally have minimal significance on financing decisions, these do become more relevant in real estate projects applying for green financing loans. As one respondent in Interview 1 defines: '*green financing is financing, which an organization aims to channel into projects that give or induce clearly positive environmental impacts*'. Some respondents further suggest that projects meeting green financing criteria may benefit from lower loan expenses or other similar advantages, although standardized terms and conditions for green loans are currently lacking in the banking sector (Interviews 4–7). According to one respondent, when given the option, actors

providing investment financing are likely to prioritize projects meeting green financing criteria over projects that only reaching the terms for a general loan (Interview 9). Another respondent's organization specifically seeks projects that align with carbon neutrality objectives, which line up with a growing trend towards environmentally conscious investing (Interview 8).

Building materials are generally not considered a significant criterion when assessing conditions for financing a construction project, with over half of the respondents indicating that this does not matter, at least not directly (Interviews 1,3,5–10). However, some suggest that it may have indirect effects, influencing construction company design choices (Interviews 1,3,5–6). Respondents investing in real estate express a desire for materials prioritizing health and safety together with market competitiveness, rather than being dictated by government regulations (Interviews 9 & 4b).

Energy efficiency or energy solutions of the buildings to be constructed emerge as noteworthy criteria for three respondents (Interviews 1,8 & 9). However, one respondent further highlights that building permits already determine the phase that needs to be met in energy efficiency (Interview 8). Precise building permit terms, based on government regulations, underscore the importance of high-quality design and energy efficiency for construction projects to even pass the criteria for obtaining a building permit (Interviews 8 & 9).

Efforts to promote sustainability extend to construction practices, with suggestions to increase the lifespan of buildings to at least 100 years, and to considerations regarding the durability of wood compared with concrete under changing weather conditions (Interviews 2 & 4b). Overall, the real estate sector has a shared goal to pursue cleaner and more environmentally friendly structures, with wood often seen as a suitable and sustainable building material (Interview 2).

Reference Point Approach in the Case of Assessing Wood Construction Projects

Regarding the specific risks and opportunities of wood construction, the respondents seem to evaluate key differences that influence their financial decision-making for wood construction, especially when compared with concrete construction. One respondent highlights a cautious approach regarding the financing of wood construction projects, particularly mentioning a case where a construction company had failed to introduce new construction technology from Sweden to Finland (Interview 5). The unfamiliarity of the construction technology led to more conservative terms in the financing, as the risks associated with the new technology were less understood. Nevertheless, the respondent highlights positive experiences with wood construction: *'we were more cautious, but in general, the experiences of financing wooden*

apartment buildings have been positive and very similar to what we see with traditional concrete apartment buildings' (Interview 5). Another respondent shares this view by emphasizing the limited market for wood construction in Finland, which makes it a less competitive alternative to concrete buildings, yet assures that: *'certainly, investments are made with the same criteria and under the same rules'* (Interview 9).

The potential for long-term maintenance costs and building material durability are other topics where the respondents compare building materials. One respondent gives an example: *'sometimes people like the idea of a house [turning] 'gray', that's somewhat of a fashion, but is it... It might put the house in a situation where more renovation is needed compared with a similar concrete house.'* (Interview 2). This potential for higher long-term maintenance costs may lead wood construction to be seen as less appealing from a financial perspective, thus increasing the risk profile. Overall, the quotations highlight references to concrete construction as "traditional" or "normal" construction, whereas wood construction is referred to as "alternative" construction, thus suggesting that wood construction is approached with more caution (than concrete construction projects are) due to concerns regarding the novelty of the technology, maintenance issues regarding the usage time of the building, and the lack of market maturity. Concrete construction is perceived as a well-established and thus safer construction method.

Perceived Risks for Wood Construction Projects

The perceived risks for wood construction lie primarily in issues related to the quality of construction and the competence of the workforce rather than in material choices (Interview 3). Not all construction companies possess sufficient skills or resources to execute wood construction projects efficiently, which potentially impacts project success (Interview 8). Furthermore, considerations extend beyond technical capabilities, including evolving consumer preferences and political dynamics related to wood construction development over time. As one respondent highlights: '*that's the hardest thing, that markets and customers' opinions change faster than the capability of guiding construction'* (Interview 8).

