HELDA
HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

UNIVERSITY OF HELSINKI

https://helda.helsinki.fi

Planning for wooden multistorey construction - insights from Finland's municipal civil servants

Franzini, Florencia

2023

Franzini , F , Berghäll , S , Toppinen , A & Toivonen , R 2023 , ' Planning for wooden multistorey construction - insights from Finland's municipal civil servants ' , European Planning Studies , vol. 31 , no. 1 . https://doi.org/10.1080/09654313.2022.2116271

http://hdl.handle.net/10138/353025
https://doi.org/10.1080/09654313.2022.2116271

cc_by
publishedVersion

Downloaded from Helda, University of Helsinki institutional repository.

This is an electronic reprint of the original article.

This reprint may differ from the original in pagination and typographic detail.

Please cite the original version.

European Planning Studies

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ceps20

Planning for wooden multistorey construction – insights from Finland's municipal civil servants

Florencia Franzini, Sami Berghäll, Anne Toppinen & Ritva Toivonen

To cite this article: Florencia Franzini, Sami Berghäll, Anne Toppinen & Ritva Toivonen (2023) Planning for wooden multistorey construction – insights from Finland's municipal civil servants, European Planning Studies, 31:1, 168-188, DOI: 10.1080/09654313.2022.2116271

To link to this article: https://doi.org/10.1080/09654313.2022.2116271

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

Published online: 30 Aug 2022.

Submit your article to this journal

Article views: 469

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=ceps20

EUROPEAN PLANNING STUDIES
2023, VOL. 31, NO. 1, 168–188
https://doi.org/10.1080/09654313.2022.2116271

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Planning for wooden multistorey construction – insights from Finland's municipal civil servants

Florencia Franzini [a], Sami Berghäll[a], Anne Toppinen [a] and Ritva Toivonen [b]

[a]Department of Forest Sciences, University of Helsinki, Helsinki, Finland; [b]Faculty of Agriculture and Forestry, University of Helsinki, Helsinki, Finland

ABSTRACT

Municipalities across Finland are promoting wooden multistorey construction as a low-carbon alternative for building construction. However, do attitudes towards implementing these alternatives stem from the opportunity to reduce carbon emissions or because these alternatives are perceived to improve local economies? This research employs a survey to collects the attitudes of Finnish municipal civil servants towards implementing wooden multistorey buildings in their municipalities. The respondents represent a mix of administrative professionals such as planners, real estate managers, building inspectors and other strategic managerial professionals ($n = 273$, 8% response rate). Their responses reflect views from approximately 8% of all municipal civil servants working on municipal land use and planning issues during 2019. The findings reveal attitudes towards implementing wooden multistorey buildings are engendered by fulfilling ecological development, economic development, technical quality and output efficiency goals. Furthermore, comparing municipal planners to other municipal administrators reveals dissimilar planning logics. Municipal planners holistically prioritize the project's ecological and economic development outcomes. Other administrators chiefly prioritize economic development outcomes. Hence, some municipal administrators may value wooden multistorey construction primarily as an activity to improve municipal vitality rather than as a holistic spatial planning solution. Future research should identify whether these divergences lead to planning tensions within municipal administrations.

ARTICLE HISTORY
Received 14 December 2021
Revised 17 July 2022
Accepted 13 August 2022

KEYWORDS
Wooden multistorey construction; attitudes; civil servants; low-carbon construction; Finland

1. Introduction

> On the path to institutionalizing green ideas and environmental ideologies, it appears something fundamental has been lost along the away. – Rosol, Béal, and Mössner (2017)

Environmentalism marks all eras of state activity across the globe, however, sustainable development and carbon-control policy discourses in North America and Western

CONTACT Florencia Franzini florencia.franzini@helsinki.fi Department of Forest Sciences, University of Helsinki, Latokartanonkaari 7, 00014 Helsinki, Finland

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Europe have reached a dialogical tipping point in favour of carbon control (While, Jonas, and Gibbs 2010). In reaction to the climate change debate, carbon-control concepts (e.g. 'low-carbon city') emerged across the literature alongside discourses from techno-economical disciplines focused on enabling a low-carbon economy through energy policies, renewable energy transitions and technological innovations (de Jong et al. 2015; Fu and Zhang 2017). Under this technocracy, a low-carbon polity formed (Jonas, Gibbs, and While 2011; While, Jonas, and Gibbs 2010). Simultaneously, a shift occurred over whom should superintend future climate actions. Where the early low-carbon polity (1990–2009) oriented itself chiefly around national-scale management (While, Jonas, and Gibbs 2010), later climate actions were entrusted to local cities (e.g. Rosenweig et al. 2010). Thus, cities begun incorporating economy-environment policies into urban politics, albeit with mixed results (e.g. Béal 2011, 2014; Gibbs, Jonas, and While 2002; Rice 2010; While, Jonas, and Gibbs 2004).

In support of low-carbon societal transitions, cities around the globe are declaring climate emergencies, setting carbon neutrality targets and planning 'carbon neutral cities' (Ravetz, Neuvonen, and Mäntysalo 2021; Solecki et al. 2021). To some, this represents the outcome of a joint, transnational, city driven imaginary, actively shaped and disseminated by cities through transnational networks like the EU Covenant of Mayors, Carbon Neutral Cities Alliance (CNCA), and the C40 initiative (e.g. Tozer and Klenk 2018, 2019). However, are city-driven narratives for carbon neutrality predisposed to becoming 'new urban environmental regimes'? According to Rosol et al., city-driven carbon neutrality initiatives promote weak sustainability[1] via 'the incorporation of environmental issues within entrepreneurial and neoliberal urban strategies' (2017, 1712). Rather than centring environmental practices as inherent goals, these regimes utilize environmental policies to enable the accumulation of capital and eventually deploy only selective environmental policies (e.g. Kenis and Lievans 2017). Consequently, some cities view carbon neutrality as the currency of international success that permits a further accumulation of wealth and capital (Tozer and Klenk 2018). Ultimately, embedded within such carbon neutral imaginaries are features of a paradoxical relationship.[2]

In Finland, several aspirant carbon neutral cities are embracing lower-carbon activities (e.g. HINKU 2021). Wooden multistorey construction (WMC) is one such exemplary activity for reducing embodied energy emission in the construction sector (see: Giesekam et al. 2014; Gustavsson and Sathre 2006). WMC employs wood as the primary construction material for multistorey building solutions in lieu of energy intensive construction materials, like concrete. One application of WMC includes wooden multistorey buildings (WMSBs), residential buildings of three or more storeys deploying structural load-bearing frames or elements made from engineered wood products (see: Ramage et al. 2017). Some cities actively promote WMC as an activity for enabling carbon neutrality goals (e.g. HEL 2018; TAM 2020; TUK 2018; VIH 2020). Nevertheless, WMC is an activity chiefly supported by central government policies and agendas (Lazarevic, Kautto, and Antikainen 2020; Vihemäki, Toppinen, and Toivonen 2020). Underpinning these agendas are divergent narratives caught between prioritizing Finland's national economy, local wood industries and carbon neutrality objectives (Toivonen, Vihemäki, and Toppinen 2021). In the case of local municipal administrations, similar topics are observed to drive their interests (Franzini, Toivonen, and Toppinen 2018), although it

is unknown whether these interests are divergent. In other words, do cities embrace WMC as a carbon neutrality strategy per se, or as a selective environmental strategy for enabling economic growth?

In Finland, the entities responsible for governing the land use planning process and city planning are local municipal administrations (132/1999 2003). While the preferential reason for embedding WMC as a planning strategy is unknown, the general directionality of municipal planning agendas is a phenomenon better understood. Hytönen and Ahlqvist (2019) argue that the restructuring of Finland´s welfare state towards an increasingly neoliberal paradigm has resulted in planning agendas beholden to short-term, growth-oriented goals in lieu of long-term sustainability goals. Arguably, this mirrors the new urban environmental regime paradigm, inasmuch as municipal planning agendas increasingly enable weak sustainability. However, whether local administrators support growth-oriented goals over environmental goals remains unanswered. Evidence suggests contradicting values are emerging within Nordic planning administrations resulting from neoliberal state paradigms (e.g. Sager 2009). In Finland, planners prioritize different planning values compared to their municipal administrative counterparts (e.g. Mäntysalo, Saglie, and Cars 2011). Possibly, the same is true about how they assess planning agendas.

