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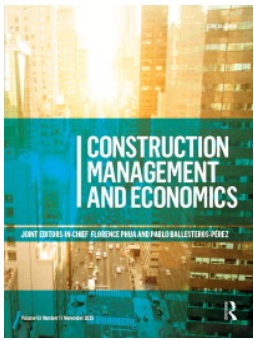To cite this publication, please use the final published version (if applicable).
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Strategic programmes for circular construction: lessons from three public clients

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ABSTRACT

Strategic programmes are frequently employed by organisations to drive transformational change, particularly when sectors pursue systemic shifts, such as the circularity transition. However, despite their potential, these programmes often fail to effect lasting change within their parent organisations, with outcomes remaining disconnected. This study examines how programme integration mechanisms shape organisational transformation in circularity-oriented change programmes. Several mechanisms were identified through a comparative case study of Dutch public construction clients. The findings suggest that isolating such programmes from the parent organisation hinders organisational transformation. Instead, the early incorporation of integration mechanisms is essential to facilitate both learning and unlearning processes, ensuring the effective and sustainable adoption of circular practices. Moreover, findings show that temporal alignment emerges as a decisive factor in a programme's transformative capacity, as mismatches between programme and organisational learning trajectories can limit systemic impact. These insights contribute to strategic programme literature by demonstrating how these programmes can, depending on their formal and informal mechanisms, promote or stall transformative change.

Introduction

Being responsible for two-fifths of global natural resource consumption and a similar share of waste production (Hossain and Ng 2018), the construction sector is one of the largest generators of CO_2 emissions and waste (Hossain and Ng 2018, Sengers et al. 2019). Circularity is increasingly advocated as a promising way to address these challenges, leading to a wealth of initiatives in both practice and academia on circular construction (Ghaffar et al. 2020, Norouzi et al. 2021). Despite the diversity in understandings (Wiarda et al. 2023), circular construction is generally associated with a lifecycle approach to products and services that optimises a construction's lifetime, integrates the end-of-life phase in the design, allowing for multiple lifecycles of construction components, and uses new ownership models where constructions are understood as merely temporary material storages

(Kristensen et al. 2021, Ossio et al. 2023). Applying these principles requires fundamental revisions of construction practices, innovations, and organisational models (Coenen et al. 2023, van Uden et al. 2024). The required systemic changes complicate the uptake of circular practices, indicated by a lack of practical knowledge (Adams et al. 2017), missing standards (Bucci Ancapi 2023), a lack of consensus regarding the definition of circularity (Wiarda et al. 2023), uncertainty of how design decisions will affect later stages, and competing ambitions (Kooter et al. 2021).

Public clients are pivotal actors in construction-related transformative change (Coenen et al. 2023). A typical approach to trigger and shape organisational transformation in public client organisations is the initiation of strategic programmes (Lehtonen and Martinsuo 2009, Turner 2009). These programmes can be described as temporary arrangements of projects

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and related activities that comprehensively enable transformation in the direction of particular strategic objectives (Frederiksen *et al.* 2024). Because of circularity's systemic nature, programme-based approaches have been increasingly used in the pursuit of circularity-oriented transformation (e.g., Sengers *et al.* 2019, Eikelenboom and van Marrewijk 2023). These programmes can act as vehicles for more comprehensive organisational and even societal transformation (Locatelli *et al.* 2020), given that single projects do not lead to such large-scale changes (Martinsuo and Hoverfält 2018). For instance, strategic programmes enable public clients to experiment with circular innovations collaboratively, develop a knowledge base, and ultimately implement circular construction practices in organisations' primary processes (Vuorinen and Martinsuo 2018, Sengers *et al.* 2019).

Programmes can contribute to continuous learning cycles, for instance by optimising novel solutions in subsequent and parallel projects while keeping an eye on the programme's objectives (Vosman *et al.* 2024). Therefore, programmes are fundamentally different from projects, despite the perception that managing a mega-project has much in common with managing a programme. An essential distinction between the two is that projects often have a strictly delineated scope with regard to delivering predefined changes, while programmes are more emergent by nature and generally pursue long-term and open-ended objectives, for instance, following an organisational vision (Pellegrinelli 2011).

Unfortunately, many strategic programmes fail to achieve the pursued organisational transformation (Lehtonen and Martinsuo 2009). This failure is often attributed to a misalignment between the programme and the parent organisation (Artto *et al.* 2009, Martinsuo and Hoverfält 2018, Martinsuo *et al.* 2022). Little research has been conducted addressing how organisations in public, project-based sectors can mobilise programmes (Huovila *et al.* 2019) to implement circular practices and processes at the organisational level (Klein *et al.* 2020, Klein *et al.* 2022). The lack of insights into how the integration of systemic programmes into public parent organisations can be achieved, both formally (e.g., through structural positioning) and informally (e.g., through boundary activities), complicates implementing change efforts (Rainey 2009, Kuitert *et al.* 2019). Therefore, a better understanding is needed of how circularity-aimed change programmes are organised and executed in relation to the parent organisation and how this affects organisational and system-level transformation.

Only then can it be understood how the insights and changes are transferred to the operational processes of the parent organisation.

In this paper, we aim to address the following research question: "How do programme integration mechanisms shape organisational transformation in circularity-oriented change programmes?" In addressing this question, we draw on strategic programme literature, which has identified several mechanisms influencing programme-organisation integration, including formal integration mechanisms and boundary activities (Lehtonen and Martinsuo 2008, 2009, Vuorinen and Martinsuo 2018). We studied the development of integration mechanisms through strategic programmes based on three cases of circular construction programmes initiated by Dutch public clients. As these programmes have a long duration and some are not focused on achieving immediate results, this study does not aim to measure the effectiveness of these programmes in terms of circular outcomes but rather to unravel the mechanisms to obtain lessons from these programmes.

The remainder of the paper is structured as follows. First, we present the current debate on circularity in construction literature. In this theoretical background section, we also explore change programme literature to understand how programme-parent organisation integration is conceptualised and the embeddedness of strategic programmes in a wider interorganisational context. Second, the data collection methods are described and discussed. Third, the findings are presented. The paper concludes with a discussion of the implications for the academic debate on strategic programmes for circularity and avenues for future research.

Theoretical background

Transforming towards circular public construction organisations

The government, primarily through its role as a client, plays a pivotal role in circular construction because a large part of the construction sector is considered public or semi-public (Coenen *et al.* 2023). In this sector, governmental organisations that own, manage and procure construction assets, hereinafter referred to as public clients, are considered a primary source for either stalling or accelerating transformative change (Braams *et al.* 2021). Public clients act not only as policymakers and regulators of the industry (McDowall *et al.* 2017) but also as legislators (Smol *et al.* 2025), purchasers and owners of construction assets (Eikelenboom *et al.* 2024), or even as change

initiators of business models (Witjes and Lozano 2016, Mark-Herbert *et al.* 2025). Kristensen *et al.* (2021) argued that single efforts introducing new circular targets in projects – the common mode of organising in construction – are insufficient because public clients need to fundamentally change their existing organisational practices to implement circularity successfully.

Various circular construction strategies exist, including the reuse of components and materials, design-for-disassembly, new ownership models, and material substitution (Foster 2020). Implementing such strategies requires fundamental changes in organisational processes and, consequently, practices throughout the whole construction sector due to the fundamental value differences (Eikelenboom and van Marrewijk 2023, van Uden *et al.* 2024). For example, whereas conventional construction focuses on economic efficiency (Hart *et al.* 2019, Ruijter *et al.* 2021), circular construction focuses on quality, durability, and ecological efficiency (Nußholz *et al.* 2019, Ghaffar *et al.* 2020). Furthermore, new technologies, such as modular building techniques and online resource-sharing platforms, need to be adopted in circular construction to minimise resource use (Adams *et al.* 2017, Van Uden *et al.* 2025). All such strategies and solutions aim to address value retention in terms of material resources (Delai and Alcantara 2024). A graphical representation of how ideal circular material flows in construction can be understood, inspired by the often-used butterfly diagram by the EllenMacArthurFoundation (2019), can be found in Figure 1.

These contrast the sector's focus on well-developed, tested, and proven technologies and processes to minimise liability concerns in conventional construction (Hart *et al.* 2019, Ruijter *et al.* 2021). These have proven to result from a conservative construction culture, which also impacts the transition towards a circular economy. Additionally, in circular construction, collaborative relationships and business models have to be developed further (Ghaffar *et al.*

2020), as the sector remains reliant on competitive and contractual relationships. Finally, circular construction requires a cultural shift regarding risk acceptance and long-term benefits (e.g., of a building lifecycle), which requires intrinsic motivation and a shift in mindset (Kooter *et al.* 2021). These include changes in practices throughout the construction sector, such as developing deconstruction for demolition (van den Berg *et al.* 2021) or designing based on available secondary resources instead of virgin materials (Eberhardt *et al.* 2022, Van Uden *et al.* 2025).