The respondents noted that the lifespan of wooden multistory buildings remains uncertain due to their novelty and limited references. This uncertainty poses additional risks for financiers, as the durability and maintenance requirements of such buildings are not well-established (Interviews 2 & 5). Concerns were raised regarding health and safety considerations, with one respondent emphasizing the importance of properly considering these factors. Ensuring the use of appropriate materials and constructing buildings and apartments of the correct size in suitable locations was highlighted as crucial for maintaining safety and quality standards. As one respondent states: '*in my opinion, every*

material should be selected for the right, suitable place, and we should gain long-term experiences using those solutions' (Interview 9).

The price and availability of wood materials fluctuates following the business cycles of the markets, posing challenges for the construction industry (Interviews 5 & 8). Additionally, the decreasing demand for multistory apartment buildings adds complexity for invested parties. Not only wood construction but also other construction costs have been increasing, placing pressure on the sector (Interview 5). Other risks associated with building materials, including wood, are extreme weather events such as droughts and floods. These risks are considered during land use planning, already before building plans and financing applications are received by the financiers. One respondent also highlights the uncertainty regarding perception of what is sustainable wood use in Finland and how this matter will develop in the future (Interview 1). Concerns were also raised regarding the compatibility of wood buildings with existing land use plans primarily designed for concrete structures (Interview 9). Additionally, the implementation of EU taxonomy has introduced reporting responsibilities, prompting questions concerning correct reporting procedures (Interview 1).

Opportunities for Wood Construction Projects

Respondents emphasized the importance of construction companies gaining more experience of WMC projects and thus receiving more good references to increase the credibility of the wood construction industry (Interview 1). Ensuring long-term financial credibility requires construction companies to address potential issues related to WMC technology, such as technical performance, fire safety, and moisture management (Interviews 7 & 9). One respondent considered that: '*occasionally, the construction industry's conservative nature might have led to biased and polarized discussions regarding various building materials'* (Interview 4a). Instead of choosing just one material for the whole building, using multiple materials could be encouraged (Interview 9).

Wood material availability in Finland was perceived as a significant opportunity for the construction industry (Interviews 5 & 10). The Finnish expertise and tradition in wood construction was considered strong, particularly in wooden family houses and low-rise buildings. The considerable potential to expand the use of wood in multistory buildings was also highlighted, especially in response to challenges such as climate change and potential crises like refugee resettlement. It was seen as beneficial that the wood material is located near the processing industry and that there are opportunities to export the construction technique and knowledge to other countries. Wood is widely regarded as a green and ecological material, aligning with sustainability goals (Interviews 5 & 10a). Moreover, the scarcity of appropriate sand, which is a

key component in concrete production, highlights the importance of exploring compensatory building materials and methods, such as wood (Interview 5).

Respondents perceived that the attractiveness of wood construction could be increased by developing cheaper raw materials and lowering construction costs (Interviews 3,5 & 10a). According to one respondent, this can be achieved by utilizing elements instead of sawn timber. Currently, Finland has a limited number of CLT element producers, rendering the import of these elements necessary. However, increasing domestic CLT element production is likely as demand grows (Interview 1). Several respondents highlighted advancements in CLT and laminated veneer lumber (LVL) production over the past two decades and suggested that further improvements could yield even more efficient use of wood as a building material (Interview 1). Adaptation to locational needs was highlighted as well: the buildings should be suitable for the particular location in which they are built, and good locations generally attract better demand and increased (apartment and rental) prices (Interviews 3 & 4b). One respondent highlights cost-competitiveness as a factor to increase interest towards WMC development: '*if construction would be significantly cheaper, then apartment prices would be lower. At least that would make them [wooden multistory apartments] more attractive to homebuyers and investors.*' (Interview 10a)

Wood buildings are also seen to offer advantages in terms of module production, transportation costs, and environmental impact. Modules can be prefabricated off-site, reducing construction time and transportation costs due to the lighter weight of wood. Additionally, shorter construction times minimize disruption to the surrounding environment. As one respondent explains the market potential: '*we have many benefits (from wood) that are promising, and some are seen there and some [are seen] here. But when they are starting to be seen all over the places at once, then we have a substantial change on our hands.*' (Interview 2).

Wood is considered to have a pleasant echo and esthetic appeal, yet the importance of selecting the correct materials for the appropriate locations is highlighted (Interview 9). One respondent emphasizes the general positive sentiment for WMC buildings by both consumers and land use planners (Interview 8). Regarding the role of political guidance, one respondent called for political consistency, granting a peaceful investment environment and opportunity to invest towards production. According to the respondent, wood construction, new construction methods, and their benefits should be promoted, yet *'silly political mistakes'* should be avoided and the markets should be left without any public involvement (Interview 2). As sustainability becomes increasingly important, there is optimism that wood construction will play a larger role in the future (Interview 7).