Ultimately, this paper aims to understand the recent promotion of WMC as an activity within the municipal planning agendas of carbon neutral cities. We arrive at this objective through a survey study eliciting the attitudes and beliefs that municipal civil servants hold towards implementing WMSBs in their municipalities. The findings of the survey study allow us to examine the following research questions:

1. Do administrators employed by Finnish municipalities (i.e. municipal civil servants) regard WMSBs as a favourable construction activity because it provides an opportunity to enable economic growth objectives or because it is an opportunity to centre carbon-control objectives?

2. Do municipal planning practitioners favour implementing WMSBs for a different set of reasons than their other administrative colleagues?

Following this introduction, Section 2 provides information on key theoretical topics used to ground and interpret the research. Specifically, Section 2.1 summarises the WMC agenda in Finland by recounting its discursive transition from the national (bio)economy into the carbon neutral city paradigms. Section 2.2 briefly describes the land use planning priorities of Finnish municipal planners in juxtaposition to that of their administrative governance regimes. Section 3 details the research study design. Section 4 reports findings from the survey study. Section 5 discusses the findings. Lastly, Section 6 provides concluding remarks about the recent uptake of WMC as an activity of carbon neutral cities across Finland.

2. Theoretical perspectives

2.1. Wooden multistorey construction in Finland: from (bio)economy to carbon neutral cities

While Finland has a long history of utilizing wood as a construction material, the building solutions employed by WMC possess few commonalities with traditional timber

construction solutions (Ramage et al. 2017). Finland's traditional load-bearing system for multistorey construction utilize concrete. Partiality for concrete is unexceptional since up until 1997, building fire codes restricted the construction of wooden framed buildings of more than two stories (Karjalainen 2002, 20). Until that time, concrete multistorey construction developed efficient competency networks and knowledge unabated. Today, the construction sector remains locked-in to replicating incumbent concrete multistorey construction building practices (Hurmekoski, Jonsson, and Nord 2015). Under this path-dependent atmosphere, the emergence of WMC required formal institutions and regulations to shield WMC from incumbent building practices until WMC developed competency networks to break into the construction sector market (Hurmekoski, Jonsson, and Nord 2015; Lazarevic, Kautto, and Antikainen 2020; Vihemäki et al. 2019). Importantly, 25 years of support from key central government agencies enabled this breakthrough (Hurmekoski, Jonsson, and Nord 2015; Vihemäki et al. 2019, 2020).

Initially, support for WMC began in the 90s during Finland's 'third investment era'. This period was marked by Finnish state investments into research and development projects for enabling Finland's international competitiveness and the capture of transnational capital investments (Ahlqvist and Moisio 2014; Moisio and Leppänen 2007). Amidst the investment were 60 million euros for wood development programmes running between 1992 until 1998 (Lazarevic, Kautto, and Antikainen 2020). Their aim was to establish an internationally competitive wood industry that could enable exports and value-added activities. Among these, the Wood in Construction Programme (1995–1998) was critical for WMC, as it facilitated the finalization of 19 WMSBs and oversaw the 1997 building fire codes revision (Lazarevic, Kautto, and Antikainen 2020). Nevertheless, the promising situation deteriorated as a period of WMC inactivity took hold from 1999 to 2010. A breakthrough occurred following a second set of investments and promotional activities. During the mid-2000s, the forest sector faced an economic downtown and in response the central government launched new wood construction development programmes (Lazarevic, Kautto, and Antikainen 2020). The primary objective of these development programmes was enabling forest product demand, increasing exports, and stimulating national economic growth and employment (Lazarevic, Kautto, and Antikainen 2020; Vihemäki, Toppinen, and Toivonen 2020). Thus, national policies exclusively discussed WMC as a market-oriented activity during this formative phase.

The market-oriented policy narrative began evolving when WMC appeared as an activity promoted under the 2014 Bioeconomy Strategy. This radical economic policy encouraged a transition to a low carbon society by creating a sustainable economy subsistent on renewable resources and free of fossil fuels (MEE 2014). Less than five years later, WMC appeared as an activity to enable carbon neutrality (Vihemäki, Toppinen, and Toivonen 2020, for policies see: MEE 2017; Paloneva and Takamäki 2021). In tandem, some municipalities began adopting carbon neutrality goals through unifying networks (e.g. 6Aika 2019; FISU 2020; HINKU 2021). By 2019, the Prime Minister's Office announced the pledge for a Climate Neutral Finland by 2035 (PMO 2019). Shortly thereafter, the Ministry of Environment launched voluntary targets for publicly procured wooden construction projects, citing that by 2025, 45% of newly constructed public buildings should be wooden projects (YM 2020). Among the justifications underpinning these targets was carbon neutrality, but also 'supporting the country's domestic economy and local economy' (translated from YM 2020, 2).

Toivonen, Vihemäki, and Toppinen (2021) ultimately identified three national level policy narratives supporting WMC diffusion: the 'bioeconomy', the 'wood industry' and the 'climate change' narrative. Each narrative possesses a unique set of actors, policy goals and preferred policy measures. Altogether, this has resulted in a divergence (Toivonen, Vihemäki, and Toppinen 2021). Arguably, divergence might lead to competing, contradicting, or even irreconcilable interest, leaving constituents of each narrative to use WMC as a vessel for advancing their own underlying interests at the expense of others (e.g. market and growth-driven logic versus environmentalist logic). To provide a relevant example, Ahlqvist and Sirviö (2019) argue that while Finland's Bioeconomy Strategy presents an agenda for radical societal transformation, it was appropriated by selective constituents into a policy tool for enabling an industrial business-as-usual renewal of Finland's forest sector. Rather than advancing sustainability, the bioeconomy became an opportunity for rural peripheral actors to became economically relevant in the face of a city-regionalism paradigm. It remains open whether similar contradictions surface among WMC narratives, however, the divergence illuminates an uncoordinated vision for the role of WMC at the national level (Toivonen, Vihemäki, and Toppinen 2021). This also exposes a gap in understanding over whether these national policy narratives impact the strategic aims of local municipal land use planning practices, particularly the uptake of WMC into local planning agenda. Because state governance complexly shapes municipal planning practices (Hytönen and Ahlqvist 2019), in the next section we discuss these complexities and the different land use planning priorities found within municipalities. These are key to understanding the underlying reasons for embracing WMC within municipal planning agendas.

2.2. Municipal planning in Finland: from state aims to local actions

Finland's Building and Land Use Act (132/1999 2003) steers the land use planning process using a three-tiered zoning plan system, with municipalities acting as the entity legally responsibility for overseeing and approving their creation. At the top of the hierarchy are 18 regional plans specifying long-term development. Each plan is drawn up and approved by a regional council comprised of municipal representatives from the respective regions. Following are the municipal master plans and the local detailed plans. Every municipality is independently responsible for overseeing the development of these plans and must present them to the local municipal council for approval. As a result of this planning system, Finland's municipalities are highly autonomous and possess large amounts of legislative planning power (Hytönen 2016). Furthermore, there are no formal decrees for how a municipality should prepare and implement their plans (Valtonen, Flakenbach, and Viitanen 2017). This allows a municipality's local political will to define the most appropriate goals for land use planning (Hytönen 2016). Nevertheless, overarching (but flexible) goals for land use planning are codified in the Land Use Act. The goals are 'to create preconditions for a favourable living environment and promote ecologically, economically, socially, and culturally sustainable development'. While this general framework permits the flexible inclusion of almost any goals, not all goals are regarded with equal importance. We agree with assessments that municipal planning agendas are complexly shaped by features of a neoliberal restructuring of the

state; therefore, we cite three such complex phenomena and their resulting (conflicting) land use planning agendas.

Ahlqvist and Moisio (2014) argue that since the 1990s, the incremental neoliberalization of the Finnish State has worked to globalize Finland in hopes of capturing transnational mobile capital. The opening of neoliberal spaces was a concerted political choice to withdraw from an economic model of redistributing wealth towards the opening of competitive markets. During this reimagining of governmentality, the state took on an economizing managerial role (Ahlqvist 2013). This reimagining also included institutional restructuring of local public administrations via new public management (NPM). The NPM governance model incorporates business sector concepts and values (Pollitt and Bouckaert 2011) and restructures administrations from bureaucratic to managerial (see: Mäntysalo et al. 2015).