Despite increased interest and awareness of the importance and conceptualisation of circularity, the transition proceeds slowly and focuses on superficial solutions (Hossain and Ng 2018). Construction actors encounter different challenges, including fragmented value chains and organisations (Giorgi *et al.* 2022), technical challenges due to the long lifespan and complex design of constructions, financial challenges such as unclear financial cases and high start-up costs (Adams *et al.* 2017), and regulatory challenges such as hindering laws and a lack of quality standards (Bucci Ancapi 2023). A particular challenge for organisations aiming to implement circular construction is its systemic nature (Joensuu *et al.* 2020), requiring a comprehensive consideration of the long lifespan of construction assets (Adams *et al.* 2017). This also means addressing the entire life cycle of construction assets, including the phases of design (e.g., modular design) (Hossain *et al.* 2020, Dokter *et al.* 2021), supply (e.g., availability of secondary materials) (Genovese *et al.* 2017), construction (e.g., deconstructability), use (e.g., waste minimisation, or allowing for multiple lifecycles), and deconstruction (e.g., reusing components) (Adams *et al.* 2017). All these aspects can be stimulated or hindered by policy, laws and regulations, and procurement. Here, public clients play a pivotal role in stimulating system change in this stage of the transition towards a circular economy (McDowall *et al.* 2017, Eikelenboom *et al.* 2024). A change in practices within
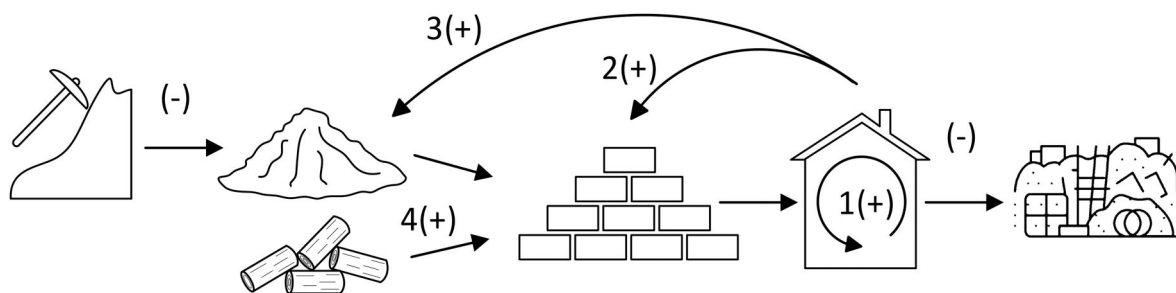
Figure 1. The conceptualisation of circular material flows in construction with (1) maximising the lifespan of existing assets, (2) reusing components, (3) recycling materials, and (4) using renewable materials (+) to minimise the input of non-renewable materials and waste creation (-).

public client organisations might therefore lead to cross-organisational change.

Focusing on public organisations introduces particular challenges for organisational change (Fernandez and Rainey 2017). For instance, current initiatives of public clients often refer to procurement approaches to circular solutions towards a circular built environment (Milios 2018), which often do not have the desired systemic impacts due to the single applications in individual construction projects (Coenen et al. 2023). Moreover, challenges result from the politicised environments in which public organisations act (Matinheikki et al. 2019). Political pressures lead to other ways of decision-making and management, and the resulting publicness also leads to other guiding values compared to private organisations (Kuitert et al. 2019). Therefore, public values require other mechanisms that safeguard the values within organisations, which affects how organisations act and change. One way is the employment of strategic programmes.

Strategic programmes and organisational change

Our study focuses on strategic programmes in public client organisations that aim to achieve a transformation towards organisational processes and practices of which the operational outcomes are in line with the circularity principles. These programmes can lead to broader and more far-reaching effects with longer-term implications than single projects (Artto et al. 2009). Programme management literature consists of roughly two streams: programmes from an efficiency point of view – bundling of related projects – or considering a megaproject to be a programme (e.g., Frederiksen et al. 2021, Denicol and Davies 2022) and programmes as vehicles to accomplish organisational changes (Lehtonen and Martinsuo 2008, Martinsuo and Hoverfält 2018, Sloot et al. 2024).

The former refers to the view that programmes comprise multiple projects and other activities, are complex and expansive in scope, and long in duration (Lehtonen and Martinsuo 2008). Such programmes can vary in size and require a common factor that is repetitive over clustered projects (Pellegrinelli 1997, Pellegrinelli et al. 2007). Goals are initially rough and tentative, and their scope and content change over time to respond to environmental uncertainty (Thiry 2015). While programmes following this view can be understood as centrally coordinated clusters of projects (cf. Frederiksen et al. 2021), in this paper, we are primarily interested in strategic programmes that aim to transform the organisation in the context of larger transitions. These

programmes sometimes induce and require a system transformation, as is the case with circularity.

The latter programme literature stream refers to the view that the central objective in strategic programmes is to ensure the implementation of the desired change into the parent organisation, which requires integration with and support from the parent organisation (i.e., the structure in which an organisation is organised (Johansson et al. 2007, Lehtonen and Martinsuo 2009, Burke and Morley 2016. Vuorinen and Martinsuo 2018, Eikelenboom and van Marrewijk 2024). This can be challenging as change efforts are implemented while the organisation's business operations continue and the parent organisation pursues other responsibilities, including other projects and programmes (Martinsuo et al. 2022). As a result, many programmes fail to achieve the intended change objectives in the organisation (Artto et al. 2009, Martinsuo and Hoverfält 2018, Martinsuo et al. 2022).

Strategic programmes are often deliberately isolated from the parent organisation to facilitate radical organisational change while being unbothered by daily affairs (Lehtonen and Martinsuo 2009, Willems et al. 2020). Contrarily, it is argued that this separation complicates the integration of changes within the parent organisation (Bos-de Vos et al. 2022), making it more difficult to embed new and adjust existing processes in line with the programme's goals (Vosman et al. 2024). An alternative then could be to either fully integrate the programme in the programme into the organisation beforehand, thereby blurring the distinction between programme and parent organisation, including setting up a hybrid version. For change programmes pursuing systemic impact like circularity-oriented programmes, little is known about the impact of the formal positioning – either isolated, integrated, or hybrid forms – on integration dynamics and organisational change.

Integration mechanisms for strategic change

Several mechanisms are identified in literature to increase the integration between the parent organisation and the strategic programme, including formal integration mechanisms (i.e., formal, higher-level decisions on organising and managing connections between programmes and parent organisations), as well as boundary activities (i.e., efforts to influence demarcations between different actors, groups or organisations). Lehtonen and Martinsuo (2009) identify four formal integration mechanisms: (1) structures and formal control mechanisms (e.g., steering groups

consisting of central managers); (2) goal and content-based linkages (e.g., connection to strategic goals and ongoing change programmes); (3) people and relationship-based mechanisms (e.g., people working part-time in the programme and their permanent units); and (4) adopting parent organisation procedures and standards (e.g., linking to corporate planning and budgeting).

In addition to formal integration mechanisms, Lehtonen and Martinsuo (2008, 2009) and Vuorinen and Martinsuo (2018) emphasise the importance of boundary activities performed by programme managers. These are understood as the mundane, micro-level day-to-day activities that shape, bridge, and buffer boundaries between programmes and parent organisations (Lehtonen and Martinsuo 2008, 2009). Boundaries in themselves can exist in many ways, such as symbolic, social, physical, and temporal boundaries (Langley et al. 2019). Symbolic boundaries represent individuals' conceptual distinctions to categorise the environment, such as the distinction between what is or is not ethically sound. When symbolic boundaries become embodied in distinctions among social groups, we speak of social boundaries, which are "objectified forms of social differences," thereby including or excluding people (Lamont and Molnár 2002, p. 168) and relating to identity and social bonding in a manner that ties a group of people together (Hernes 2004). Furthermore, physical boundaries represent spatial separations and materiality (Langley et al. 2019). Such boundaries relate to formal rules and physical structures that regulate human action and interaction within organisations (Hernes 2004). Temporal boundaries, lastly, emphasise differences in time periods and paces (Stjerne and Svejenova 2016, Söderberg 2020) and play a role in, for instance, connecting temporary organisational forms such as projects to the permanent parent organisation (Stjerne and Svejenova 2016).

In the context of strategic programmes, activities to influence boundaries include (1) defining and shaping the boundary (e.g., defining the programme's scope with relation to the other challenges of the parent organisation), (2) representing the programme and creating legitimacy (e.g., lobbying for the programme to top management), (3) information scouting and negotiating (e.g., expert workshops), and (4) ensuring continuity (e.g., communication of quick wins) (Lehtonen and Martinsuo 2008).

