



Strategic change towards cost-efficient public construction projects

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ARTICLE INFO

Keywords:

Strategic initiative
Strategic change
Cost performance
Cost reduction
Cost-efficiency
Public construction projects
Implementation

ABSTRACT

The cost of public construction projects is a central topic in project management. However, studies have primarily focused on cost at the project level, not on cost management at the portfolio level. In this paper, we take the perspective of a government agency, conducting a strategic initiative to increase cost-efficiency in their portfolio of construction projects. We use an action research approach to investigate the dynamics of the initiative and the implementation of resulting actions to achieve lasting change towards cost-efficiency. Co-creating actions for cost-efficiency together with the project teams was important for the success of the strategic initiative. For successful implementation, alignment of the objectives of the initiative with organizational strategy, and knowledge transfer between projects is central. This study expands the project management literature regarding strategic cost management of portfolios of construction projects and provides practical guidance for organizations.

1. Introduction

Any project-based organization (PBO) that wants to achieve lasting change needs to take action. For a lasting effect, the changes need to be institutionalized, which implies learning from temporary actions to permanent practices. A wide specter of challenges that occur in such settings, has been studied in the literature (e.g. Saunders et al., 2008; Stensaker et al., 2008; Kunisch et al., 2019; De Melo et al., 2020). However, these studies tend to focus more on theory than on what happens in reality. This study responds to the need for more practice-based research in the field that explores the reality of strategic enactment through a project portfolio (Clegg et al., 2018) and uncovers linkages between practices, organizational learning and change (Brunet, 2019). Additionally, Klessova et al. (2020) ask for more empirical studies to understand the processes that influence knowledge integration in the context of innovation projects.

In this paper, we report on an empirical study concerning how a public organization conducted an initiative to lower the overall cost of their construction projects. Project cost is a complex issue and influenced by many factors. However, it is relevant to all types of projects as it can be a decisive factor in whether to invest at all, when choosing between project alternatives, or in a client's decision of which organization will conduct a project.

Next, although cost reduction practices often reveal themselves in individual projects, they still need to be leveraged into a complete

project portfolio. This can greatly increase an organization's cost performance and competitive advantage. Few researchers have, however, transformed the cost perspective from an individual project into cost as a strategic factor at the portfolio level. Achieving cost-efficiency in individual projects might be challenging enough on its own, but achieving permanent cost-efficiency at the portfolio level is even more challenging. How can a PBO reduce costs at this level on a permanent basis? As PBOs organize most of their activities in temporary organizations to perform project tasks (Lundin & Söderholm, 1995; Hobday, 2000), they have to transfer successful project practices to subsequent projects (Sydow et al., 2004).

Nevertheless, organizational learning is not a natural project outcome (Ayas & Zeniuk, 2001). The lack of having an automatic transfer of lessons learned between projects (Wiewiora et al., 2009) makes it difficult to achieve lasting change towards higher cost-efficiency throughout the portfolio. The nature of projects being temporary organizations can even lead to the creation of silos that prevent knowledge transfer; the organization must therefore intervene to support learning between projects.

To tackle this challenge, a PBO might implement a strategic project to increase and formalize the use of successful project practices, thereby taking full advantage of the cost-efficiency potential at a project portfolio level. This type of initiative is an attempt to achieve organizational transformation and strategic goals (Ponomarenko et al., 2016). The term 'strategic initiative' will be used throughout this paper to distinguish

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this study's strategic organizational project from the construction projects completed by the organization. This term has been used by project management research scholars to describe how strategic decisions are integrated into either transformation projects or overall organizational development (Whittington et al., 2006; Gemünden et al., 2018). According to Saunders et al. (2008), a "strategic initiative signals important changes in an organisation, affecting its long-term direction and the scope of its activities", while a strategic project is more task-oriented, having a specific outcome and implementation that uses pre-existing structures.

Against the background of organizational transformation towards cost-efficiency in construction projects, we conducted research in a Norwegian public sector organization working with public construction projects. Between 2018 and 2020, the building commissioning department of the governmental agency conducted a strategic initiative to increase the cost-efficiency of their construction projects. The organization deals with approximately 150 construction projects at any given point of time, with a total annual investment volume of approximately EUR 730 million in 2020. For a public sector organization managing collective funds in a situation where the availability of public resources seems to be becoming scarcer, achieving cost-efficiency will be vital to its survival and success.