In Finland, NPM privileges efficient administration capable of expediting productivity and restraining expenditure (Juntunen and Leinonen 2007), also discussed as 'output efficiency' goals (e.g. Mäntysalo, Saglie, and Cars 2011). During the NPM reform, some municipal managers became mayors that adopted a new role in between strategic administrative management and political leadership (Juntunen and Leinonen 2007). At the same time, some municipal planners lost their ability to define planning agendas and were consigned to accept planning agendas deemed appropriate by municipal strategy managers (Puustinen et al., 2017). Hence, planners accepted a new external rationality of 'cost efficiency' in the workplace. This is cited as a tension between conflicting land use planning ideologies (Mäntysalo, Saglie, and Cars 2011; Sager 2009).

Ahlqvist and Moisio (2014) likewise argue that the opening of neoliberal spaces in Finland included reconstructing the state around urban city-regions (i.e. city-regionalism, see also: Jonas and Moisio 2018) because these spaces represent strategic 'global nodes' connecting Finland to the larger constellation of global cities accumulating mobile capital (Moisio and Rossi 2020). Under this economic imaginary, an entrepreneurial city agenda takes hold, wherein administrations emphasize agendas that enhance or maintain their economic competitiveness; however, a paradox often develops. City regions with high economic activity readily amass further investments and maintain competitive advantage over peripheral spaces. Meanwhile, municipalities comprising 'left-behind' spaces are pressured into aggressive place-branding as a strategy to secure resources and investments (Moisio et al. 2020).

In Finland, economic regional differentiation results in uneven distribution of economic resources among spaces peripheral to city regions (e.g. Hytönen et al. 2016; Pelkonen 2016). In response, municipal planning agendas adopt strategies to attract new taxpayers and investments, thereby fueling strong intermunicipal competition (e.g. Hytönen et al. 2016; Salo and Mäntysalo 2017). The pervasiveness of this new entrepreneurial city agenda is visible in discussions where municipal planners describe how planning for a favourable living environment became 'a means to reach other goals, especially competitiveness and attractiveness of the city or region to investors and the so-called 'good' taxpayers.' (Puustinen et al., 2017, 79).

Recently, Hytönen and Ahlqvist (2019) argued that Finnish planning is becoming increasingly market-reactive at the expense of long-term goal formulation (e.g. environmental goals, see: Hytönen 2019). This reactivity is attributed to the culmination of three factors: relegation of the state's spatial planning power, intensive intermunicipal

competition and an absence of local planning resources. While this argument remains open to debate, the incremental exclusion of broader interests within Finnish planning is a topic of attention in the literature (e.g. Mäntysalo and Saglie 2010; Puustinen et al., 2017; Davoudi, Kallio, and Häkli 2021). For example, planners describe that their role has shifted from 'guarantors of the public' towards being 'in service of private developers' (Puustinen et al., 2017, 79–80).

The effects of NPM, entrepreneurial city logics, and market reactive planning begs the question: What objectives do municipalities fulfil through enabling WMC projects? Hynynen (2016) argues municipal localities (and certain regions) stand to improve their employment rates, tax revenues and the future of local small- and middle-sized companies. Through Hynynen's interpretation, WMC serves as a tool of marketing and place branding, while undeniably reducing carbon emissions. What remains unanswered is whether WMC represents a selective environmental strategy chosen specifically to further local economic growth. We propose approaching the question by determining whether municipal civil servants view different land use planning outcomes of WMC with equal standing. This is theoretically achievable by operationalizing how civil servants view different planning outcomes associated with implementing WMSBs in juxtaposition to an operationalization of their attitudes towards these buildings. The study design for this proposition is presented in the following section.

3. Methodological approach

3.1. Theory of planned behaviour

To examine 'whether' and 'why' local administrators accept implementing WMSB in their municipality, this paper analyses responses from a survey study designed using the theory of planned behaviour (TPB; Ajzen 1991). Fishbein and Ajzen (1975) argued that beliefs are the building blocks of human behaviours – they lead us to action. The conceptual framework explaining how beliefs lead to behaviour action is TPB. It posits that an individual's engagement in a behaviour is predicted by their intentions to engage in the behaviour. The intention to engage in a behaviour is determined by three factors: 'attitudes', 'subjective norms' and 'perceived behavioural control'. Attitudes represent the individual's view towards the behaviour, subjective norms represent the individual's perceived pressure to engage in the behaviour, and perceived behavioural control represents the individual's perceptions about whether they can perform the behaviour. Forming these three factors are beliefs. Respectively, they are behavioural beliefs, normative beliefs and control beliefs (Figure 1).

In this research, we use the survey data to analyse attitudes and behavioural beliefs. TPB posits that attitude predetermines the intention to take up an action. The behaviour in this research concerns local administrations implementing WMSBs in their municipality and municipal civil servants represent the proxy for collecting information about the actions of local administrations. Hence, the exact behaviour in question was 'implementing wooden multistorey building projects in my municipality'. Measuring attitude towards this behaviour ascertains 'whether' the municipal civil servants see the implementation of WMSB projects in their municipality favourably or unfavourably. Forming these attitudes are behavioural beliefs, or in other words, the underlying reasons

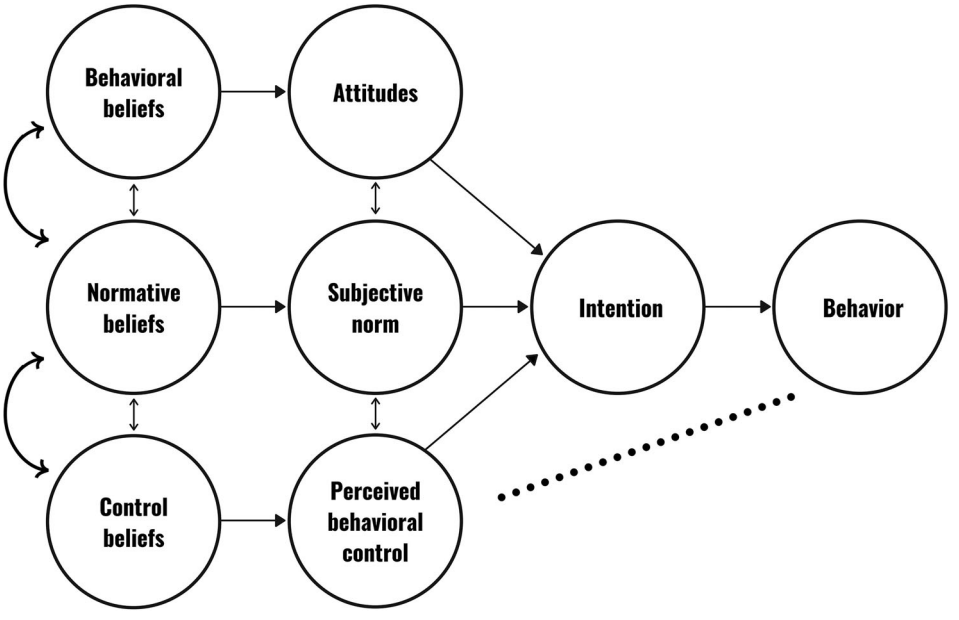

Figure 1. TPB model (Fishbein and Ajzen 2010).

'why' the attitude is held. Behavioural beliefs (b_ie_i) are perceptions about the outcomes of a behaviour (i). If the behaviour is perceived to have a certain outcome and that outcome is evaluated positively, then a favourable attitude towards the behaviour forms. Theoretically speaking, behavioural beliefs (b_ie_i) are a composite created by measuring two different aspects: (1) how strongly one believes the behavioural to hold the said outcome (b_i) and (2) an evaluation of that outcome (e_i).

3.2. Survey development

3.2.1. Attitude measures

Attitudes towards implementing WMSB were measured using semantic differential scales formulated using examples provided by Fishbein and Ajzen (2010). The survey asked respondents to evaluate the question, 'If wooden multistorey building projects were implemented in my municipality, I would think that it is … ' and afterwards provided seven semantic differential statements. The scales used 5-points and were measured in a bipolar fashion (−2 to 2).

3.2.2. Behavioural belief measures

Prior to developing the survey, representatives of the target group were interviewed to determine appropriate modal salient behavioural beliefs to measure in the survey (Fishbein and Ajzen 2010). Eleven semi-structured interviews were conducted with municipal civil servants employed across five municipalities between 2017 and 2018. The interviewees were asked to describe the advantages and disadvantages of WMSBs, and a content analysis of the most frequently discussed topics was produced from the interview transcripts (for the full set of methods, see: Franzini, Toivonen, and

Toppinen 2018). From the content analysis list, 16 modal salient behavioural beliefs (*i*) were chosen for measurement in the survey. In other words, the 16 behavioural beliefs represent a series of subjects the interviewees perceived to drive the implementation of WMSBs.