Despite earlier studies focusing on programme integration within parent organisations, the multi-lifecycle, cross-organisation, and uncertain nature of circularity-oriented programmes create dynamics that are different from other, intra-organisational transformation programmes (Arranz et al. 2024). This difference stems from the systemic nature of the desired change, as circularity programmes need to become embedded not only in the parent organisation, as is the case for conventional strategic change programmes, but also in its related contexts like the interorganisational network and industry system (Manning 2008), or multiple parent organisations in parallel (Bos-de Vos et al. 2022). Few studies explicitly consider the systemic integration of strategic programmes. For instance, Bos-de Vos et al. (2022) focus on an interorganisational programme for transforming the healthcare industry and Stjerne et al. (2019) focus on a transformation programme to increase efficiency and collaboration in the Danish manufacturing industry. All in all, programmes' focus on circularity will likely affect how organisations structure and coordinate these strategic programmes, of which little knowledge is available. Therefore, in the remainder of the paper, we study three in-depth empirical cases to reveal how programme integration mechanisms shape circularity-oriented transformation within parent organisations.

Research approach

To investigate how programme integration mechanisms shape organisational transformation in circularity-oriented change programmes, we applied a comparative case study approach. Three diverse cases were studied considering circular construction programmes in three public client organisations in the Netherlands, each with another approach to positioning and organising the programme. This allowed for an in-depth, contextual exploration of how different programmes operate, how they are positioned to the parent organisations, and how boundary activities shape change.

Selection and introduction of three empirical cases

Cases were selected in the context of circular construction in a public context. Using a purposive sampling approach (Campbell et al. 2020), cases were selected based on their focus on a strategic circular construction programme (Lehtonen and Martinsuo 2008), their consideration as frontrunners in the circular construction transition in the Netherlands, their diverse approaches of how the organisation of a strategic programme was adopted in terms of size, clarity,

of goals (Pellegrinelli *et al.* 2007), and their formal integration in the parent organisation (Lehtonen and Martinsuo 2009). Given the timeline of the introduction of circularity in Dutch construction that started around 2016, the programmes all took place in a similar institutional context, that despite the efforts of these programmes has only changed limitedly so far (NL 2023, Hanemaaijer *et al.* 2025). Specifically, three distinctive structural positioning strategies representing the programme's implementation approaches were defined after case selection (Willems *et al.* 2020): one where the programme is entirely isolated from the parent organisation, one in which the programme is integrated into the organisational line of the parent organisation, and one that is partly isolated and partly integrated, i.e., hybrid (Figure 2) . The three cases represent this variety in the positioning strategy (Bryman 2012), which enabled us to inquire how different integration mechanisms shape organisational change, considering previous research suggesting that the isolation of programmes might hinder later integration (Bos-de Vos *et al.* 2022). The approach enabled us to create both variance and divergence in the data (Eisenhardt 1989, Pauwels and Matthyssens 2004). Preliminary interviews, networks from previous research, and document research allowed us to learn

about these companies before finally selecting them. The three selected cases are transformative programmes in (1) a large municipality, (2) a national infrastructure agency, and (3) an energy network operator.

In the first case (*MunProg*), a municipality initiated a strategic innovation programme to promote circular construction within its various departments. The programme, led by managers from sustainability, waste and material, and innovation departments, spanned three phases. Each phase featured numerous circular construction projects as part of the programme, totalling fifty-two, running from 2019 to 2023. Projects were evaluated in collaboration with project partners and the knowledge gained from these projects was intended to be used to change the organisation by developing follow-up initiatives and learning documents, such as a circular construction toolbox that included elements such as techniques, measuring tools and standards, and new practices.

The second case (*AgProg*) involved a circularity implementation programme between an infrastructure ministry, its executive agency, and a railway agency. The programme was tightly integrated with the parent organisation, and from 2019 to 2020, it was structured into four Transition Pathways, each managed by a
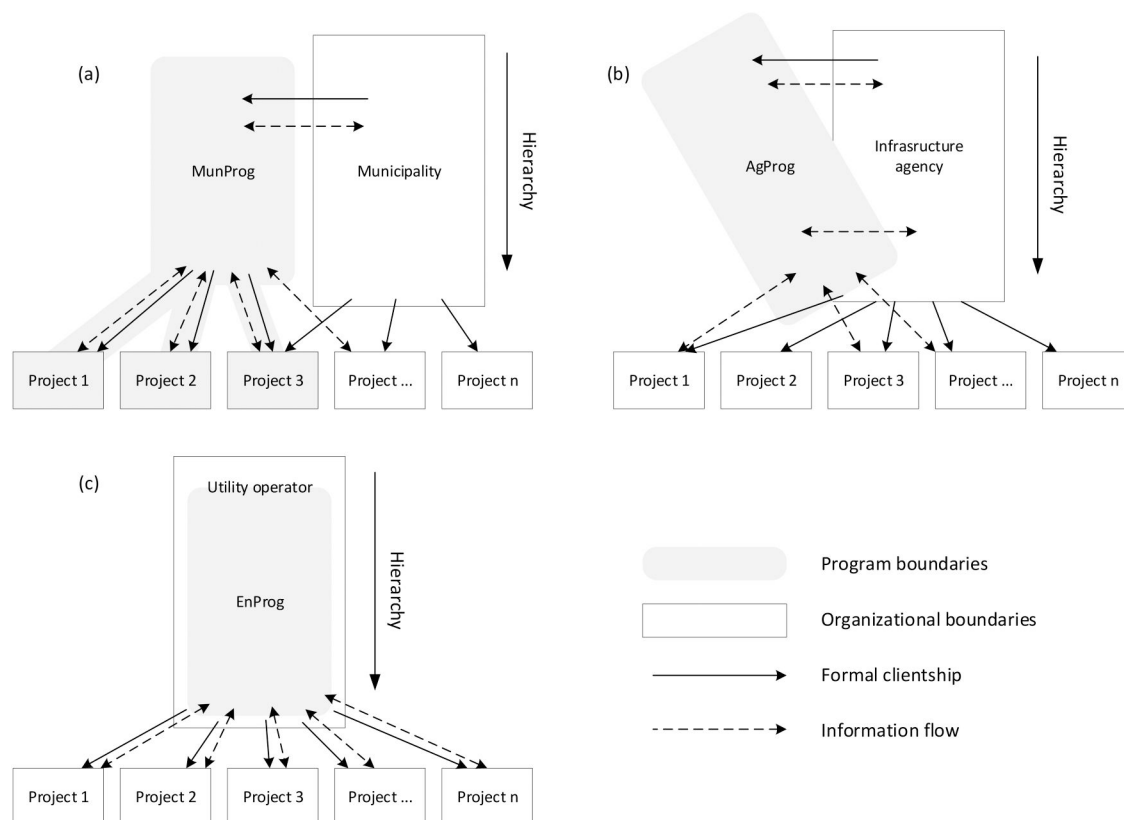
Figure 2. Illustration of integration between the programme, construction projects, and parent organisation of (a) MunProg, (b) AgProg, and (c) EnProg.

Table 1. Overview of the studied programmes.

	MunProg (case 1)	AgProg (case 2)	EnProg (case 3)
Programme name	Circular innovation programme	Circular implementation programme	Circular change programme
Ambition programme	Gain traction and implement circular construction in various departments to reduce resources by 50% in 2030 and 100% by 2050.	Render the full organisational practices, and eventually the sector, circular through transition pathways — 50% of materials and 100% of practices in 2030 and 100% of materials in 2050.	Full circular procurement in the organisation, starting with 60% circular materials by 2025 and 100% circular by 2040, requiring new procurement methods and partnering, affecting various departments.
Programme methods	Isolated pilot projects to stimulate knowledge gathering on circular construction via conscious partnering and evaluation, resulting in a toolbox for future projects.	Different specific sub-programmes (transition pathways) were developed for several product groups. These activities span all relevant departments of organisation and related organisations, aimed at the full transformation pathway from experimenting to institutionalising.	Radical pilot projects that expose where old practices are no longer helpful for circular construction, leading to skill development and attraction of new employees.
Stakeholders in the lead	Sustainability department	Programme manager appointed by board, collectively between Ministry and infrastructure agency.	Corporate Social Responsibility manager
Duration programme	Phase 1: 2019-2021 Phase 2: 2022-2023 Phase 3: 2023-2025 Possible follow-ups	Ideation: 2018 Running: 2020-2030 Possible follow-ups	Phase 1: 2013-2020 Phase 2: 2021-2025 Phase 3: 2025-2040
Initiating organisation	Municipality	Infrastructure agency, railway agency, and Ministry	Public energy supplier
Organisation size	16.000 employees	10.000 employees	7.500 employees
Programme positioning	Programme as a separate organisation, managing its own projects (Figure 2a)	Programme with its own governance structure but with strong connections to ongoing operational activities (Figure 2b)	Programme as integral part of the parent organisation (Figure 2c)

programme manager and overseen by a programme director. The programme addressed various goals, including reducing machinery emissions, promoting circular material practices, and meeting CO_2 reduction targets from the climate agreement, all detailed in four corresponding implementation roadmaps. While interaction with operational construction projects was part of the strategy, those projects themselves were not initiated exclusively because of the programme.