Previous initiatives in the organization had focused on stand-alone actions in individual projects. Examples of such actions include innovative use of contractual approaches, more effective use of area and standardization. Yet even if these actions contributed to the delivery of successful individual projects at low cost, it was not enough to reduce the total costs significantly and permanently at an organizational level. Improving a project portfolio's long-term cost performance requires the transfer of relevant experience between projects. The organization therefore started a strategic initiative to bundle the efforts made in previous projects in order to fulfill the need for increased cost performance and achieve lasting cost-efficiency. The initiative's objective was to reduce the investment cost of its project portfolio by 20% by 2025 – without either any life cycle cost increase or any decrease in customer satisfaction. The initiative is strategic in the sense that it is both business-critical and transformative, with the aim of leading to substantial organizational change (Martinsuo et al., 2020). The initiative can be characterized as both intra-organizational (it is executed in one organization) and inter-organizational (it works across construction projects). The inter-organizational aspect is given by considering projects are temporary organizations embedded in the permanent organization with a certain degree of independence and strong project cultures (Sydow & Braun, 2018).

The initiative was accompanied by a research project designed to gain academic insight into the initiative. This included a study of how organizational change happens from a building commissioner's perspective that was comprised of the following research questions:

What challenges did the organization encounter when conducting their strategic initiative to increase cost-efficiency in public construction projects?

Based on the results of the strategic initiative, what actions can organizations take to effectively deploy the results?

This paper draws on theories from the field of organizational sociology in order to make a contribution to project management theory. It identifies the challenges that strategic public construction initiatives face when trying to transfer learning from the temporary to permanent organization. One particular contribution is the investigation of the construction projects' role in the strategic initiative. To the authors' knowledge, this aspect has not been emphasized in project management literature before. Further, the study aims to expand on the research findings of Willems et al. (2020) on the influence of strategic initiatives' autonomy on transmitting results to the permanent organization by adding the perspective of a project-based organization. Based on the empirical data, a framework for the implementation of strategic project cost-efficiency measures in the permanent organization has been established.

The paper starts with a review of the literature in Section 2 on cost performance of public construction projects, strategic initiatives and portfolio management in PBOs, learning in PBOs and on how temporary strategic initiatives are deployed in permanent organizations. The methodological action research approach used in the study is outlined in Section 3. This is followed by a presentation of the empirical results from the strategic initiative in Section 4. In Section 5, an analytical model is presented and applied to the results, followed by answers to the research questions. The study's implications for both theory and practice as well as limitations and suggestions for further research are outlined in Section 6.

2. Theoretical background

2.1. Cost performance of public construction projects

Project cost is a popular topic in the discipline of project management, and different facets of the topic have been investigated in depth. A search for "project" and "cost(s)" in the title, abstract or keywords of the International Journal of Project Management alone yields 412 papers published between 1983 and 2021 (Scopus search, 17th April 2021). These papers primarily focus on the individual project as a unit of research and examine factors such as cost estimation, cost development, cost overruns and/or other factors affecting project cost.

Cost performance can be measured using two important components: (1) cost growth from a baseline (estimate) to the final cost, or (2) cost per unit of work completed, usually measured by either square meters or other units, for example the number of students (Sullivan et al. 2017). Large sums are invested in the construction of public special purpose buildings such as schools and university buildings, museums, prisons, libraries, hospitals, or government buildings. In these expensive public projects, it is important not to overspend scarce public resources. Further, projects' challenges and cost overruns in both the public and private sectors are well documented (Volden & Samset, 2017). Love et al. (2015) distinguish cost escalation, an increase of project cost due to market forces, from cost overruns due to e.g. project content changes. Public construction projects face the challenge of operating within a political environment of multiple stakeholders who have different objectives, and face difficulties in measuring success (Volden & Samset, 2017; Klakegg & Volden, 2016). In addition, internal challenges unique to the public sector include weakness in strategic vision creation, lack of skilled resources and poor coordination between different project actors (OECD, 2015). Flyvbjerg (2005) argues that to ensure building approval, large public construction projects strategically underestimate costs and overestimate benefits at the front-end. This leads not only to large cost overruns in public projects but also lopsided decisions being made either for or against an investment.