The strength of the behavioural beliefs items (b_i) were measured by asking respondents to evaluate different attributes of WMSBs. The survey presented the primer question, 'What views do you have on the following statements? Compared to concrete apartment buildings, wooden apartment buildings are/have … '. Following the primer, respondents evaluated 16 attribute statements using a 5-point Likert scale measured in a bipolar fashion (−2 to 2). The evaluation of the WMSB attributes (e_i) were measured by asking respondents to assess how influential each attribute is in the decision to implement multistorey buildings in their municipality. Respondents were asked the primer question, 'How much do you think the following factors influence your municipality's decision to implement any kind of multistorey building project?'. Following the primer, respondents evaluated 16 statements using a 4-point unipolar Likert scale (0–3). The behavioural belief composites (b_ie_i) were created by multiplying responses from the respective belief outcome (b_i) to the corresponding belief evaluation (e_i).

3.3. Survey deployment

The survey was e-mailed to 3095 municipal civil servants working across mainland Finland (296 municipalities in 2019). The study resorted to a selective sampling technique because there are no publicly available registers detailing the civil servants employed by municipalities in Finland. Emails were collected manually through the online web pages of the target municipalities. A targeted email list was compiled according to whether the municipal employees held job titles suggesting workplace responsibilities relating to land use planning or development. The final e-mail list theoretically comprised the entire target population rather than a sample of the target population. The selective sampling approach can result in the exclusion of relevant participants or the inclusion of irrelevant participants. On the other hand, because the survey provided an introductory letter explaining the purpose of the study and intended target group, these shortcomings are limited. The survey was emailed in November 2019 and remained open until January 2020. One reminder email was sent in December 2020. We collected 273 usable surveys, resulting in an 8% response rate. The low-response rate and use of selective sampling can lead to response bias. These results are not representative views from the whole target population; thus, findings should be generalized with caution.

3.4. Data analysis

A two-step procedure was used to analyse the survey data. First, an exploratory factor analysis (EFA) of the 16 behavioural belief items (b_ie_i) was carried out to create factors. Reducing the 16 items into factors facilitates interpreting the underlying beliefs forming attitudes. The EFA was executed following the procedure outlined by Dawson (2017). The EFA applied maximum likelihood estimation and a varimax

rotation. Belief items with high crossloadings on multiple factors were omitted from the analysis, as is characteristic in EFA. In the second step, a multiple cause multiple indicator (Jöreskog and Goldberger 1975) structural equation model (SEM) tests TPB's hypothesis that behavioural belief form attitude by ascertaining construct validity (Posey et al. 2015). In the SEM, 'Attitude' was treated as the latent variable, the attitude scale items were treated as reflective indicators, and the behavioural beliefs factor scores created from the EFA were treated as formative indicators (Ajzen 2020). Critical to this study, the SEM also quantifies the extent to which the different behavioural belief factors lead to the formation of attitudes, thus permitting an interpretation of which beliefs are shaping attitudes most strongly.

The validity of the attitude scale (A_i) was assessed through Cronbach's Alpha. The validity of the belief factors was assessed during the EFA by checking for a reasonable variance extracted and high factor loadings (Posey et al. 2015). The SEM's fit was evaluated using the root mean square of approximation (RMSEA), comparative fit index (CFI) and Tucker-Lewis index (TLI). As per recommendations from Brown (2015), acceptable values for the SEM indicators are: CFI (>.90), TLI (>.90) and RMSEA (<.80).

4. Results

4.1. Descriptive statistics

Respondent ages ranged from 26 to 67, with the average age being 49. Approximately 38% of respondents identified as female and 62% identified as male. Most respondents held job functions related to planning (Table 1). Approximately 31% of respondents worked for a municipality with more than 50,000 inhabitants, 32% worked for a municipality with 10,000–50,000 inhabitants, and 32% worked for in a municipality with a less than 10,000 inhabitants.

Table 2 presents the descriptive statistics of the semantic differential items measuring attitude. Responses showed extremely positive attitudes towards the implementation of WMSBs. Six of the seven measurement items were found to be reliable measures of attitude (Cronbach's alpha = .875).

Table 3 presents the descriptive statistics for the behavioural beliefs composites (b_ie_i). Nearly all behavioural beliefs held a positive mean score. The behavioural belief measures 'Cost to Build', 'Cost to maintain' and 'Susceptibility to mould' held negative mean scores. The behavioural belief composite measures 'CO_2 emissions', 'Recyclability' and 'Environmental friendliness', held the highest mean scores.

Table 1. Self-reported job function. Percentages rounded to nearest whole number.

Job Function	*n*	%
Planners		
Tasks related to planning	98	35.9
Other administrators		
Tasks related to property management	28	10.3
Tasks related to building supervision	48	17.5
Strategic tasks of senior management	41	15
Other	32	15.4
Missing	16	5.9

Table 2. Responses to the semantic differential statements. Note item A6 was omitted from the analysis due to low internal consistency.

Item	Statement	Mean	Standard deviation	*N*	Cronbach's alpha
A_1	Bad – Good	1.57	0.64	271	0.875
A_2	Unreasonable – Reasonable	1.23	0.83	263	
A_3	Negative – Positive	1.5	0.61	262	
A_4	Dangerous – Safe	0.75	0.76	262	
A_5	Foolish – Sensible	1.09	0.72	263	
A_7	Worthless – Worthwhile	0.99	0.72	264	

4.2. Factor analysis

Table 4 depicts the rotated factor matrix of the four-factor solution for 13 of the 16 behavioural belief composites. Three behavioural beliefs were omitted during the EFA. The Kaiser's measure of sampling adequacy was .827. The four factors explained 48% of the total variance. The factors were named according to the items loading highly on each factor. The 'ecological development' factor is composed of items related to fulfilling environmental objectives (i.e. environmentally friendliness, recyclability, CO_2 emissions of WMSBs). The 'economic development' factor is composed of items related to objectives enabling local municipal vitality (i.e. secure financial investment, local land value impacts, economy of the municipality, supporting domestic bioeconomy and forest product industries). The 'output efficiency' typology is composed of items related to administrative objectives (i.e. cost of constructing, cost of maintaining WMSB and the construction time of a project). Lastly, the 'technical qualities' factor is composed of items related substantive technical requirements of a structure (i.e. building lifecycle, indoor air quality, mold susceptibility).

4.3. Structural equation model

Figure 2 depicts the SEM for the whole population, planner and other administrator dataset. Displayed are the standardized regression estimates for each model. Examining the standardized regression estimates between the four factors indicates which factors have the greatest relative effect on forming attitude.

Table 3. Descriptive statistics for behavioural beliefs (b_ie_i). Products ranged from – 6 to 6. Note the three behavioural beliefs omitted from the EFA are not reported.

Behavioural beliefs (b_ie_i)	Mean	*n*	SD
Susceptibility to mould	−0.27	242	2.09
Indoor air quality	1.49	249	2.31
Building's lifecycle	0.01	249	1.81
CO_2 emissions	2.16	250	1.91
Recyclability	2.04	253	1.84
Project time schedule	0.56	243	1.83
Environmentally friendly	2.63	258	1.96
Cost to build	−1.30	247	2.29
Cost to maintain	−0.55	248	1.92
Land value	1.69	252	1.64
Value-added bioeconomy product	1.76	251	1.72
Investment safety	0.24	243	1.48
Municipality's economy	0.80	242	1.59

Table 4. Factor loadings for the EFA rotated matrix.

Behavioural Belief Item (b_ie_i)	Factor 1	Factor 2	Factor 3	Factor 4
Ecological development				
Environmentally friendly	**0.823**	0.169	0.179	0.141
CO_2 Emissions	**0.786**	0.131	0.122	0.041
Recyclability	**0.612**	0.215	0.081	0.175
Economic development				
Land value	0.200	**0.693**	0.177	−0.052
Municipality's economy	0.203	**0.637**	0.025	0.110
Investment safety	0.071	**0.614**	0.215	0.156
Value-added bioeconomy product	0.463	**0.511**	0.003	0.133
Technical quality				
Susceptibility to mould	0.063	0.063	**0.673**	0.122
Indoor air quality	0.287	0.219	**0.585**	0.097
Building's lifecycle	0.027	0.362	**0.427**	0.298
Output efficiency				
Cost to build	0.068	0.058	0.070	**0.651**
Project time schedule	0.298	0.165	0.137	**0.426**
Cost to maintain	0.097	0.042	0.334	**0.417**
Cronbach's alpha	.818	.754	.650	.554

Table 5 presents the goodness-of-fit indices, standardized regression estimates, unstandardized regression estimates, and the squared multiple correlation for the whole population and the subpopulations datasets (i.e. planners and other administrators). All three datasets showed acceptable goodness-of-fit, thereby supporting the validity of the measurement theory to the dataset (i.e. hypothesis that beliefs form attitudes). All the reflective measures of attitude held a statistically significant relationship to the latent variable. The statistical significance of the relationship between the formative factors and the latent variable varied among the subpopulation datasets, thereby indicating not all formative factors have a role shaping attitudes within certain subpopulations.