Green financing options may offer better terms for projects using wood as the main building material, incentivizing construction companies to consider

wood over concrete. These financial incentives, such as lower interest rate margins, can make wood-based projects more cost-effective for applicants (Interviews 5, 7 & 8). Additionally, the sustainability benefits of wood buildings, such as a smaller carbon footprint and environmental friendliness, contribute to their attractiveness compared with concrete structures (Interview 10b).

Moreover, the respondents considered that there is potential for wood buildings (and apartments in these buildings) to retain or even increase their value on the resale market. This was seen as a positive opportunity, making the WMC projects more attractive to investors (Interview 7). Reputation plays a critical role in promoting the attractiveness of wooden multistory apartment buildings, with respondents highlighting the importance of a positive perception of wood buildings in the construction industry (Interviews 6 & 7). Table 3 summarizes the perceived risks for wood construction from the perspective

Table 3: Summary of perceived risks and opportunities for funding WMC projects.

Perceived risks for WMC	**Opportunities/risk aversion strategies for WMC**	**Interviewed experts**
Higher construction costs	Efficiencies through element manufacturing and lower transportation costs. Addressing benefits of wood construction.	1,2,3,5,6,10
Material availability (wood)	Considering price fluctuations and material availability.	1,5,8
Competence of construction companies	Larger companies seen as more reliable, references for wood construction.	3,8,10
Durability and maintenance risks	Technical performance, fire safety, and moisture issues need to be addressed to mitigate risks.	2,5,7
General economic conditions	Maintaining reputation and attractiveness of WMC buildings.	5,6,7
Lack of market demand	Pre-marketing and pre-selling of apartments to secure financing.	8,10
Climate risks, extreme weather events	Sustainable wood use, more consideration in the planning phase of WMC buildings needed.	1,9
Project completion risks	Pre-evaluation of the construction companies; Convert into housing cooperative loans after project end.	10
Higher financing expenses	Green financing incentives for lower margins.	7
Regulatory requirements	Ensuring accurate and consistent reporting of sustainability metrics for EU taxonomy requirements.	1

of construction project funding organizations (financiers) and links them to risk-aversion or opportunity-seeking strategies for wood construction.

5 Discussion

The purpose of our study was to explore financiers' perceptions of wooden multistory residential buildings as investment projects. A specific emphasis was to examine which criteria financiers use when making decisions over such projects, what is the role of sustainability in such assessments, and how they assess risks and opportunities for WMC projects.

A theory-based analytical framework (Figure 2) guided the empirical analysis of the study, which was conducted through thematic interviews with financing specialists. While the interviewees represented various organizations in the finance sector, it's important to note that their comments and opinions were personal and not reflective of their respective organizations. The data did not cover all finance sector organizations (and experts in these) in Finland. However, for the chosen research method it was possible to engage a sufficient number and a good variety of the relevant construction investment funding organizations in Finland. A summary of the research results is presented below (Figure 3), applying the analytical framework of the study (as presented in Figure 2).

The revised framework (Figure 3) builds upon the initial analytical model first, by integrating empirical findings of organization-specific and project-specific factors of financiers' investment criteria. Our empirical findings support the approach where financiers distinguish their finance criteria based on organization-specific (e.g. risk status and financial state of the company) and project-specific (e.g. specific location and longer-term attractiveness of the building) risks. Second, the reference point in the decision-making is grounded in considerations over market price, location of the building project, and comparing wood construction to traditional concrete buildings. Third, the perceived risks (e.g. material availability, new technology) and opportunities (e.g. green financing incentives, sustainability benefits) for WMC have been incorporated, providing richer understanding of financiers' decision-making processes. Finally, the revised framework expands the finance decision to include possible changes in the terms of financing as an outcome of assessing perceived risks and opportunities for WMC.