In a literature review, Doloi (2013) categorized the influence on project cost into factors related to: project, contract, project management team, quality, planning, market, and contractor. Cheng (2014) identified scope definition in the contract, cost control and contract disputes as the factors that have the greatest influence on cost. In contrast, Love et al. (2015) highlighted project-internal attributes such as technical issues (changes in scope, change orders, errors in contract documentation and rework) as being central reasons for cost increases. Finally, in their literature review Adam et al. (2017) identified the following root causes of cost overruns and time delays in large public construction projects: communication, financial, management, material, organizational, project complexity, duration as well as psychological and weather conditions. Flyvbjerg et al. (2018) considered the external factor of human bias to be the root cause of cost overruns.

Many studies of cost drivers and reasons for cost overruns are found in the academic literature, particularly studies undertaken from a specific geographical perspective. Less research has been done on success factors behind positive cost performance or the mitigation of cost overruns in construction projects. As an example, Asiedu et al. (2017)

conducted research on how to avert cost overruns in construction projects, listing preventive, predictive and corrective approaches for countering cost-driving elements in construction projects. Construction project cost performance can also be examined from a value creation perspective. For instance, Klakegg et al. (2018) conducted six case studies of value creation in Norwegian public construction projects and concluded that project costs are largely determined in early project phases where owner decisions have the highest impact on project cost. Then, the selection of a competent project team, construction concept and project delivery model are the most important factors in the next phase. Other important aspects include specific area requirements as well as the systems and material choices made by the design team and contractors.

With this background on project cost in mind, what is done on the strategic level to tackle the problem of cost escalation in projects?

2.2. Strategic initiatives and portfolio management in PBOs

Grundy (1998) advocated thinking strategically about project management, not just at project but also at portfolio level. Artto & Wikström (2005) discovered in their bibliometric study the importance of strategically managing the *permanent* organization. They found organizational theory and the logic of value creation to be influential for PBO development. Strategic management at this level must be in relation to the internal and external context in which the project portfolio is managed (Martinsuo & Geraldi, 2020; Martinsuo, 2013). Engaging in strategic initiatives at the portfolio level (Martinsuo & Geraldi, 2020; Chinowsky, 2000) and aligning the project portfolio with the firm's strategic objectives (Paquin et al., 2016) can supplement business strategy (Grundy, 1996; Shenhar, 2004). This notion is confirmed by the findings of Kopmann et al. (2017), who, in their study of 182 firms, suggest that strategic management at the project portfolio level is important for the successful management of emergent strategies in an organization. Likewise, in their study on how strategic intentions are managed in a multi-project context, Dietrich & Lehtonen (2005) found that it is necessary to align strategic initiative objectives with an organization's strategy. Success factors for strategic initiatives include implementing a common project management process or project model that works at both the single and multi-project levels.

Kock & Gemünden (2019) called for exploratory projects which may contribute to increased value creation and project success throughout the project portfolio by creating strategic options to be exploited by successive projects. Recent research by Sergeeva & Ali (2020) has stressed the role of a project management office (PMO), supporting collaboration across projects to improve project performance. This includes managing lessons learned from previous projects to explore innovative solutions for future projects. For instance, Bredillet et al. (2018) found PMOs to be instrumental to leading strategic change throughout a portfolio of projects. Similarly, Müller et al. (2019) advocated using organizational project management as a complement to project, program and portfolio management in order to enable a joint delivery of beneficial change by conceptualizing both the role of projects and their interaction.

The high cost level of (public) construction projects requires strategic project cost management, as managing cost in each project separately does not seem to be sufficient. One suggestion involves using simultaneous top-down and bottom-up strategies. Top-level management is responsible for creating the basic process outline; while it also has the ultimate authority to make decisions, employees are encouraged to participate at all levels of the decision-making process (Himme, 2012). Training programs for planned changes can ensure employee readiness for change and enhance cost consciousness. Based on practical evidence, Lavingia (2003) advocates the application of a structured project management process, which should ensure top management's commitment to applying best practices. Furthermore, total cost management should integrate the management of cost at all portfolio, program and project

levels to improve the project portfolio's overall profitability.