The third case (*EnProg*) focused on a circular construction programme initiated by a large Dutch public energy supplier. This organisation aimed to make its real estate 60% circular by 2025 and to use only circular materials by 2040. Initially focusing on office buildings, they have already procured and completed multiple projects with full integration. The programme employed radical pilot projects to learn about the bottlenecks for circular construction throughout the organisation. Lessons from programme outcomes informed subsequent initiatives and inspired similar efforts (e.g., for underground infrastructure projects). Further, the pilot projects led to the development of skills and securing these through tactically placed change agents. This in turn resulted in attracting

employees with new skillsets and letting go of employees who wanted to maintain old skillsets. An overview of the three cases is shown in Table 1.

Figure 2 illustrates how the programmes are formally positioned to the parent organisation and the projects. The organisation's boxes indicate the organisational lines, including the internal management structures, while the grey boxes indicate the programme boundaries. The boxes should be understood top-down, indicating top management up in the boxes and, for instance, project teams in the boxes' bottom. Overlap indicates that the individuals in the organisational line participate in the programmes' organisation, while separation indicates autonomy. As all organisations are project-based, their operations occur in projects, regarding both circular programme execution and conventional business operation. The solid lines indicate where the programme or project is formally commissioned or managed in the organisation. The dotted lines, contrarily, indicate the flow of data, knowledge, and lessons. For instance, for AgProg (case 2), information is coordinated between the programme executives and organisational executives as well as with the project teams in the organisation,

Table 2. Data sources cases.

	MunProg (case 1)	AgProg (case 2)	EnProg (case 3)
In-depth interviews	1. Sustainability/ circularity expert #1 2. Sustainability/ circularity expert #2 3. Programme manager #1 4. Programme manager #2 5. Middle manager department A 6. Middle manager department B 7. Senior manager sustainability department 8. Senior manager department C 9. Senior manager department D 10. Project member #1 – project 1 11. Project member #2 – project 1 12. Project member #3 – project 1 13. Project member #4 – project 2 14. Project member #5 – project 2 15. Project member #6 – project 3 16. Project member #7 – project 3 17. Project member #8 – project 3 18. Project member #9 – project 3 19. Project member #10 – project 3 20. Sustainability advisor engineer – project 3 21. Project manager engineer – project 3	22. Programme director 23. Pathway manager 24. Programme initiator 25. Steering group member 26. Circularity expert #1 27. Circularity expert #2 28. Regional director 29. Transition manager 30. Sustainability department manager 31. Portfolio manager 32. Policymaker #1 33. Policymaker #2 34. Policymaker #3	35. Urban developer municipality 36. Consultant contractor project 4 37. Architect project 4 38. Head procurement department client 39. Advisor installations project 4 40. Contractor realisation project 4 41. Interior architect project 2, 3, 4 42. Corporate Social Responsibility manager client 43. Constructor project 4 44. Consultant project 1, 2, 3, and 4 45. Installation specialist project 4 46. Contract manager project 4 47. Project manager project 4
Observations	a) Project meetings, project 3 – 25x b) Sustainability meetings, project 3 – 5x c) Internal sustainability meetings – 5x		a) General project meetings, project 4 – 4x b) Meetings regarding specific design parts, project 4 – 2x c) Internal meetings with the contractor, project 4 – 2x d) All meetings at least partly focused on circularity

while in MunProg (case 1), coordination only takes place between the executive teams.

Data collection

Data was collected through various sources, including interviews, observations, and organisational documents (Table 2). Here, we took a longitudinal approach to data collection to account for variations in programme implementation that might take place throughout time and support the comparative analysis between the cases. First, in-depth semi-structured interviews with diverse case organisation members were conducted for all three cases, including circular economy experts, middle and senior managers from different departments, programme managers and circular construction project managers. Using a purposive sampling approach (Campbell *et al.* 2020), interviewee selection was based on involvement in circular construction programmes, complemented with suggestions of previous interviewees. This approach resulted in forty-nine interviews (twenty-one interviews for MunProg (case 1), fourteen for AgProg (case 2), and fourteen for EnProg (case 3)), conducted between 2021 and 2023. Interview questions concerned the implementation of circular construction in the organisation, the programme, and projects within the programme (i.e., programme activities, organising and management structure, challenges encountered,

and perceptions on the progress of the programme), and the interactions between members of the parent organisation and the programme. These questions were related to the theoretical framework of integration mechanisms as shown in the coding framework (Appendix A).

Second, ethnographic observations were conducted in MunProg (case 1) and EnProg (case 3) to collect in-depth insights. For MunProg (case 1), we observed thirty meetings of one of the construction projects involved in the programme between December 2021 and December 2022, including bi-weekly project meetings and multiple sustainability meetings. We also observed five internal meetings on sustainable and circular construction within the organisation in MunProg (case 1) between November 2021 and December 2022. For EnProg (case 3), we observed eight meetings of one circular construction project involved in the programme between June 2021 and January 2022. These meetings were about the progress of the construction project and decisions that needed to be made for its continuation, including those on circularity.

An overview of the timelines of research and strategic programmes can be found in Figure 3. This shows, for instance, for MunProg (case 1), that data was collected on the programme stage between 2021 and 2023, where both interviews and observations were conducted, with partly overlapping times. Note that only parts of the programmes were studied as
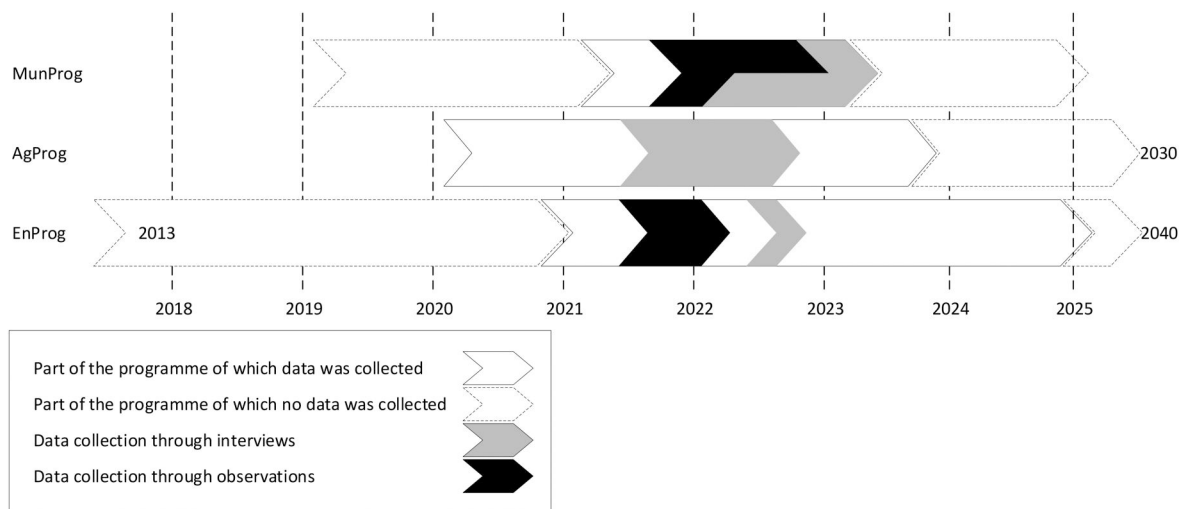
Figure 3. Timeline of the studied programmes and points of engaged data collection.

their running time spans many years and will potentially extend into the next decades.

Finally, documents were analysed for each case. For MunProg (case 1) these included organisational strategic and policy documents; programme evaluation and progress reports; documents for knowledge sharing resulting from the programmes; and several documents relating to specific projects. For AgProg (case 2) documents included organisational strategy documents, programme evaluation reports, and policy advice. For EnProg (case 3) documents included contracts between different organisations, ambition documents related to specific construction projects, and annual reports. These documents provided a contextual understanding and formal approach to the strategies.