A key observation of our results is the importance of monetary criteria over non-monetary criteria in guiding the selection of financing objects by the financing organizations and, accordingly, the terms of funding. The existing literature also highlights the centrality of the monetary criteria, such as an organization's profitability and overall financial position and the investment case-related figures (Brealey *et al.*, 2020; Dahlquist and Knight, 2022; Herciu

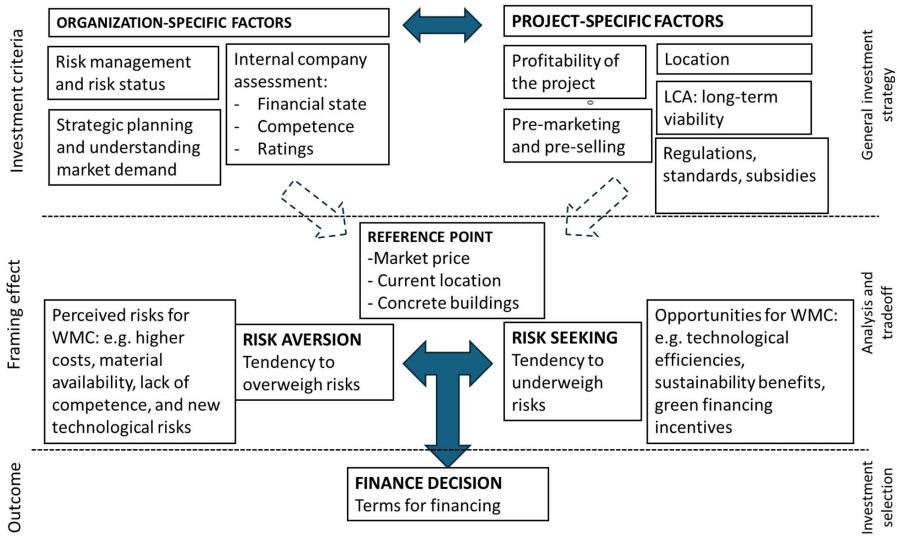

Figure 3: Summary of financiers' decision-making, investment criteria, and perception-based risk assessment in the case of residential wooden multistory construction (WMC).

and Ogrean, 2017). In this study, financial indicators form integral components of the funding, providing organizations' internal rating systems, which are utilized, for instance, in evaluating the financial robustness of construction companies. While specifics regarding these figures were not openly disclosed during the interviews due to confidentiality concerns, it can be inferred that ratings vary across organizations, as indicated by the financial expert respondents of our study.

Additionally, previous literature indicates the importance of location as a determinant attribute in property selection (e.g. Jussila *et al.*, 2024; Kauko, 2003). This resonates with the findings of our research that underline location being a key factor also for financing organizations assessing the appeal of a construction project investment for funding. Respondents of this study also underscored other monetary and non-monetary criteria, including the financial state of the construction company, sustainability considerations, apartment pre-marketing strategies, and building maintenance costs. Notably, while building material as such was not perceived as a significant criterion (it is typically determined by the construction company during the building design phase), it nevertheless forms part of the broader risk analysis framework rather than being viewed as a standalone factor.

In addition to financial considerations, local-, national-, and EU-level policies and regulations play a pivotal role in guiding the selection of financing

objects in the construction industry. These regulatory frameworks not only ensure adherence to sound financing principles but also promote sustainable practices and the selection of environmentally friendly financing portfolios (Schütze and Stede, 2021). Respondents also highlighted the influence of municipal land use plans on construction companies' decisions and project plans, emphasizing the interconnectedness between regulatory policies and industry practices. Banking regulations were identified as key determinants shaping financing decisions, alongside organizations' internal investment and financing strategies. Roberts and Henneberry's research (2007) similarly underscores the significance of the investment strategy and decision-making phases, providing valuable insights into the financial decision-making processes within the construction sector. EU taxonomy emerged as a critical guiding framework, particularly concerning sustainability considerations. While not yet a primary driver for all interviewees, its classification of sustainable actions is expected to exert increasing influence on construction companies and financiers' project selections in the future. A common, standardized view on the green financing criteria was found to be missing in the current practices of the financiers.

Sustainability was recognized as an important and growing aspect, yet its integration into the financial criteria varied, with some experts considering it secondary to financial metrics while others aligned it with organizational sustainability goals and regulatory requirements like EU taxonomy. Generally, interviewees perceived wood positively for WMC buildings. The importance of market-led material selection and life cycle calculations was emphasized over regulatory mandates, advocating for a balance between market dynamics and sustainability goals. Meanwhile, the lack of previous financing experience in this domain was notable, attributed to the limited number of proposed projects rather than unwillingness. A lack of references was identified as the main concern against WMC, increasing perceived risks due to uncertainties concerning future costs and durability, reflecting higher risks in the decision-making. Experts further expressed a need for greater understanding of the long-term usage and cost implications of WMC buildings.