5. Discussion

5.1. Project outcomes leading to project approval

The first research question asks whether municipal civil servants regard WMSB favourably as an opportunity to enable economic growth objectives or as an opportunity to centre carbon-control objectives. Four factors were found to significantly form attitudes towards WMSB implementation. We argue these four factors represent key project outcomes engendering the implementation of WMSB projects in Finnish municipalities. As a starting point to answering the first research question, we briefly discuss what land use planning criteria each of the four factors represents before discussing the SEM outputs for the whole population dataset.

The ecological development and economic development factors align with the overarching spatial planning objective 'to promote a favourable environment by virtue of ecologically, economically, socially, and culturally sustainable development' (132/1999 2003). The technical quality factor represents substantive technical criteria found within Finland's building codes and their objectives to producing viable and safe buildings (e.g. 782/2017; 1009/2017). The output-efficiency factor represents NPM governance objectives to reduce expenditures and enable efficient project procurement (see: Juntunen and Leinonen 2007; Mäntysalo, Saglie, and Cars 2011). Ultimately, whether a

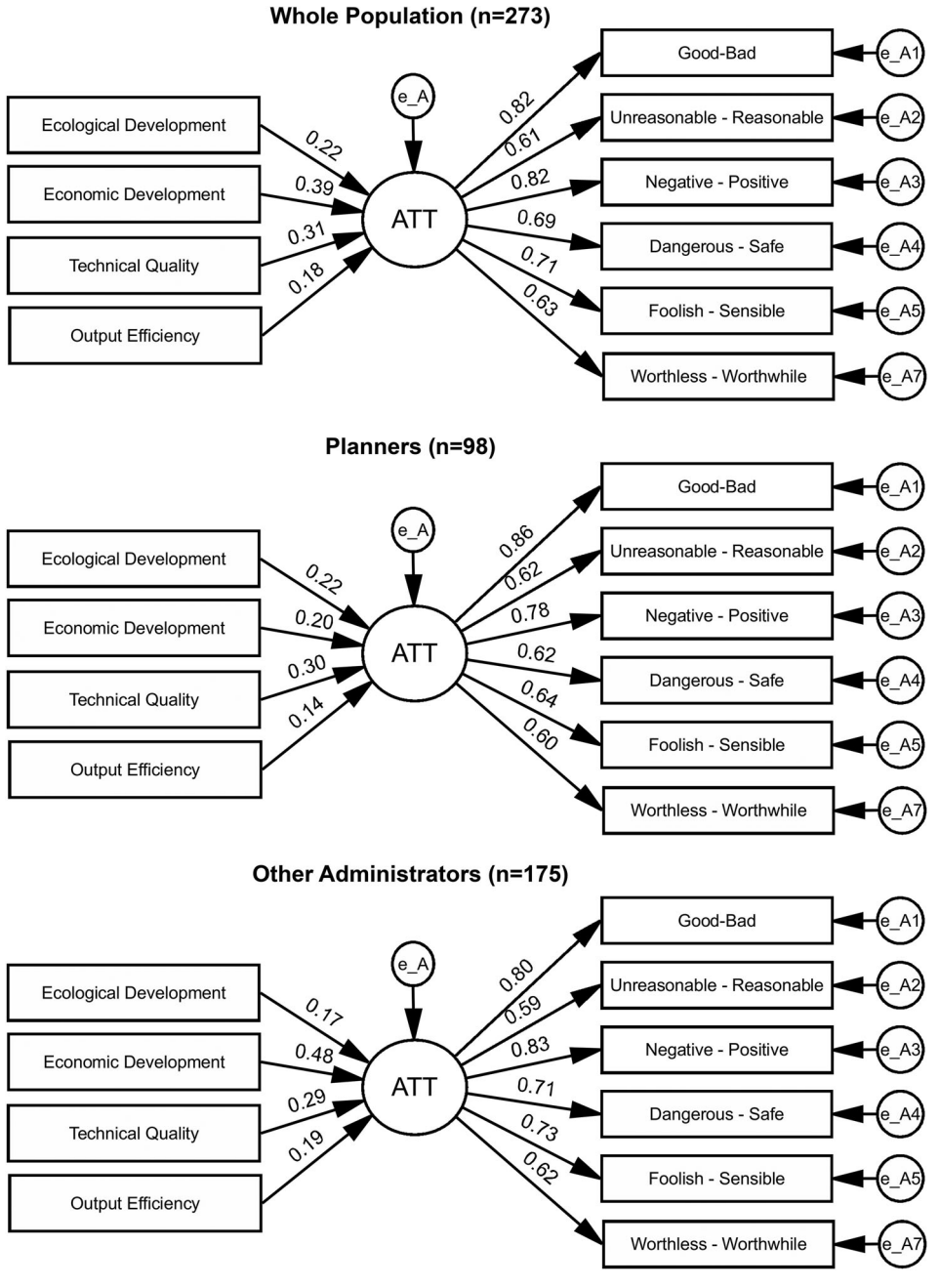

Figure 2. SEM with outputs for the whole group population, planner subpopulation and other administrators subpopulation. Only standardized regression estimates are displayed.

project can fulfil spatial planning goals, building regulations and administrative NPM criteria are all factors forming attitudes towards WMSB projects.

The SEM outputs for the whole population dataset indicate the factors with the most power to shape attitudes are economic development (.39), technical quality (.31), ecological

Table 5. Structural equation model outputs.

	Whole population	Planners	Other administrators
Standardized estimates belief factors			
Environmental development	0.22**	0.22*	0.17*
Economic development	0.39**	0.20*	0.48**
Technical quality	0.31**	0.30*	0.29**
Output efficiency	0.18**	0.14	0.19*
Unstandardized estimates belief factors			
Environmental development	0.12**	0.10*	0.10*
Economic development	0.24**	0.11*	0.29**
Technical quality	0.20**	0.18*	0.19**
Output efficiency	0.13**	0.09	0.13*
Standardized estimates attitude measures			
Bad – Good	0.82**	0.86**	0.80**
Unreasonable – Reasonable	0.61**	0.62**	0.59**
Negative – Positive	0.82**	0.78**	0.83**
Dangerous – Safe	0.69**	0.62**	0.71**
Foolish – Sensible	0.71**	0.64**	0.73**
Worthless – Worthwhile	0.63**	0.60**	0.62**
Goodness-of-fit Indices			
CFI	0.945	0.982	0.935
RMSEA	0.070	0.034	0.079
TLI	0.093	0.977	0.918
Squared multiple correlation			
Attitude	.326	.195	.426
N	273	98	175

** indicates $p < .001$ and * indicates $p < .05$. (124 words).

development (.22) and output efficiency (.18), respectively. This implies that fulfilling land use planning goals to improve the municipality's vitality and economic growth are more powerful drivers of attitudes than land use planning goals to enable a municipality's ecological objectives (e.g. reducing CO_2 emissions). Nevertheless, the ecological development factor was significant to attitude formation signifying its importance as an objective. Practically speaking, the model implies that if a WMSB project fails to meet economic development goals but fulfils ecological, technical and output efficiency criteria, then the project may still be viewed positively. On the other hand, fulfilling ecological criteria alone is unlikely to engender positive attitudes towards project implementation. This contradicts the tendency to promote WMC chiefly under environmental planning agendas (e.g. carbon neutral strategies, see: HEL 2018; TAM 2020). Ultimately, the whole population model cannot elucidate if WMSBs are promoted selectively because they represent activities for improving economic growth; nevertheless, fulfilling such objectives is a powerful criterion in determining whether a WMSB is considered a 'good' project to implement.

5.2. Conflicting planning logics?

The second research question asks whether different municipal administrators assess WMSBs projects according to similar criteria. Analyzing how different administrators perceive WMSBs informs whether there is consensus over the strategic planning objectives WMSBs can fulfil. In this section, we discuss unique features and divergences found between planners and other administrators.