Data analysis

To analyse the data, we first performed an analysis to become familiar with each case as a stand-alone entity (Eisenhardt 1989). This process allowed for the emergence of unique patterns for each case before we generalised patterns across cases. We did so by carefully reading all interview transcripts, observation notes, and documents for each case to become familiar with the vocabulary of each strategic programme and the involved organisations. Afterwards, materials for each case were coded in Atlas.ti using a coding framework based on the literature discussed in section "Strategic programmes and organisational change" (Appendix A). This contains elements such as defining and shaping the boundary of a programme, isolative mechanisms, and linking programme and project outcomes to existing procedures/structures.

This coding framework consists of the general programme information, formal integration mechanisms, boundary activities of project and programme managers, isolating and integrating boundary activities of parent organisation members, and programme integration outcomes. Using the theory introduced in section "Theoretical background," we identified separate subcodes for each of these categories for each case. To identify boundary activities, we focused on identifying the participants' interpretations, considerations, decisions, and behaviours during the observations and their accounts of the activities of other involved actors. While evaluating the results for each case, we paid specific attention to the particularities of the circular construction transition and the context of public clients for the integration mechanisms. During this process, we continuously moved back and forth between the empirical data and the literature, allowing for both building on and contributing to existing theory (i.e., abductive approach; Sætre and Van de Ven 2021).

Following Eisenhardt (1989), we compared the cases by evaluating the similarities and differences between the three cases. This approach enabled us to uncover notable mechanisms and contextual influences across the cases using the theory-based code framework (Appendix A). It allowed us to systematically evaluate the implications of the different identified integration mechanisms for the programme-parent organisation integration and the implementation of circular construction in the organisation for these three cases. This helped us to create coherent storylines, which were used to formulate the results. While the cases take place in different organisations, and therefore contextual factors might play an unforeseen role, the contexts of circularity, the Dutch public sector, and the construction

context enable us to link the change mechanisms to the circularity-oriented transition. The three storylines allow for the identification of elements that are related to organisational practices versus elements that pertain to the approach to the positioning and execution of the strategic change programme.

Results

Based on how the programmes were positioned and the boundary activities between the programmes and the parent organisations, we identified several similarities and differences in integration mechanisms in the three cases. A comprehensive table of the comparative analysis can be found in Appendix B. The formal positioning, boundary activities performed by programme members, and programme involvement by members of the parent organisation are separately discussed in the following sections.

Formal positioning of the programme

In each programme, it was emphasised that the integration of the programme into the parent organisation was essential to implement circular construction. For example, in the MunProg (case 1) strategy document was stated: "To ensure that we can work towards a circular organisation, we have established the programme with and in close relation to the strengths of all departments." To achieve this goal, all programmes installed several formal integration mechanisms, such as linking the programme to the organisation's overall strategy and adopting organisational procedures. How the programmes were formally positioned in the parent organisation differed per case.

MunProg (case 1) was formally positioned as a separate and isolated circular innovation programme. Emergent circular practices were aimed to be developed in circular construction projects that were explicitly selected to be part of the programme. The insights of these projects would afterwards be transferred to the parent organisation, for example, through documents such as the "Circular toolkit." MunProg (case 1) is also involved in several conventional projects to adopt circular practices. This formal programme was positioned to offer room for learning-by-doing and experimentation within the projects. Despite these formal integration mechanisms, it appeared difficult to implement insights from MunProg (case 1) in the parent organisation, as a programme manager (#3) emphasised: "We are thinking of very good things here; however, nobody in the

organisation does anything with it." A crucial reason seemed that it was difficult to adopt new circular practices in regular projects, as internal organisational processes inhibited this (#16): "Adopting a lifecycle approach requires new ways of working in the welfare and facilities department too. But they are not changing, so that really blocks our efforts." These internal processes were not addressed in MunProg (case 1), as it focused on developing circular practices in separate projects. Although the projects were carefully selected for their potential to serve the programme's objectives, little contributions were made to achieving the strategic, organisational programme goals. In MunProg (case 1), isolation of the programme led to two separate trajectories in the organisation, one with circular practices and one with established linear practices (#2): "That is the problem: we spread the message that all is fine, circular construction but also the standard approach." The programme therefore also had only a limited impact on generating sector-wide circular construction practices.

AgProg (case 2) followed a hybrid positioning strategy and was intentionally directly connected to top management to integrate the programme's objective into the parent organisation's central strategy. Simultaneously, it was positioned outside the typical organisational structure, ensuring it retained its agility. Nevertheless, AgProg (case 2) relied on the expertise and guidance of experienced professionals from various departments within the organisation rather than exclusively relying on circularity experts. This approach aimed to align the efforts as closely as possible with current practices and proved to be relatively successful in directing circularity initiatives and attracting opportunities to test and scale circular solutions and practices in ongoing projects and activities. However, the actual circularity implementation remained challenging for the programme, primarily due to a lack of a clear mandate and sufficient resources, illustrated by a middle manager (#30): "The circularity goals are formulated in the management contracts as 'best efforts obligation' rather than a 'performance obligation', which makes managers not responsible for the actual implementation or outcomes." Also here, most projects already existed or were intended and had to be shaped to fit into the programme; yet a clearer coupling with the programme's change objectives was perceived compared to MunProg (case 1). In AgProg (case 2), the programme was initiated as part of a coordinated implementation effort while operating with limited financial and human resources. This approach offered guidance and direction to the

circularity initiatives (#22): "We translate policy into operation so that the existing organisation can execute this policy. My primary responsibility is streamlining all circularity initiatives into the four Transition Pathways, making them actionable." While AgProg (case 2) is still ongoing and the positioning's effectiveness in transforming the organisation is hard to pinpoint, early results suggest it has been a relatively successful approach to not only develop innovations in pilots but also induce wider organisational change.

In EnProg (case 3), the transition towards an organisation with circular procurement and asset management was not defined as a formal programme but a combination of policies and actions that have been reevaluated and adjusted over ten years to change the internal organisation. All these policies stem from Corporate Social Responsibility (CSR) management. The budget for innovations was limited, but most of the programme is steered through power structures: the CSR manager reports directly to the executive director and is involved in all files that could impact the sustainability profile of the organisation. Full integration was deliberately pursued from the start, as the CSR manager (#42) argued: "I worry about polarisation, […], so we need to make sure to incorporate everybody in the sustainability mindset." The programme used pilot projects as the dominant mechanism for integration. The first served as a bottleneck project – contradicting practices became visible throughout the organisation by setting high demands. Therefore, daily practices were forced to change, as traditional practices (e.g., cost-oriented procurement) conflicted with the new ambitions enforced in policies (e.g., sustainability-oriented procurement). People who left since the initiation of the programme have been replaced based on the newly demanded skillset and mindset. Also, department heads started hiring personnel based on these qualities. The CSR manager (#42) explained: "You can see that especially in our procurement procedures. We used to have many people who were trained to get everything for the lowest possible price and to cut harsh deals. We do not have those people anymore." As building projects lasted around two years, lessons from pilot projects were used to adopt new practices, such as tendering based on functional requirements instead of technical demands. Consultancy firms and evaluation meetings further enabled these learning and adoption processes. One consultant (#44) said: "We work with the model 'do first-copy-do it yourself', so first we do a project ourselves, then we do a project and act as coach, and then they can do it by themselves … ." The

CSR (#42) manager confirmed this, stating: "You see that [these ambitions] were translated again at [this project] […]. They are so high, that the whole team knows what energy neutral means, what passive construction means, and what circular business models are." As circular practices gradually and systematically found their way into EnProg's (case 3) projects, these spread to other industry actors. Even more so, because the projects were promoted and became nationally known showcases for circular construction, resulting from EnProg's (case 3) highly integrated approach.

In conclusion, while MunProg (case 1) faced challenges in transferring insights to the parent organisation due to its isolated positioning, AgProg (case 2) was more integrated and strategically aligned with top management and leveraged existing expertise to promote circular initiatives, yet showed elements of isolation, which we labelled "hybrid." Contrastingly, EnProg (case 3) adopted policy adjustments and radical pilot projects more integrally to foster a circularity-oriented mindset throughout the parent organisation.

Boundary activities programme managers

In all three programmes, intrinsically motivated programme managers and members were involved who put substantial effort into the performance of boundary activities, such as involving members of the parent organisation in workshops and communicating outcomes. However, we identified that the focal point of these boundary activities differed in two ways: the way knowledge transfer took place between the programme and parent organisation, and the transformative character of the envisioned change.

In line with its formal positioning, the boundary activities in MunProg (case 1) focused on transferring knowledge from individual projects and enabling these projects to interact. Contrarily, the boundary activities in AgProg (case 2) and EnProg (case 3) focused on the entire programme and on communicating the envisioned transformation to mobilise people within and beyond the parent organisations. For example, MunProg (case 1) aimed at communicating the insights of individual projects without much emphasis on the accumulation of knowledge from different projects in the programme (#13): "That is the way it was carried out, like it was just one project, with clear boundaries, and afterwards it is done." This pilot approach resulted in being exempted from rules and regulations, instead of changing rules and regulations. One circularity expert (#1) argued: "In all projects, we do find leeway to get things done. However,

we should now really go towards a real change in the organisation."