A systematic manual search of all articles published during the last five years in the leading journals in the field, *The International Journal of Project Management* and *Project Management Journal*, showed that little of the academic literature focuses explicitly on strategic cost reduction initiatives in a construction project portfolio. However, related research on project governance systems has been carried out earlier. For example, Klakegg et al. (2008) compared project governance frameworks for public investment projects in Norway and the United Kingdom, concluding that the frameworks increase (cost) control and transparency. In a similar fashion, Volden (2019) studied the quality of cost-benefit-analyses in Norwegian state projects, concluding that a deficient handling of non-monetary considerations early on in the projects might make decision-makers overestimate a project's potential benefits. Moreover, Caffierei et al. (2018) conducted research on the Strategic Asset Management Framework in Western Australia and found that the controls established by the framework contribute to reducing human bias and avoiding cost growth in major public projects. For their part, Shibani & Gherrbal (2018) investigated the use of a balanced scorecard in construction projects as a strategic management system used to counter both time and cost restraints. This balanced scorecard integrates four dimensions: financial, customer, internal process and innovation (Kaplan & Norton, 1992).

2.3. Learning at the interface between temporary and permanent organizations in strategic initiatives

Strategically approaching cost management in projects at a portfolio level requires knowledge of learning processes in PBO projects. Cost is a central concern in PBOs; consequently, the lack of automated cost-efficiency knowledge transfer between projects calls for strategic initiatives to tackle the cost issue at a portfolio level. Further, although project teams are often separated in the PBO in both a physical and organizationally, a supportive learning environment that includes common practices and arenas can create a knowledge transfer network between projects (Ayas & Zeniuk, 2001; Garvin et al., 2008; Fitzgerald, 2003).

Project cost knowledge includes actions in one project that are used to avert cost overrun, which might be useful to other project teams. 'Sticky' knowledge might occur, where tacit knowledge within one project team remains hidden to other project teams, who may need this knowledge to solve a similar problem (von Hippel, 1994). Interestingly, Wiewiora et al. (2009) found that in many construction companies, lessons learned are not communicated between project teams. Factors inhibiting the exchange of these lessons are time constraints and people's reluctance to share information that might weaken their personal position (Wiewiora et al., 2009), a lack of incentives, the absence of knowledge-sharing systems (Ajmal et al., 2010) and the projects' temporality (Jafari et al., 2011). However, Yap et al. (2017) concluded from their study on design change management that capturing and sharing reusable project experiences is essential for increasing the speed of learning and adding value to future projects.

Organizations that successfully provide effective knowledge-sharing opportunities also allow projects to "serve as practice fields for developing learning capabilities and cultivating effective habits of reflective practice" (Ayas & Zeniuk, 2001, p.62), which can in turn be transferred to subsequent projects. Berggren (2019) underlines the cumulative power of incremental innovation in projects by transferring best practices done at the project level to the organizational level.

The compilation of literature on learning in PBOs highlights the central role of projects in organizational learning processes and the implementation of organizational strategy (Musawir et al., 2020). In other words, projects and organizations mutually constitute each other (Söderlund & Sydow, 2019). Furthermore, project actors react to institutional changes: Their underlying practices can be influenced by organizational strategy, or vice versa, when projects experiment with

new forms of governance and thus influence organizational strategy (Hetemi et al., 2021; Clegg et al., 2018). Actualities from the projects shape strategy in the organization (Löwstedt et al., 2018) and can ultimately impact institutionalized tools (Brunet, 2019). Likewise, De Melo et al. (2020) stress the importance of vanguard projects to build systematic capability for organizational development. Therefore, even if this topic has been the focus of recent research, there is still the need for further empirical research on bi-directional interaction between the permanent organization and its temporary units (Mahura & Birollo, 2021).

2.4. From temporary to permanent-implementing results from strategic initiatives

Driving change within an organization is inherent to each strategic initiative, the aim being to transform the organization in a way that enhances organizational success or the fulfillment of strategic objectives (Martinsuo et al., 2020). A central element of strategic initiatives is the provision of their capacity for change and innovation. Strategic initiatives must therefore have a certain degree of autonomy from the permanent organization if innovation is to be fostered. On the other hand, integration mechanisms must be in place to ensure connection to this same permanent organization (Willems et al., 2020) and prevent the strategic initiative's isolation (Lehtonen & Martinsuo, 2009; Willems et al., 2020). To explore this idea further, Löwstedt et al. (2018) studied strategy as-it-is-practiced in large construction PBOs. They discovered that project actualities shape the implementation of strategy and play a larger role in organizational strategizing than typically portrayed in the literature. Similarly, Artto et al. (2008) concluded that project strategy, i.e. the strategy of an individual project, can take various positions in relation to its environment and the permanent organization's strategy. A project does not necessarily replicate the parent organization's strategy but can take a more independent role in establishing its own robust culture and strategy.