The risks and opportunities identified in this study resonate well with the principles of prospect theory (Kahneman and Tversky, 1979; Ossokina and Arentze, 2022). Prospect theory posits that individuals evaluate potential outcomes based on perceived gains and losses relative to a reference point and are often risk averse when facing gains and risk seeking when facing losses (Clark and Lisowski, 2017). In line with this theory, the risks identified by respondents, such as concerns over wood prices and life cycle costs, reflect their aversion to potential losses associated with these factors. The stability of the financial position of construction companies emerged as a significant risk factor for funding, highlighting financiers' apprehension towards potential losses stemming from investing in projects with partners perceived as

financially unstable actors. This highlights the importance of risk analysis in the investment decisions, as also noted by Virlics (2013), and aligns with the notion that individuals are more sensitive to potential losses than gains and are inclined to avoid investments perceived as risky. Moreover, a distinction between public and private actors in financiers' risk perception was discussed. Public actors, enjoying a risk status akin to that of the Finnish Government, are perceived as safer investments, allowing for better financing terms and are considered more attractive for funding compared with private actors.

Conversely, the opportunities associated with wood, such as its environmentally friendly and sustainable properties, can be viewed as potential gains through the lens of prospect theory. Respondents' positive perceptions of wood as a locally sourced material with lower carbon dioxide emissions compared with concrete and steel-based buildings indicate their inclination towards options perceived as advantageous or rewarding. The positive features of wood construction were widely in line with the benefits of wood construction mentioned in earlier literature (e.g. Aguilar *et al.*, 2023; Gosselin *et al.*, 2017; Jussila *et al.*, 2022; Riala and Ilola, 2014) and indicated experts framing their decision-making for wood construction against concrete buildings. Regardless of the framing effect, respondents perceived that building materials have little or no direct effect on their financing decisions. Overall, the risks and opportunities identified in the interviews provide valuable insights into how prospect theory influences decision-making in the financing of WMC buildings, highlighting the interplay between perceived gains, losses, and risk preferences of financiers.

Overall, monetary criteria continue to drive construction investment funding decisions, including residential wood construction projects. However, the evolving regulatory landscape, particularly influenced by EU taxonomy, is poised to further integrate sustainability considerations into financial decision-making processes. Construction companies, together with public construction development organizations, play a pivotal role in promoting wood as a sustainable material and garnering references for wooden multistory residential buildings. The industry's transition to new techniques and materials is imperative, with a concerted effort needed from investors, financiers, and construction companies to prioritize sustainability in financing practices. As sustainability is increasingly included into financial considerations, the importance of assessing project profitability and risk alongside broader sustainability metrics becomes important in shaping the future development of the construction industry.

Conclusion

Our study contributes to further elaboration of prospect theory by providing empirical evidence of how financiers' decision-making in WMC projects are influenced by the risk assessment of companies and projects, the reference

point, and their subjective evaluations, aligning with the theory's principles of decision-making under uncertainty. Our findings underscore the importance of the financial position of the construction company alongside project-specific characteristics for financiers. Alongside monetary criteria, location of the planned building project emerged as a significant factor, with prime locations favored by financiers to enhance long-term value. While wood is generally seen in a positive light, financiers aim to pursue material-neutrality in their views for funding criteria. Thus, WMC projects are generally assessed using the same investment criteria as used on other buildings (concrete buildings used as a reference).

However, WMC is seen to include larger (negative) risks, which are mainly related to a lack of references of the building technique and limited knowledge of long-term qualities of wooden buildings. These larger risks associated with WMC may lead to tighter financing terms and higher costs of funding, conflicting the financiers' stated pursuit of material-neutrality in their decision-making. Therefore, growth of the WMC sector requires construction developers that enjoy a low-risk profile in the funding assessment. Public construction organizations together with large commercial construction companies with strong financial positions can thus be identified as the critical actors for WMC market development from the niche to the mainstream.

Interestingly, sustainability was perceived as a matter of growing importance among financiers' decision-making. It was also perceived as a positive opportunity for WMC. Still, it was not yet clearly considered in nor did it clearly impact the funding decision or terms. However, the growing attention given to sustainability by consumers, particularly within Finnish society, is assumed to increase the attractiveness of wood material in construction. This is supported by financiers' opinions of what is good wood availability from domestic forests, which may be positively reflected in future funding assessments of WMC projects. The emerging importance of ESG principles and EU taxonomy may increase the interest towards funding WMC projects if sustainability can be accounted for as a monetary criterion in the decision-making.