In line with their formal positionings, the boundary activities programme managers performed in AgProg (case 2) and EnProg (case 3) related to the programmes and the organisational change they aimed to accomplish (e.g., changed practices regarding collaborative procurement). For example, the CSR manager (#42) of EnProg (case 3) often gave emotional presentations about the state of the world and climate change to highlight the change needed in the entire organisation: "I never start my presentations with 'thou shalt do thus, because it is policy', but I start with the why-question. I start with global warming, [...] I start with the urgency." In AgProg (case 2), particularly temporal boundaries appeared challenging, as the pace of internal activities – projects can take from start to delivery up to ten years – do not allow for the changes introduced by the circularity programme, which renders implementation of circular solutions, and particularly the impact of practice, very difficult. Consider, for instance, the challenges in aligning organisational processes and project timelines when reusing an element from one project into the other. A portfolio manager (#31) argued: "To [address this misalignment], and especially since we will do mostly renewal projects in the coming years, we really need to include circularity requirements up front."

Knowledge sharing in AgProg (case 2) and EnProg (case 3) focused on organisational learning beyond project environments to a larger extent than MunProg (case 1). For example, the programme manager of a sustainability department in AgProg (case 2) (#30) explained the role of the programme as a vehicle to transfer and apply knowledge: "We work on the same [circularity] goals, but we focus on the development of knowledge on CE, also to further the programme. So, the programme can be seen as the runway for circularity knowledge towards the parent organisation." While operation in the construction and infrastructure sectors eventually takes place in projects, activities in AgProg (case 2) show only an indirect link to projects rather than being comprised of projects.

Contrarily, in EnProg (case 3), projects in the strategic programme were treated as inherently embedded in the parent organisation. For instance, the CSR manager (#42) acknowledged that for organisational change, apart from policies, you also need to unlearn established and learn new processes: "You can see that especially in our procurement procedures. We used to have many people trained to get everything for the lowest possible price and cut harsh deals. We

do not have those people anymore." AgProg (case 2) resembled EnProg's (case 3) organisational transformation approach, particularly regarding programme focus, albeit to a lesser extent. Because of the lack of formal integration in the organisational line and lack of mandate, programme members in AgProg (case 2) experienced more difficulties than in EnProg (case 3) in getting decisive support beyond the voluntary cooperation of individuals. This lack of support made it more difficult for programme managers in AgProg (case 2) to accomplish change in established practices, for instance through regular projects.

For all three programmes, it was clear that lessons for the parent organisations did not automatically result in lessons for the organisations they worked with. For instance, in EnProg (case 3) in every respective project they had to find architects and project leaders who knew enough about circularity, which proved difficult. As not every other organisation gave circularity as much attention, internal knowledge was sometimes limited or developed to a lesser extent. This is because the organisations worked project-based, involving different organisations every time, and the influence of the project faded further down the value chain. EnProg (case 3) employees noticed they had developed faster regarding circularity than the majority of partners they worked with. Organisational programmes for circularity have clear interorganisational implications.

In conclusion, dedicated programme managers were pivotal in bridging boundaries in all programmes, albeit in different ways. MunProg (case 1) primarily focused on transferring knowledge and new practices from individual projects, while AgProg (case 2) and EnProg (case 3) prioritised broad programme-level change, affecting practices and institutions. These distinctions in boundary activities substantially impacted how circular initiatives were integrated into the parent organisation. Also, although these boundary activities helped organisational change, their influence on systemic change remained unclear.

Involvement and boundary activities of the parent organisation members

Results indicated that members of the parent organisations played a crucial role in establishing integration between the programme and parent organisation by performing boundary activities, for example, by operationalising programme insights to be implementable by other parent organisation members and identifying new connections between the programme and other

projects and activities. In AgProg (case 2), due to the hybrid positioning of the programme, the translation towards the parent organisation relied heavily on individual networks within the parent organisation as illustrated by a sustainable concrete expert (#25): "Some technical managers just call you for help on a circular opportunity on, for example, some funds for circular innovations and we can play a mediating role. As a result, some projects know where to find you for solutions, and others don't even pose the question." Members of the parent organisation assisted in creating beneficial conditions for the programme. For instance, in AgProg (case 2), resources and capacity were allocated to the programme, and, even though they did not own these resources as a programme, they could use them as a steering tool, as illustrated by the programme director (#22): "We manage budgets coming from the Ministry. […] So, we do not own these. Nevertheless, this is an example of the boundary conditions that give us the power to execute [the programme]."

In MunProg (case 1), however, members of the parent organisation perceived the programme as separate from their activities – isolated – as it was formally positioned, despite that they acknowledged the importance of the programme. Illustrated by a middle manager (#5): "My daily agenda is mostly in the here and now, our societal function to construct and maintain sufficient buildings. These [circular construction] are themes that are not really part of my activities." Accordingly, members of the parent organisation isolated themselves from MunProg (case 1), for example, by deciding not to go to programme meetings, because it was not explicitly communicated what organisational change was required from them. In EnProg (case 3), in line with its fully integrated formal positioning, effective communication took place, for example, through the personal attention of the CSR manager (with a direct mandate from the CEO) to employees working on pilot projects, pushing them to raise the bar regarding circularity continuously. This continuously blurred the distinction between parent organisation and programme and hence an absence of boundaries.

Concludingly, by focusing on the actions performed by members of parent organisations, several patterns emerged related to integration mechanisms (e.g., positioning strategy and boundary activities) when comparing the cases. While members of AgProg (case 2) and EnProg (case 3) leveraged their networks and created favourable conditions in line with the (partly) integrated formal positioning of the programme,

MunProg (case 1) revealed a disconnection. A major reason seemed a lack of communication and alignment with broader organisational goals, showing that its formally isolated position hindered change of this systemic nature. Accomplishing the envisioned changes was increasingly difficult as programme objectives needed to become aligned to already existing or intended projects from which the initial project goals diverged from the programme goals. For all programmes, the timing of performing boundary activities, especially concerning other actors involved in the programme or programme context, emerged as a critical factor in the implementation of circularity.

Discussion

In this study, we uncover how programme integration mechanisms shape organisational transformation in circularity-oriented change programmes. The multiple-case study encompasses three strategic change programmes that aim for circular construction. This type of programme is illustrative of an understudied trend of strategic change programmes (cf. Martinsuo and Hoverfält 2018) that do not only pursue change in the respective organisation but also beyond. Following the call from Martinsuo *et al.* (2022) to study strategic programmes that pursue institutional change while facing uncertainty and involving multiple organisations, our study contributes to theory in three significant ways: (1) showing the consequences of project-based organisations in implementing programmes and for programme literature; (2) revealing the decisiveness of the systemic character of the pursued change for change dynamics; and (3) exposing the role of temporal boundaries in strategic change programmes for circularity.

First, of the two literature streams on programmes – one as vehicles to accomplish organisational change and the other as configurations of related projects (cf. Lehtonen and Martinsuo 2009, Denicol and Davies 2022) – our results show that construction circularity programmes are hard to place within only one of the streams, because of the organisations' project-based character and a thorough analysis of these programmes requires an integration of both streams. The misfit appears two-sided: projects to accomplish strategic change by means of the programme are already existing instead of being initiated by the programme, on the one hand, and selecting projects for the programme is based upon differing criteria compared to bundling for efficiency reasons, on the other. Accordingly, we argue that both views fall short when it comes to comprehensively understanding change

programmes in project industries specifically. We found that strategic change objectives initiated in project organisations often encounter resistance, as actors in projects value the freedom that project-based working offers, resulting in distance from parent organisational initiatives. For change programme literature, this means that when studying strategic programmes in project-based industries, an integrated view is necessary to understand the dynamics resulting from project interaction on the one hand and strategic change objectives on the other. Our results show ways in which members of the parent organisation can increase the integration between the programme and the parent organisation, for example, by creating beneficial programme conditions and translating programme insights to other organisational members due to their power and oversight in the organisation (Lehtonen and Martinsuo 2009, Wiewiora et al. 2020). However, members of the parent organisation may also prevent programme integration, for example, by explicitly deciding not to go to programme meetings. These findings highlight the interdependencies between boundary activities of members of the parent organisations, projects, and programmes and call for a need to incorporate the two literature streams on strategic programmes.