For the planner subpopulation, the factors explaining attitudes were technical quality (.30), ecological development (.22), and economic development (.20). Three features

stand out from these findings. First, output-efficiency was not statistically significant towards attitude formation. Recall that output-efficiency represent objectives of NPM. Perhaps these objectives are insignificant because planners do not view themselves responsible for administrating such goals. This coincides with previously literature suggesting NPM agendas are criteria externally forced onto planners by their administrations organizational culture (Puustinen et al., 2017).

A second notable feature is that whether a project fulfils substantive technical criteria (i.e. technical quality) is more powerful to forming attitudes than whether the project delivers spatial planning objectives (i.e. economic development, ecological development). At first glance, this appears at odds with a planner's responsibility to oversee spatial planning tasks. From the local administrations point of view, however, land use objectives and building codes are both provisions nested within Finland's Land Use and Building Act (132/1999 2003: Section 5 and Section 13, respectively); hence, the administration is responsible for overseeing both aspects. What differ between these two provisions are the planning tools used to delineate and implement them. Finland's land use planning objectives are guidelines codified within a hard law (i.e. the land use and building act) that rely on soft planning instruments to crystalize objectives (Mäntysalo et al. 2015; Mäntysalo and Bäcklund 2018; Mattila and Heinilä 2022). Meanwhile, building codes are stringently defined via formal regulations that represent hard planning instruments. Perhaps technical criteria are regarded with more legitimacy because they are formal criteria regulated by hard law and implemented through hard planning instruments. If so, this may suggest municipal planners prefer a more bureaucratic style of administrative governance (i.e. preference for statutory planning, see: Mäntysalo et al. 2015).

As a final point, planners form attitudes by equally considering a project's ecological and economic spatial planning objectives. Thus, we argue planners have a holistic interpretation regarding which project outcomes make implementing a WMSB 'good' because each of the three factors hold similar bearing towards forming attitudes. In practical terms, this indicates implementing a WMSB project will be perceived positively if it can simultaneously enable economic and ecological spatial planning goals. This deviates from the logics of 'new urban environmental regimes' to promote growth-oriented spatial planning goals over ecological spatial planning goals (c.f. Rosol, Béal, and Mössner 2017). In short, municipal planners appear to regard WMSB according to whether they fulfil a holistic set of land use planning criteria, with the most powerful criteria being whether the project fulfils substantive technical qualities associated with building code regulations.

When examining the other administrators SEM outputs, all four factors were significant towards attitude formation. Other administrators formed their attitudes chiefly based on the economic development (.48) and technical quality (.29) factors. Meanwhile, the output efficiency (.19) and ecological development (.17) factors held relatively smaller formative power. Two key features are revealed from these findings. Most notably, attitudes are chiefly based on whether a WMSB project improves a municipality's vitality while ecological outcomes contribute marginally towards attitude formation. Practically speaking, even if the administrator recognises that a WMSB project fulfils ecological development goals (e.g. CO_2 reduction), this alone will not result in a positive view towards project implementation. Through this logic, incorporating environmental goals into spatial planning objectives would only occurs only when tied to projects that improve local growth. This also ties to previous views from municipal planners

who cite their administrations becoming increasingly committed to improving economic competitiveness in lieu of other spatial planning goals (Puustinen et al., 2017).

The second key feature regards the role of output efficiency (i.e. NPM criteria) as a significant factor shaping attitudes. The findings support previous arguments that the administrative counterparts of municipal planners are inclined to pursue managerial and growth-oriented objectives typically associated with neoliberal ideologies (Mäntysalo, Saglie, and Cars 2011, Puustinen et al., 2017). Ultimately, we argue the planning logic underpinning the other administrators model is neomanagerial[3] in nature. In other words, it represents the logic of an administrator who applies managerial ideologies (e.g. NPM criteria such as output efficiency) to fulfil entrepreneurial city agendas (e.g. enabling growth and competition, opening markets).

5.3. Limitations

There are important limitations to this study. First, the results of the models cannot be generalized to represent the views of the entire target population. Second, a larger sample size may result in different model estimations. The other administrators subgroup includes responses from a variety of professionals. Findings may change with more granular delineations by occupational group; however, it was impossible to further divide the populations into professional subgroups due to the limited sampling size. Despite this limitation, the models are valuable for exposing the existing differences in planning logics between municipal planners and other administrators who responded to the survey. Ultimately, we estimate these findings reflect the views of 8% of the municipal civil servants working on issues of land use and planning in Finland in 2019.

6. Conclusions

Some argue that the implementation of environmental policies within neoliberal regimes is paradoxical, as market-logics will circumstantially appropriate environmental agendas to open new market opportunities (Béal 2014, 2017; While, Jonas, and Gibbs 2010). This predisposition of neoliberal ideologies usurping environmental-economic discourses in urban policymaking is a symptom of 'new urban environmental regimes' (Rosol, Béal, and Mössner 2017). In Finland, municipalities promote WMC within carbon neutral city strategies as a mean to reduce embodied energy emissions. However, it is unknown whether WMC is preferred as an environmental strategy *per se*, or if it is selectively implemented to further entrepreneurial city logics and place-branding that ultimately enable local development and growth. This paper used findings from a survey study collecting the attitudes and beliefs of municipal civil servants to examine this gap.

The survey respondents ($n = 273$, 8% of total target population) predominantly favoured the implementation of WMSBs in their municipalities, however, the underlying rationale for approbation diverges according to the respondents' professional role. On the one hand, municipal planners form their attitudes depending on whether WMSB projects will fulfil holistic land use planning outcomes valued by both environmentalist and neoliberal paradigms. More specifically, whether the buildings are technically sound, environmentally friendly, and able to support local economic development are features that equally engender positive attitudes towards WMSB. Such holistic views serve as a

counterbalance to the logics of 'new urban environmental regimes'. On the other hand, other municipal administrators (e.g. real estate professionals, building inspectors, strategic managers) chiefly form attitudes according to criteria prioritized under neoliberal and managerial governance paradigms. This includes prioritizing spatial planning objectives that improve economic growth and valuing NPM 'output efficiency' criteria of low cost and expedient project procurement. In short, neomanagerial logics are also found among municipal civil servants. These neomanagerial views align with the logics of 'new urban environmental regimes' by selectively favouring WMC for the purpose of improving local vitality beyond that of fulfilling carbon control objectives.

While the uptake of WMC is a notable endeavour towards reducing embodied carbon emission in the construction sector, the notion that favourable attitudes towards these projects at times hinge chiefly upon improving local growth purports a form of weak sustainability. Under such pretences, it remains uncertain whether WMC can achieve mainstreaming as a low-carbon activity per se. Consequently, these findings substantiate cause for further researching the process of deliberation over carbon neutrality strategies among municipal civil servants working in Finland. If the disparate rationales found among colleagues results in planning tensions, then there is a benefit to understanding whether municipal civil servants cope with this tension through means that enable or hinder WMC uptake.

Notes

1. *Weak sustainability* holds that all types of capital (e.g. human, natural) are interchangeable; hence, if degradation of one capital is offset by increases to stocks from another form of capital, this is still viewed as sustainable. Weak sustainability is at odds with the notion of *strong sustainability,* stating that different types of capital are not interchangeable. For more information, see: Ayres (2001).
2. Béal (2017) argues, 'While many experts still view urban sustainability policies among the main opponents of neoliberalism, critical urban research has often seen these policies as one of the key areas for deepening and reinventing the process of neo-liberalization.' (120).
3. Terry (1996) applies the concept of neomangerialism to a specific type of public administrator influenced by managerialism ideologies (e.g. NPM) that also promotes market-driven and liberation agendas (i.e. entreprenurialism).

Acknowledgement

The authors would like to thank Vesa Kanninen and the anonymous reviewers for their excellent feedback. The primary author would also like to extend a special thanks to Dr. Howell Baum at the University of Maryland for his encouragements during a bleak moment. Lastly, this work would not be possible without the 300 Finnish civil servants that participated in the interviews, feedback sessions and survey study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Florencia Franzini http://orcid.org/0000-0001-5463-1375
Anne Toppinen http://orcid.org/0000-0003-0910-1505
Ritva Toivonen http://orcid.org/0000-0001-5894-4790

References

132/1999. 2003. Land-Use and Building Act (Amendment 222/2003 included).

782/2017 Decree of the Ministry of the Environment on the Moisture Performance of Buildings.