Prado & Sapsed (2016) have investigated the adaptation of organizational changes in PBOs. This transition from the temporary to the permanent is achieved either through management commitment or the effectiveness of the innovations themselves. Systems such as databases can mediate transition, and IT-artefacts can facilitate knowledge transfer. The actions must, however, ultimately be adopted by other projects. This issue is approached by Stensaker et al. (2008), who highlighted the necessity of sensemaking through action when implementing change activities. One challenge associated with implementation is the temporary organization's rapid dissolution at the end of a strategic initiative. Members are assigned new tasks before any new knowledge or actions are fully integrated into the parent organization (Stjerne & Svejenova, 2016; Swan et al., 2010; Sydow et al., 2004). To avoid this situation and ensure successful change, a good plan for implementation should therefore be put in place before any strategic initiative ends.

3. Methodology

3.1. Action research

Action research is a "type of applied research designed to find the most effective way to bring about a desired social change or to solve a practical problem, usually in collaboration with those being researched." (SAGE, 2019). The aim is "both changing the system and generating critical knowledge about it" (Susman & Evered, 1978, p. 586). Instead of one theoretical research method, action research is an applied research approach that links theory and practice to generate a solution (Azhar et al., 2010). It is a methodology for "introducing change (or 'action'), and critically understanding that change to produce new knowledge ('research') within a social setting" (Sexton & Lu, 2009, p. 688). A unique aspect of action research is the participative and democratic process, research not being conducted *on*, but *with* the

participants, empowering them to engage in inquiry and knowledge creation (Dick & Greenwood, 2015; Reason, 2006).

This paper's first author engaged in action research as a practitioner-researcher. As she was an employee of the organization and was aware of the organizational preconditions and constraints, she could assume the twin role of researcher and practitioner. Additionally, her participation in the internal project also legitimized access to data for academic analysis. The rationale for selecting action research was the opportunity it gave to combine the organization's objective of higher cost-efficiency with an in-depth investigation of the researched subject. In addition, the organization had no tradition of implementing long academic research projects with a high level of proximity to projects conducted by external researchers.

The objective of the larger research project was to examine the process towards achieving higher cost-efficiency in the organization's portfolio of construction projects. The researcher participated in a small project team and examined different elements of the strategic initiative: concrete actions taken in individual projects, the influence of stakeholders on project cost, and knowledge transfer processes. This paper is a meta-analysis of what happened in this strategic initiative and focuses on the interface between the strategic initiative and permanent organization at the initiative's conclusion.

The concept of *engaged scholarship* was used in the research project: "Engaged scholarship is defined as a participative form of research for obtaining the different perspectives of key stakeholders (researchers, users, clients, sponsors, and practitioners) in studying complex problems." (Van de Ven, 2007, p. 9). This enables the accommodation of fragmented academic and practitioner goals along with the production of insightful knowledge (Van de Ven, 2007; Van Marrewijk & Dessing, 2019). Explicit epistemic scientific knowledge and tacit practical knowledge complement each other in engaged scholarship: While the academic perspective allows a bird's eye view of the organization and a high degree of reflexivity, the practitioner perspective focuses on the reality and constraints of the organizational context. Practical knowledge is considered to be a distinct mode of knowing, not just a derivative of scientific knowledge (Van de Ven, 2007). The organization represents an idea factory, or a learning workplace, where researchers and practitioners engage in reciprocal relations (Van de Ven, 2007; Van Marrewijk & Dessing, 2019).

3.2. Methods and analysis

In the strategic initiative, the first author conducted meetings to engage practitioners in the co-creation of cost-efficiency measures. "Co-creation is the joint, collaborative, concurrent, peer-like process of producing new value, both materially and symbolically" (Galvagno & Dalli, 2014, pp. 644). The researcher and the project managers used the meetings to create and discuss cost-efficiency actions. Lindhult (2019) calls this kind of collaboration "democratic dialogue", acknowledging that all research participants, both academics and practitioners, have significant capacity for knowledge generation.