Second, while theory stresses the importance of isolation of change programmes to create protected spaces for innovation (e.g., Lehtonen and Martinsuo 2008, Lehtonen and Martinsuo 2009, Willems et al. 2020), our results are more in line with Bos-de Vos et al. (2022), showing that isolation hinders the institutionalisation processes needed to account for systemic changes. Isolation disconnects the change programme from the wider context, which is essential for achieving systemic change beyond exploratory innovations (Geels and Locatelli 2024). Therefore, isolated programme positioning strategies run into many problems regarding goals within and beyond the internal organisation. The degree of "systemicity" of the strategic objectives hence seems to be a distinguishing characteristic in how to position the programme to the parent organisation. This finding adds an additional layer to existing work that identified change programme integration on an intra-organisational level (Lehtonen and Martinsuo 2008, 2009, Turkulainen et al. 2015, BenMahmoud-Jouini and Charue-Duboc 2022) by stressing the importance of acknowledging the interdependence between the positioning strategy and contextual integration of change programmes that aim to achieve change beyond the initiating organisation. This "systemicity" appears to be mostly dependent on contextual integration, which increases the complexity of programme execution (Bos-de Vos et al. 2022, van Uden et al. 2024). This includes the alignment with political decisions, integral consideration of project life spans, and responding to and taking advantage of actor interdependencies, for instance for more collaborative innovation outcomes (cf., Vosman et al. 2023, van Uden et al. 2024, 2025).

Third, the results confirm previous research (Lehtonen and Martinsuo 2008, 2009, Vuorinen and Martinsuo 2018, Willems et al. 2020) on the importance of boundary activities to strengthen the integration between programmes and the parent organisation (Turkulainen et al. 2015, Shen and Xue 2023). In addition to those insights, our results indicate that not only the number and focal point of boundary activities performed is essential, but also aligning these to the right boundary type. Specifically, we found that the alignment of temporal orientation for strategic programmes pursuing systemic change seems to be crucial for circularity-oriented change programmes. Organisational change programmes can theoretically follow the cycles of definition, delivery and renewal (Pellegrinelli 1997). Yet, we noticed that none of the studied change programmes progressed according to such clear steps but rather as simultaneous operations in different phases (cf.,van Uden et al. 2024). These phases involved different actors, departments, and organisations. Consider, for instance, how EnProg (case 3) succeeded in adjusting the status quo towards circular practices internally but went too fast for external actors to cope with the envisioned systemic change. This temporal mismatch, which was already demonstrated at the project level by Stjerne et al. (2019) and Söderberg (2020), seems especially relevant for strategic change programmes aiming for systemic change. The decisiveness of temporality for circularity, for instance in the different learning trajectories of actors within and outside of the organisation in EnProg (case 3), but also temporal mismatches that hamper the reuse of construction elements, adds to the importance of temporal alignment of the strategic programmes for circularity. In line with Langley et al. (2019), we find that boundary work addressing temporal boundaries and focussing on aligning time horizons is needed within the organisation.

Conclusions

This research addressed the question of how programme integration mechanisms shape organisational transformation in circularity-oriented change

programmes. We addressed this question by exploring three circular construction programmes initiated by Dutch public clients. Results highlight how different integration mechanisms impact whether and how these programmes lead to transformative change in parent organisations. Specifically, we find that while programme isolation leads to opportunities for innovations more integrated approach seems to be more effective in achieving institutionalised change. Moreover, results indicate that, due to the systemic character of circularity-oriented change programmes, temporal boundaries become more important to address compared to more conventional change programmes. Finally, the organisation's context becomes more important when aiming to achieve systemic change through change programmes.

The study's outcomes have several implications for practice. We show that public clients in construction should carefully consider the position of circular construction programmes in their organisations. When these programmes aim to implement changes and accelerate the circularity transition, they must focus on fundamental change processes in the organisation, requiring changes in internal (and external) organisational practices. This means programmes should not just be placed in an isolated environment, as is often suggested, but integration of programme lessons should also be considered early on to foster systemic change throughout departments of the organisation and beyond. For this, programmes could use exploratory projects to find bottlenecks in the parent organisation. Furthermore, programme managers can increase integration, for example, by communicating required change in established organisational practices through short communication lines with top and middle managers. Outcomes can go both ways: programme members can stimulate change in the parent organisation, and members of the parent organisation can find programme members to help them make change come about. These kinds of boundary activities are useful for all boundaries. However, we noticed that for systemic changes, such as the circularity transition, special attention should be paid to boundary activities regarding the temporal boundary and contextual integration, as it highly matters who learns which lesson and when.

Future research

While this study offers valuable insights, several areas remain open for future research. First, we focused on the strategic programmes of large public, project-based client organisations. While large clients are important actors in the circular construction transition (McDowall et al. 2017, Klein et al. 2020), this research cannot highlight how their specific features distinguish the transformative outcomes from other types of organisations, such as private clients or contractors. Future research is needed to explore distinct types of organisations, their changing position in relation to the strategic change programmes of client organisations, and their change programmes.

Second, we focused on ongoing strategic programmes in this research, enabling us to explore the dynamics during their execution and dig deeper into the early activities and decisions which, according to the literature, are central in promoting programme-organisation integration (Lehtonen and Martinsuo 2009). This approach provided an understanding of relevant activities and mechanisms but did not allow us to link these to the transformative outcomes of the strategic programmes, such as actual integration. Future research, including longitudinal research designs, might reveal other integration mechanisms during separate phases of strategic programmes and better show the relation to transformative programme outcomes towards circular practices and processes. Relatedly, the separate case studies used slightly different types and amounts of data sources. While this has not impeded addressing our research question, a detailed comparative analysis between case programmes would require more consistency in data sources. Such future research would decrease the organisation-specificity and hence potentially contribute to the generalisability of the revealed mechanisms concerning circularity-oriented transformations.

Third, we identified projects as units where circularity is operationalised in the construction context yet focused on the interplay between programmes and organisations. Moreover, we identified that circularity-oriented change programmes in project-based sectors have implications on both the project clustering programme literature (e.g., Denicol and Davies 2022) and strategic change programme literature (e.g., Lehtonen and Martinsuo 2009). To better understand how strategic change programmes relate to organisations acting in project-based industries projects, future research is needed on the relationship between programmes and projects to implement circularity. In addition to that, we found that project-based organisations blur the distinction between the literature stream on programmes as vehicles to accomplish organisational changes and the stream of programmes

from an efficiency point of view. Future research might further explore the nuances of this distinction.

Finally, following our study's results on the decisiveness of the "systemicity" of the pursued change, organisational transformations must be seen in light of overarching societal transitions and contexts, for which the programmes can be instrumental in internalising and operationalising socio-technical change towards societal goals or missions, such as circularity (Coenen *et al.* 2023). Taking Bos-de Vos *et al.* (2025) as a starting point, explorations into the relations between strategic programmes and broader transitions are needed to better understand how such programmes can foster both organisational transformations and societal transitions and what this means for the integration mechanisms of programmes. In addition, future research could look at the influence of different contexts in which public parent organisations act (e.g., infrastructure or energy) and the need for and possibilities of integration of the programme.

Author contributions

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available as they contain information that could compromise the privacy of research participants and their organisations.