1009/2017 Decree of the Ministry of the Environment on the Indoor Climate and Ventilation of New Buildings.

6Aika. 2019. "Era of Cities: The Joint Development of the Six Cities within the Six City Strategy." Report, Helsinki, Finland.

Ahlqvist, T. 2013. "Potential Governmentality and the State Transformation in Finland." *Geopolitics* 18: 328–342. doi:10.1080/14650045.2012.723286

Ahlqvist, T., and S. Moisio. 2014. "Neoliberalisation in a Nordic State: From Cartel Polity Towards a Corporate Polity in Finland." *New Political Economy* 19 (1): 21–55. doi:10.1080/13563467.2013.768608

Ahlqvist, T., and H. Sirviö. 2019. "Contradictions of Spatial Governance: Bioeconomy and the Management of State Space in Finland." *Antipode* 51: 395–418. doi:10.1111/anti.12498

Ajzen, I. 1991. "The Theory of Planned Behavior." *Organizational Behaviour and Human Decision Processes* 50 (2): 179–211. doi:10.1016/0749-5978(91)90020-T

Ajzen, I. 2020. "The Theory of Planned Behavior Frequently Asked Questions." *Human Behavior & Emergent Technologies* 2: 314–325. doi:10.1002/hbe2.195

Ayres, R. 2001. "Strong Versus Weak Sustainability: Economics, Natural Sciences, and "Consilience"." *Environmental Ethics* 23 (2): 155–168. doi:10.5840/enviroethics200123225

Béal, V. 2011. "Urban Governance, Sustainability and Environmental Movements: Post-Democracy in French and British Cities." *European Urban and Regional Studies* 19 (4): 404–419. doi:10.1177/0969776411428562

Béal, V. 2014. "Selective Public Policies: Sustainability and Neoliberal Urban Restructuring." *Environment & Urbanization* 27 (1): 303–316. doi:10.1177/0956247814549153

Béal, V. 2017. "Greening the Neoliberal City? Urban Sustainability and Selective Neo-Liberalization in Manchester and Nantes." In *Debating the Neoliberal City*, edited by G. Pinson, and C. Morel, 119–135. London: Routledge.

Brown, T. 2015. *Confirmatory Factor Analysis for Applied Research Second Edition*. New York: The Guilford Press.

City of Helsinki (HEL). 2018. *The Carbon-neutral Helsinki 2035 Action Plan*. Report, Central Administration of the City of Helsinki, Helsinki, November.

City of Tampere (TAM). 2020. *Carbon Neutral Tampere 2030 Roadmap*. Report, Tampere City Board, Finland, August.

City of Turku (TUK). 2018. *Turku Climate Plan 2029*. Report, City Council of Turku, Finland, June.

City of Vihti (VIH). 2020. *Vihdin kunnan kestävän energian ja ilmaston toimintasuunnitelma Vihti [Sustainable Energy and Climate Action Plan of Vihti]*. Report, City of Vihti, Finland, January (in Finnish).

Davoudi, S., P. Kallio, and J. Häkli. 2021. "Performing a Neoliberal City-Regional Imaginary: The Case of Tampere Tramway Project." *Space and Polity* 25 (1): 112–131. doi:10.1080/13562576.2021.1885373

Dawson, J. 2017. *Analysing Quantitative Survey Data for Business and Management Students*. London: SAGE Publications, Ltd.

de Jong, M., S. Joss, D. Schraven, C. Zhan, and M. Weijen. 2015. "Sustainable Smarter Resiliente Low Carbon Eco-Knowledge Cities; Making Sense of a Multitude of Concepts Promoting Sustainable Urbanization." *Journal of Cleaner Production* 109: 25–38. doi:10.1016/j.jclepro.2015.02.004

Finnish Sustainable Communities (FISU). 2020. *Fisu Municipalities*. Accessed 3 July 2021. https://fisunetwork.fi/en-US/Fisu_municipalities

Fishbein, M., and I. Ajzen. 1975. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Boston, MA: Adison-Wesley Publishing Company.

Fishbein, M., and I. Ajzen. 2010. *Predicting and Changing Behavior: The Reasoned Action Approach*. New York: Psychology Press.

Franzini, F., R. Toivonen, and A. Toppinen. 2018. "Why Not Wood? Benefits and Barriers of Wood as a Multistory Construction Material: Perceptions of Municipal Civil Servants from Finland." *Buildings* 8: 159. doi:10.3390/buildings8110159

Fu, Y., and X. Zhang. 2017. "Trajectory of Urban Sustainability Concepts: A 35-Year Bibliometric Analysis." *Cities* 60: 113–123. doi:10.1016/j.cities.2016.08.003

Gibbs, D., A. Jonas, and A. While. 2002. "Changing Governance Structures and the Environment: Economy–Environment Relations at the Local and Regional Scales." *Journal of Environmental Policy & Planning* 4: 123–138. doi:10.1002/jepp.104

Giesekam, J., J. Barrett, P. Taylor, and A. Owen. 2014. "The Greenhouse gas Emissions and Mitigation Options for Materials Used in UK Construction." *Energy and Buildings* 78: 202–214. doi:10.1016/j.enbuild.2014.04.035

Gustavsson, L., and R. Sathre. 2006. "Variability in Energy and Carbon Dioxide Balances of Wood and Concrete Building Materials." *Building and Environment* 41: 940–951. doi:10.1016/j.buildenv.2005.04.008

Hurmekoski, E., R. Jonsson, and T. Nord. 2015. "Context, Drivers, and Future Potential for Wood-Frame Multi-Story Construction in Europe." *Technological Forecasting & Social Change* 99: 181–196. doi:10.1016/j.techfore.2015.07.002

Hynynen, A. 2016. "Future in Wood?" *Timber Construction in Boosting Local Developments. European Spatial Research and Policy* 23 (1): 127–139. doi:10.1515/esrp-2016-0007

Hytönen, J. 2016."The problematic relationship of communicative planning theory and the Finnish legal country." *Planning Theory* 15 (3): 223–238. doi:10.1177/1473095214549618

Hytönen, J. 2019. "Limits of localism: Institutional perspectives on communicativeness, neoliberalization and sustainability in Finnish spatial planning." *Nordia Geographical Publications* 48 (4): 110.

Hytönen, J., and T. Ahlqvist. 2019. "Emerging Vacuums of Strategic Planning: An Exploration of Reforms in Finnish Spatial Planning." *European Planning Studies* 27 (7): 1350–1368. doi:10.1080/09654313.2019.1580248

Hytönen, J., R. Mäntysalo, L. Peltonen, V. Kanninen, P. Niemi, and M. Simanainen. 2016. "Defensive Routines in Land use Policy Steering in Finnish Urban Regions." *European Urban and Regional Studies* 23 (1): 40–55. doi:10.1177/0969776413490424

Jonas, A., D. Gibbs, and A. While. 2011. "The New Urban Politics as a Politics of Carbon Control." *Urban Studies* 48 (12): 2357–2554. doi:10.1177/0042098011411951

Jonas, A., and S. Moisio. 2018. "City Regionalism as Geopolitical Processes: A new Framework for Analysis." *Progress in Human Geography* 42 (3): 350–370. doi:10.1177/0309132516679897

Jöreskog, K., and A. Goldberger. 1975. "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable." *Journal of the American Statistics Association* 70 (351): 631–639. doi:10.2307/2285946

Juntunen, P., and J. Leinonen. 2007. *Exploring Finnish Local and Regional Administration – Some Current Perspectives*. Rovaniemi: University of Lapland, Faculty of Social Science.

Karjalainen, M. 2002. Dissertation, "*Suomalainen puukerrostalo puurakentamisen kehittämisen etulinjassa"*. ["Finnish wooden multistory apartment buildings at the forefront of development of wooden construction."]. Oulu University.

Kenis, A., and M. Lievans. 2017. "Imagining the Carbon Neutral City: The (Post)Politics of Time and Space." *Environment and Planning A* 49 (8): 1762–1778. doi:10.1177/0308518X16680617

Lazarevic, D., P. Kautto, and R. Antikainen. 2020. "Finland's Wood-Frame Multi-Storey Construction Innovation System: Analysing Motors of Creative Destruction." *Forest Policy and Economics* 110: 1–11. doi:10.1016/j.forpol.2019.01.006

Mattila, H., and A. Heinilä. 2022. "Soft Spaces, Soft Planning, Soft law: Examining the Institutionalisation of City-Regional Planning in Finland." *Land Use Policy* 119: 106156. doi:10.1016/j.landusepol.2022.106156

Mäntysalo, R., and P. Bäcklund. 2018. "The Governance of Planning: Flexibly Networked, Yet Institutionally Grounded". In *The Routledge Handbook of Planning Theory*, edited by Gunder, M., A. Madanipour, and V. Watson, 237–249. New York: Routledge.