Widening the research to cover broader (EU) markets with quantitative methods would be beneficial in future studies. Understanding both financiers' and homebuyers' decision-making processes and criteria is important for fostering sustainability initiatives in the construction sector, as they possess an important gatekeeper role. Furthermore, future research avenues could explore the perspectives of construction companies and contractors in financing, shedding light on their roles in project planning and customer preferences. Their views on financing application and relevant criteria could provide valuable insights for enhancing the financing process and promoting sustainable practices in the construction industry.

Appendix A — Interview Questions

*Note: These questions have been translated from the original Finnish version to English.

Financing models

1. How are multi-storey buildings financed in Finland?
    - What kind of financing models exist?
    - Do they differ between private and public buildings? If so, how?
2. What kind of funding usually applies to multi-storey buildings?
    - Do different builders apply different financing?
    - If so, what kind of financing do they apply and why?

Factors and criteria affecting the financing decision

On the object's value and preservation of value, how is the attractiveness and success of the funding object evaluated/measured?

3. What kind of financial criteria are used in financing/investment decision-making when the target is apartment building construction?
    - How are these measured (for example, profitability, payback time, risks, etc.)?
    - What kind of calculation tools and profitability calculations do you use when making financial decisions?

Location as a criterion and physical characteristics as a criterion

4. What other criteria are used when making a financing decision/investment decision? Are decisions affected by any of the following factors?
    - Location
    - Location services
    - Accessibility in traffic
    - Type of building materials used

- The type or character of the builder or developer (for example, private or public operator)
- Whether it is a rental object or an object of your own money
- And, are there other factors that are not mentioned above?
- How do the factors influence your decision, and do they have mutual importance?

5. Do the housing-related needs or preferences of future tenants or apartment owners matter when deciding on financing?
    - Will this be investigated when considering the funding decision?
    - If so, how is this investigated?
6. Do private and public actors receive funding with the same criteria? If not, why?
7. Do municipal or state guidelines have an impact on funding decisions/investment decisions?

Wood as a building material and wooden apartment buildings as an investment target

8. How is the construction of apartment buildings perceived in the financial sector?
    - How is wooden apartment building construction perceived?
    - Does the material used in the building, for example wood vs. concrete as the main building material, influence the financing? If so, how?
9. Are wooden apartment buildings financed with the same criteria as concrete or steel buildings?
10. Do financing decisions/investment decisions consider any of the following factors?
    - Architectural aspects
    - Location environment
    - Planned lifespan of the building
    - Energy solutions
    - Maintenance costs of the building projects

11. What are the factors in favour of financing/investing in wooden apartment buildings? And what are the factors against it?
12. What kind of risks are seen in the construction of apartment buildings from a financial point of view? In particular, what kind of risks are seen in the construction of wooden apartment buildings?
13. What are the possibilities of wooden apartment building construction?
14. Which factors would make a wooden apartment building more attractive as an investment or financing object?
15. Have you been involved in financing the construction of a wooden apartment building, and what kind of experiences did you have?

Sustainability and sustainability in building materials/construction

16. Do the principles of sustainable development matter in funding decisions? If so, what kind of principles?
17. How do you or your organization see sustainability? Does the environmental friendliness of the object to be financed influence financing decisions?
18. What kind of goals does your company/organization have regarding sustainable development?
    - Does your company have sustainable development goals regarding the company's own operations and financing?
    - How do you approach, for example, the effects of climate change or possible changing weather conditions when evaluating construction sites?
    - If so, is this evaluated in any way?
19. From a financial perspective, do materials and especially wood as a building material matter when evaluating the durability of apartment buildings?

Objectives and regulations

20. Do the sustainable development regulations and guidelines of the municipality/city, Finland or the EU guide the selection of the objects to be financed or the financing criteria in use? Can you give examples?

21. Does the EU taxonomy affect the selection of financed objects or is it applied in the financing conditions?

22. Do you think that municipal/city, national and EU-level goals and incentives or regulations are relevant to the construction of apartment buildings and wooden apartment buildings and their financing?

23. Do you see the funding criteria changing in the future to comply more with the principles of sustainable development?

24. Is there anything else you would like to bring up regarding this topic?

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