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Appendix A –Coding scheme

Broad category	Specific category	Description
General programme information		General information about the program, such as goals, size (number of projects), duration, people involved
Formal integration mechanisms		Formal, higher-level decisions on organising and managing the connections between programs and parent organisations
	Structures and formal control mechanisms	Enhancing integration through organising structures and formal control mechanisms. For example, establishing steering groups including top managers, management groups and reporting procedures to top management for the programs.
	Goal and content-based linkages	Achieving integration through goal and content-based linkages: the programs' content is linked to the strategic goals, business processes, supportive functions, daily activities, and other projects, thus providing requirements and channels for communication and collaboration.
	People and relationship-based mechanisms	Enhancing integration through recruitment, location and working time related decisions and other personnel management issues. Such as workers working part-time on the program, staying located in their permanent units. Requiting programme participants based on their prior experience in other projects and the parent organisation.
	Adopting parent organisation procedures and standards	Achieving integration through using the same methods and procedures that are in use in the wider organisation. For example, organisational project management models, existing planning tools, document templates and communication channels.
	Isolative mechanisms	Formal mechanisms to facilitate programme autonomy and isolation: e.g., developing new project review procedures, explicitly not involving members of the parent organisation in early project stages.
Boundary activities project & programme managers		The mundane, micro-level day-to-day activities of project and programme managers that shape, bridge, and buffer the boundaries between programs and parent organisations
	Defining and shaping the boundary	Defining and redefining the responsibilities and scope of the programme in relation to the parent organisation, establishing connections with the parent organisation and constantly negotiating about the program–parent organisation boundary. E.g., linking the programme to other internal changes.
	Representing the programme and creating legitimacy	Creating legitimacy and a favourable atmosphere for programme work by making the programme known and promoting the programme initiative. Activities such as representing the programme in forums, inviting people to workshops and meetings, communicating goals, plans and progress.
	Information scouting and negotiating	Gain inputs for programme planning. Such as scouting for information from the parent organisation (e.g., about the current situation) to inform the programme and make programme decisions. Such as inviting the parent organisation's personnel to participate in workshops and meetings and asking for information from them through surveys or personal contact.
	Ensuring continuity	Utilising the created change momentum to ensure that the programme progresses smoothly and achieves its objectives. Activities such as measuring/keeping track and communicating of progress (e.g., quick wins), sharing lessons learned, celebrating successes.
	Explicitly deciding not to bridge a boundary	Isolating the programme organisation and guarding programme from disturbances by differentiating the programme from its surroundings and withholding information. E.g., by promoting a separate work culture, keeping immature plans inside the program, withholding critical information from members of the parent organisation.
Boundary activities members parent organisation – isolating		The mundane, micro-level day-to-day activities of members of the parent organisation that increase the boundaries and isolation between programs and parent organisations *Members parent organisation = top managers (e.g., policy makers), middle managers (e.g., team leaders), sustainability/circularity experts (e.g., members sustainability department that are not official programme managers)
	Lack of interest and involvement in the program	Thinking the programme and projects are not relevant/will not have an impact on own ways of working (only relevant for project managers), diverting responsibility to others (other departments, project managers, externals), not being aware of the program, not being involved/getting involved too late to assist project and programme managers (mainly the case for sustainability experts).
	Not looking at CE in an integral way	Not acknowledging goal and content-based linkages (e.g., arguing that circular goals of the programme are not compatible with/do not contribute to other sustainability goals), stacking ambitions/competing over sustainability ambitions; not collaborating/aligning with other departments for CE
	Not integrating programme outcomes in policies	Making policies, strategies, documents, and recommendations without using the insights from the programme and projects. Not providing feedback from policy to practice, lack of feedback-loops (not thinking about the impacts of new policies for the programme and projects).
	Holding on to 'old' procedures and assumptions	Holding on to old rules, regulations, and criteria for projects such as time and money, not being open to adopt new innovative criteria and rules, holding on to assumptions that circularity is expensive/too much work and not being open to challenge these assumptions/ engage in difficult conversations.
Boundary activities members parent organisation – integrating		The mundane, micro-level day-to-day activities of members of the parent organisation that shape, bridge, and buffer the boundaries between programs and parent organisations *Members parent organisation = top managers (e.g., policy makers), middle managers (e.g., team leaders), sustainability/circularity experts (e.g., members sustainability department that are not official programme managers)

Continued.

Broad category	Specific category	Description
	Linking programme and project outcomes to existing procedures/ structures	Making links between new circular innovations and existing procedures; how can they help? How do they need to change? Integrating new findings in existing procedures (e.g., integrating circular criteria in existing BIM models). Is easier to be done by members of the parent organisation (have more power, oversight) compared to members of programs and projects.
	Increasing scales	Emphasising that innovations work on a larger scale than just the project, making sure solutions can work on a bigger scale e.g., not a material bank for just the project or programme but for the whole organisation; setting up/being involved in task forces to organise innovations on a bigger scale; making a knowledge transfer system for the whole organisation (not just the program) where knowledge from different programs and projects can be integrated and shared.
	Emphasising/realising needed change in (own) internal processes	Emphasising, acknowledging, and communicating that change in own internal processes is needed for the success of the circular program, helping project members to ask the right questions to change things internally, lobbying internally for change but also broader within regional and national policies, discussing dilemmas with policy makers.
	Ensuring beneficial programme conditions	Ensuring that there are beneficial conditions for the programme and projects internally in the organisation, e.g., links to policy, getting others in the organisation to realise its importance; promoting content and insights from the program, giving programme and project actors extra time and budget; emphasising the importance of and being comfortable with flexibility in the programme and projects.
Programme integration outcomes		Indications for the integration or isolation of the programme in the parent organisation
	Isolation	Indications that the programme insights/outcomes are not integrated in the parent organisation. E.g., insights of the programme remain in the programme and are not adopted by other members of the organisation, there is limited follow-up on the program, internal processes and procedures remain the same.
	Integration	Indications that the programme insights/outcomes are integration in the parent organisation. E.g., members of the parent organisation recognise the importance of the insights and/or adjust their practices, lessons are integrated and further developed in new/other projects/ programmes, internal procedures and processes are changed.

Appendix B –Comparative analysis three cases on integration mechanisms

	MunProg (case 1)	AgProg (case 2)	EnProg (case 3)
Formal integration mechanisms	• Different departments responsible for execution of projects and governance programme • Programme coupled with the circular strategy of the municipality; each project is connected to one of its nine circular ambitions • Links to corporate planning and budgeting • Use of similar procedures and standards as other innovative projects in the organisation • Isolation by explicitly marking the projects involved in the programme as experiments	• Top-down steered; reports directly to board • Separate from organisational line, yet crowded with individuals from all over the parent organisation • Programme structure is isolated from organisation but towards operation strongly linked to organisational processes • Acts as bridge between circular knowledge and expertise and projects • Programme is positioned as an advisory to projects and other organisational activities	• The programme is steered top-down by the CSR manager that directly reports to the CEO. • Programme aimed at knowledge and skills development among employees for circular procurement and asset management. Pilot projects used as mechanism to let the organisation change by doing. • Policies set circular goals. They are evaluated and adjusted based on learned lessons and ESG ratings, evaluative practices of the parent organisation. • Integration is aimed for from the start.
Boundary activities programme managers	• Actively linking projects to the circular ambitions of the municipality and top managers • Workshops and conversations with members from different departments at the start; project managers expected to negotiate and discuss with members of the parent organisation themselves • Communicating programme outcomes; sharing new circular practices; documents limitedly accessed, most knowledge transfer is ad-hoc and personal; lack of time to do project evaluations • Creating programme isolation by deciding not to involve members of the parent organisation in specific programme and project decisions	• Managers actively seek interaction with both parent organisation members and external organisations • Programme members involve members of the parent organisation to link with organisational practices • Members actively link to existing and new projects; identification of circularity opportunities and advise on potential solutions • Not monitored on successes in the programme itself but on circularity achievements in the wider organisation • Increasing efforts to implement programme insights into the parent organization	• The boundaries between programme and parent organisation are purposefully blurred • Programme policies grew organically and were eventually evaluated and adjusted based on both programme and parent organisation • Representation of the programme internally using emotional speeches • Project members undertook efforts to integrate learnings from projects, measurements of current activities, and new standards of ESG-ratings into new programme policies and daily activities that, in turn, stimulated circular goals in construction projects through evaluation meetings.
Boundary activities members parent organisation	• Translating programme insights to own practices and those of others in the parent organisation; limitedly done so • Creating beneficial programme conditions: offering room for flexibility/mistakes • Creating isolation by not getting involved in programme activities, separating own work (e.g., on other sustainability ambitions) from the programme	• Intrinsically motivated members of the parent organisation reach out to the programme for assistance on circularity issues • Boundary activities highly dependent on individual motivations and interest in circularity • Creating isolation by placing the programme management in parallel to the organisational line • No formal mechanisms that require members of the parent organisations to perform boundary activities	• The incorporation of programme activities is a given for many employees, which, for instance, is also a selection criterion for hiring new employees • Resistance from old practices (e.g., procuring for lowest price). Employees who did not change with the programme have left • Some old practices still hinder the programme that has not become known earlier.
Implementation efforts	• Difficulties experienced in sharing insights from the programme with regular projects and the parent organisation • Organisational structures inhibit adoption circular practices. Limited change in internal structures realised (at the end of the data collection stage) • Frustration among project and programme managers	• Some first successes appeared in a few Transition Pathways towards normalisation of circular practices • The programme is increasingly successful in engaging with project teams from the parent organisation • Early stage of the programme, so long-term implementation outcomes are not yet assessable	• All involved department heads have taken over a different, more circular, mindset and hire their staff accordingly • Different competencies have been learned through the pilot projects by employees in and around construction projects • Some old practices still hinder programme uptake
Contextual factors	• Strong political influence; complex organisational change due to changing political values • Building constructions and infra part of the activities of the organisation; enables risk-taking in circularity-oriented projects	• Long lead times for projects lead to slow learning and rigid projects • Strong dependence on politics • Infrastructure is core business: higher risk of circular innovation programmes • Oligopolist market creating high actor interdependence	• More distance from political process; slowly changing values • Building construction is not the core business of the organisation; enabled risk-taking in circular programmes