The participants in the 75 meetings were mainly project managers of the construction projects, in some meetings also being joined by project controllers or other project team members. Additional demographic information about the participants was not collected in order to maintain the "business as usual" character of the meetings. The researcher acted as a colleague during the meetings to allow unhindered information flow about both positive and negative aspects of the projects' various cost developments.

The researcher used the meetings as an important method in the research study. She took notes during the meetings and established so-called 'value cards' for each project (see chapter 4.1). Cost-reducing actions for each project were categorized on these cards according to the following topics: (1) analysis of needs/concept (2) standardization (3) new contractual models (4) technology/digitalization (5) engineering costs (6) cost estimation and control, and (7) project organization.

On a practical level, the cards were used to log and quantify potential cost reductions as well as follow up and share information between projects. In the research project, these cards were used for content analysis.

The actions from the strategic initiative and the results were disseminated in the organization using a number of means: A micro-learning series on cost-efficient construction projects and the integration of cost-efficiency measures into an existing project database to which every employee in the organization had open access. Regular meetings in the organizations were used as arenas to communicate the results from the value meetings. Project managers had the opportunity to exchange ideas and discuss cost-efficiency actions. These arenas could be departmental meetings (with participants from across the project management teams), management meetings, as well as in-person and online innovation seminars with a broader audience across the organization.

To ensure triangulation of methods (Neuman, 2006) in the action research project, quantitative analysis of project data for completed and ongoing projects in addition to qualitative methods, including document analysis and interviews, were used. Document analysis is particularly relevant to the part of the research project presented in this paper. The first author performed thematic analysis (Fereday & Muir-Cochrane, 2006) on the following documents: the value cards, her notes from the value meetings, the presentations to the strategic initiative's steering committee, the initiative's implementation strategy and the strategic initiative's final report. Thematic analysis was carried out to uncover themes in the documents which are relevant to the study's research questions. The themes that emerged included the immediate results of the strategic initiative, its dynamics and challenges, the co-creation of cost-efficiency actions and the implementation of actions from the strategic initiative. Quotes from the meetings are based on the researcher's notes and have been translated into English by the first author.

3.3. Validity and relevance of the chosen methodology

Action research assumes a messy reality in which research is more a process than a product (Law, 2004). A diverse set of mixed methods that are heterogeneous and based on the research setting must therefore be applied. As this type of situated inquiry is context related, the research result might not be replicable under other circumstances. The validity of action research therefore lies in making "the best possible use of these tools [i.e. research methods] within the constraints of the workplace" (Somekh, 1995, p. 341). Action research of high validity produces practical wisdom that is relevant to the organization by using research methods that allow the exploration of multiple determinants of (inter) actions. This deepens practitioners' understanding of complex situations, allowing them to make better informed decisions. This intertwining, however, makes it impossible to draw a clear line between research data and work-related data. The interpretation of results in the light of prior practical knowledge can therefore be problematic (Reason, 2006).

The value of action research is mainly defined through its practical relevance to the organization, i.e. the practical goal of solving the problem at hand. The goal of the strategic initiative is to achieve greater cost-efficiency in construction projects, an aim motivated by the need to maximize benefits from construction projects while minimizing the cost to the taxpayer. Data emerges directly from the strategic initiative and is therefore an authentic and reliable record. In addition, the data's reliability and credibility can be validated through project final cost accounts (upon project completion). A situated inquiry into the organizational context, however, lacks direct external validity and makes no claim of generalizability; nevertheless, the study's results might be applicable in a wider perspective.

The first author was the key resource for collecting and analyzing the data, a factor which ensures strong data ownership but might cause bias. Researcher triangulation would have benefited the study's rigor. To

limit bias and ensure a high degree of reflection, the meeting results were discussed with both "non-researcher" members of the strategic initiative and external researchers during the analytical process and writing of this paper.

4. The results of the strategic initiative

This section provides insight into the strategic initiative, its dynamics, results, and challenges during and at the initiative's conclusion. Special focus is given to the post-initiative challenges of implementing cost-efficiency actions in the permanent organization.