Mäntysalo, R., K. Jarenko, K. Nilsson, and I. Saglie. 2015. "Legitimacy of Informal Strategic Urban Planning—Observations from Finland." *Sweden and Norway. European Planning Studies* 23 (2): 349–366. doi:10.1080/09654313.2013.861808

Mäntysalo, R., and L. Saglie. 2010. "Private Influence Preceding Public Involvement: Strategies for Legitimizing Preliminary Partnership Arrangements in Urban Housing Planning in Norway and Finland." *Planning Theory & Practice* 11 (3): 317–338. doi:10.1080/14649357.2010.500123

Mäntysalo, R., I. Saglie, and G. Cars. 2011. "Between Input Legitimacy and Output Efficiency: Defensive Routines and Agonistic Reflectivity in Nordic Land-Use Planning." *European Planning Studies* 19 (12): 2109–2126. doi:10.1080/09654313.2011.632906

Ministry of Employment and Economic Affairs (MEE). 2017. *Wood-based – Bioeconomy Solving Global Challenges*. Report, Ministry of Economic Affairs and Employment Enterprise and Innovation Department, Helsinki, May.

Ministry of Employment and the Economy (MEE). 2014. *Sustainable Growth from Bioeconomy: The Finnish Bioeconomy Strategy*. Report, Biotalous, Helsinki, May.

Ministry of Environment (YM). 2020. *Julkisen puurakentamisen kansalliset tavoitteet [National Targets for Public Timber Construction]*. Report, Ministry of Environment, Helsinki, September (in Finnish).

Moisio, S., A. Jonas, N. Koch, C. Lizotte, and J. Luukkonen. 2020. "Changing Geographies of the State: Themes, Challenges and Futures." In *Handbook on the Changing Geographies of the State*, edited by S. Moisio, A. E. G. Jonas, N. Koch, C. Lizotte, and J. Luukkonen, 1–28. Northampton, MA: Edward Elgar Publishing, Inc.

Moisio, S., and L. Leppänen. 2007. "Towards a Nordic Competition State? Politico-Economic Transformation of Statehood in Finland, 1965–2005." *Fennia* 185: 63–87.

Moisio, S., and U. Rossi. 2020. "The Start-up State: Governing Urbanised Capitalism." *Economy and Space: A* 52 (3): 532–552.

Paloneva, M., and S. Takamäki. 2021. *Summary of Sectoral Low-Carbon Road Maps*. Report, Ministry of Economic Affairs and Employment, Finland, December.

Pelkonen, A. 2016. "Rescaling and Urban-Regional Restructuring in Finland and in the Helsinki Region." *European Urban and Regional Studies* 23 (2): 149–166. doi:10.1177/0969776413492785

Pollitt, C., and G. Bouckaert. 2011. *Public Management Reform: A Comparative Analysis. New Public Management, Governance and the Neo-Weberian State*. Oxford: Oxford University Press.

PMO (Prime Minister's Office). 2019. *Inclusive and competent Finland – A socially, economically and ecologically sustainable society*. Report, Finnish Government Publication, Programme of Prime Minister Sanna Marin's Government, Helsinki, December.

Posey, C., T. Roberts, P. Lowry, and R. Bennett. 2015. "Multiple Indicators and Multiple Causes (MIMIC) Models as a Mixed-Modeling Technique: A Tutorial and an Annotated Example." *Communications of the Association for Information Systems* 36 (11): 179–2014.

Puustinen, S., R. Mäntysalo, J. Hytönen, and K. Jarenko. 2017. "The "deliberative bureaucrat": deliberative democracy and institutional trust in the jurisdiction of the Finnish planner." *Planning Theory & Practice* 18: 71–88. doi:10.1080/14649357.2016.1245437

Ramage, M., H. Burridge, H. Busse-Wiche, G. Fereday, T. Reynolds, D. Shah, G. Wu, et al. 2017. "The Wood from the Trees: The use of Timber in Construction." *Renewable and Sustainable Energy Reviews* 68: 333–359. doi:10.1016/j.rser.2016.09.107

Ravetz, J., A. Neuvonen, and R. Mäntysalo. 2021. "The New Normative: Synergistic Scenario Planning for Carbon-Neutral Cities and Regions." *Regional Studies* 55 (1): 150–163. doi:10.1080/00343404.2020.1813881

Rice, J. 2010. "Climate, Carbon, and Territory: Greenhouse Gas Mitigation in Seattle, Washington." *Annals of the Association of American Geographers* 100 (4): 929–937. doi:10.1080/00045608.2010.502434

Rosenweig, C., W. Solecki, S. Hammaer, and S. Mehrotra. 2010. "Cities Lead the Way in Climate-Change Action." *Nature Sustainability* 467 (7318): 909–911.

Rosol, M., V. Béal, and S. Mössner. 2017. "Greenest Cities? The (Post-)Politics of new Urban Environmental Regimes." Environment and *Planning A* 49 (8): 1710–1718.

Sager, T. 2009. "Planners' Role: Torn Between Dialogical Ideals and Neo-Liberal Realities." *European Planning Studies* 17 (1): 65–84. doi:10.1080/09654310802513948

Salo, R., and R. Mäntysalo. 2017. "Path Dependencies and Defensive Routines in Finnish City-Regional Land-use Policy Cooperation: Case Ristikytö." *International Planning Studies* 22: 128–144. doi:10.1080/13563475.2016.1219653

Solecki, W., G. Ramos, D. Roberts, C. Rosenzweig, and W. Brenna. 2021. "Accelerating Climate Research and Action in Cities Through Advanced Science-Policy-Practice Partnerships." *NPJ Urban Sustainability* 1 (3): 1–8.

Terry, L. 1996. "Administrative Leadership, Neo-Managerialism, and the Public Management Movement." *Public Administration Review* 58 (3): 195–200.

Toivonen, R., H. Vihemäki, and A. Toppinen. 2021. "Policy Narratives on Wooden Multi-Storey Construction and Implications for Technology Innovation System Governance." *Forest Policy and Economics* 125: 102409. doi:10.1016/j.forpol.2021.102409

Towards Carbon Neutral Municipalities (HINKU). 2021. *Hinku Networks*. Accessed 3 July 2021. https://www.hiilineutraalisuomi.fi/en-US/Hinku/Hinku_network__Towards_Carbon_Neutral_Mu(50207)

Tozer, L., and N. Klenk. 2018. "Discourses of Carbon Neutrality and Imaginaries of Urban Futures." *Energy Research & Social Science* 35: 174–181. doi:10.1016/j.erss.2017.10.017

Tozer, L., and N. Klenk. 2019. "Urban Configurations of Carbon Neutrality: Insights from the Carbon Neutral Cities Alliance." *Politics and Space C* 37 (3): 539–557.

Valtonen, E., H. Flakenbach, and K. Viitanen. 2017. "Development-led Planning Practices in a Plan-led Planning System: Empirical Evidence from Finland." *European Planning Studies* 25 (6): 1053–1075. doi:10.1080/09654313.2017.1301885

Vihemäki, H., A. Ludvig, R. Toivonen, A. Toppinen, and G. Weiss. 2019. "Institutional and Policy Frameworks Shaping the Wooden Multi-Story Construction Markets: A Comparative Case Study on Austria and Finland." *Wood Material Science and Engineering* 14 (5): 312–324. doi:10.1080/17480272.2019.1641741

Vihemäki, H., A. Toppinen, and R. Toivonen. 2020. "Intermediaries to Accelerate the Diffusion of Wooden Multi-Storey Construction in Finland." *Environmental Innovation and Societal Transitions* 36: 433–448. doi:10.1016/j.eist.2020.04.002

While, A., A. Jonas, and D. Gibbs. 2004. "The Environment and the Entrepreneurial City: Searching for the Urban `Sustainability Fix' in Manchester and Leeds." *International Journal of Urban and Regional Research* 28 (3): 549–569. doi:10.1111/j.0309-1317.2004.00535.x

While, A., A. Jonas, and D. Gibbs. 2010. "From Sustainable Development to Carbon Control: Eco-State Restructuring and the Politics of Urban and Regional Development." *Transactions* 35 (1): 76–93.