4.1. Co-creation of actions for cost reduction in 'value meetings'

A central activity that emerged during the initiative was the direct involvement of the construction projects in the strategic initiative. As an interactive method to collect and generate cost-efficiency action in projects, 75 so-called 'value meetings' were held with over 100 project managers and other construction project personnel. The researcher engaged in a dialogue with the project managers, focusing on the particularities of the project at hand. This was possible as the meetings were held in connection with one project at a time at which one to three people from the project team were present – the project manager and, in some cases, the assistant project manager or project controller. Most of the participants were eager to talk about their projects' cost issues and the cost-efficiency actions they had already implemented. The majority were also open to suggestions made by the researcher. However, a lack of time was mentioned as an important limitation: "We have enough tasks in the project as it is, can we please spend as little time as possible on this?" Some were hesitant to mention cost issues that arose from organizational constraints, e.g. the unavailability of internal specialists to the project.

The meetings were characterized by active interaction with each project. Actions could be initiated, and information could be collected in real time. However, the meetings were a resource-intensive method, requiring the researcher to call, prepare and follow up the meetings. As the meetings concerned one project at a time, this meeting format did not allow direct contact between construction projects to exchange their experiences with cost-efficiency measures. However, as more meetings were held, the researcher could draw parallels between the projects and connect those projects with similar planned actions for cost-efficiency.

To promote a structured discussion, the researcher proposed the following topics at the beginning of each meeting: analysis of needs, standardization, new contractual approaches, technology/ digitalization, engineering cost, cost estimation and control and project organization. These topics had emerged from an initial analysis as being important. The project managers were allowed to choose the topics that seemed relevant to the project at hand.

The actions that were developed during these meetings were documented on so-called *value cards* (see Fig. 1), which were used as a tool to visualize and summarize actions. The cards could be used as a reference point for projects to follow up actions and as an information source for other projects. All 75 value cards were made available to everybody and could be shared between project teams. The researcher also suggested creating connections between projects with similarities to assure cost-efficiency action knowledge transfer.

Fig. 1 shows the template of the value card on the topic of standardization. The inner circle on the template provides facts about the topic: how it is measured, potential actions and how the strategic initiative can support the construction project. Planned actions and their intended effects were listed during the meeting in the table on the card. The outer circle could be used at a later stage to summarize the actual effect of actions and e.g. note the amount of cost reduction achieved by the measures.

This paper does not aim to provide a detailed account of the wide range of actions developed during the meetings. Examples include

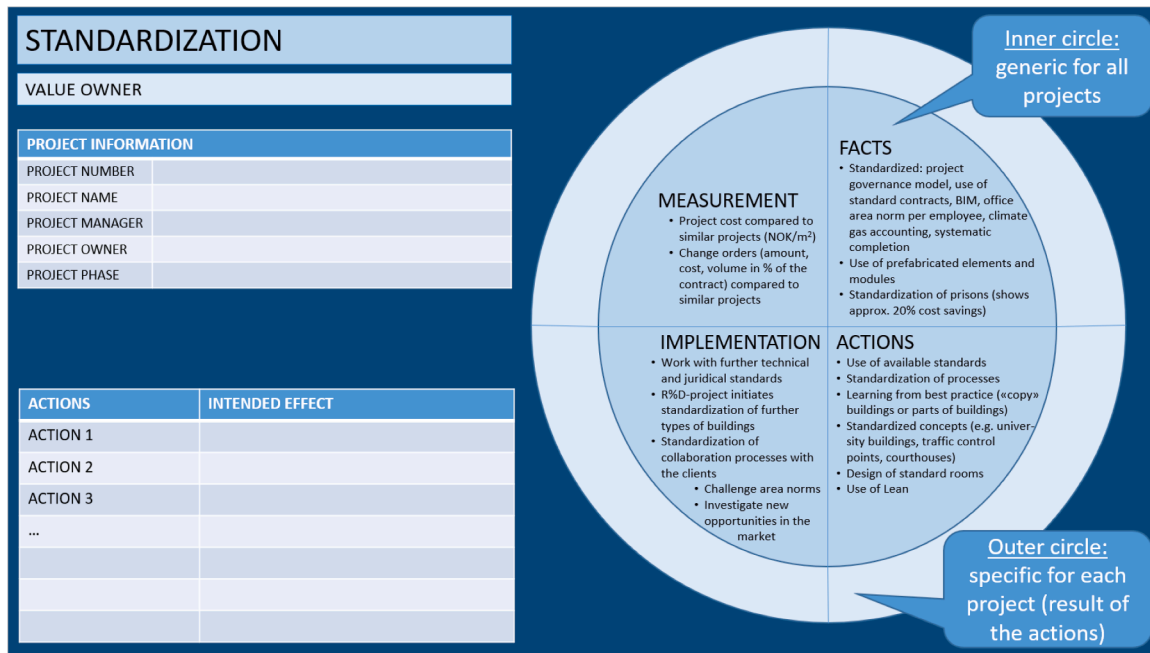


Fig. 1. Template of the project value card on the topic of standardization.

substantial area reductions in the conceptual phase through a thorough analysis of client needs, the standardization of prison buildings, use of virtual reality for visualization and travel minimization or using early contractor involvement to benefit from the contractor’s expertise. A table of real-life examples from the projects is provided in Appendix 1, which illustrates the width of the cost-efficiency actions and documents success stories on the project level.

Conducting ‘value meetings’ in connection with each project was a very positive experience, both as a pedagogical activity to stimulate the identification and implementation of cost reduction actions in the construction projects and as an implementation tool. The initiative has acted as a catalyst for the further implementation of cost-efficiency actions in construction projects.

4.2. Immediate results of the strategic initiative

The strategic initiative’s final report points out that the initiative represented an important start towards implementing a strategic approach to achieve cost-efficiency in construction projects. The long-term effect of the actions in the strategic initiative remains to be seen, as most of the participating projects are still being executed. Other projects had progressed too far at the time of intervention to create effective cost-efficiency actions. The cost objective status at the strategic initiative’s conclusion was as follows: The average final cost of the portfolio of projects completed between 2010 and 2018 (baseline) was 98% of the cost estimate at the time the decision to build was made. Further, while the final cost of projects completed in 2019 shows a marginal improvement to 97%, the prospect for ongoing projects returned this cost to 98%. The majority of average-sized projects achieved lower costs than before the initiative, but the largest projects showed a cost increase.

There is no indication of an increase in life cycle costs due to investment cost reducing actions. This is in line with prerequisites defined in the strategic initiative. However, several years must pass before evidence on how the actions really affect life cycle costs can be collated, as projects have long durations and buildings have long expected lifetimes.

Another prerequisite was that reductions in project costs should not negatively affect customer satisfaction levels. The customer satisfaction index in 2020 was 71 points, which is almost unchanged from the score

of 70 in 2018 (before the strategic initiative). This result suggests that cost-efficiency actions had no significant effect on customer satisfaction. However, on closer examination of the results, the index for the department that handles the earliest project phases (business case, evaluation of needs, concept) increased from 62 to 75 in the same time span. This indicates that the work on cost-efficient project concepts has contributed to higher customer satisfaction levels in projects’ earlier phases.

In the meetings, good collaboration with the customer and the user was mentioned as essential, especially in early project phases: “We had a very knowledgeable client, who was easy to collaborate with and find good solutions.” The overall customer satisfaction index did not change much from 2018 despite satisfaction being substantially higher for this specific department. This can be explained by a slight reduction in customer satisfaction levels for the operations department, and that the results for the department in early project phases is weighted less than other departments due to the lower number of projects in those phases and thus fewer answers from customers. The index for the building commissioning department, where most of the projects are managed, showed no significant change.

4.3. Challenges in the strategic initiative

At the beginning of the strategic initiative, the team and steering group discussed if a simple strategy could be a flat budget cut of 20% for each project. This idea was not popular with the project managers, as they were skeptical about cost reductions *per se*. Therefore, an approach of working together with the individual projects on concrete cost-efficiency measures was taken. It was believed to be important to give each construction project a certain degree of autonomy to find their level of cost-efficiency and develop effective actions, even though this could result in projects achieving different degrees of cost reduction. As one project manager expressed: “We’re working with design to cost and have already scaled the project back as much as possible, so now what’s left is only what’s really essential.” Changing the focus from the term ‘cost reduction’ to the more positive ‘cost-efficient value creation’ contributed to a greater acceptance of the strategic initiative. This was also reflected by the name ‘value meetings’ and using the term ‘cost-efficiency’ instead of ‘cost reduction’. The aim of the meetings was

therefore to find actions that could maximize the value generated by the construction projects without increasing the cost – or create actions which saved costs without reducing value.

The organization's top management group had mandated the initiative, whose objectives were therefore linked to the organization's overall strategy. There was, however, a gap between the construction project teams' project objectives and those of top management. While cost reduction was very important to top management, project managers had no real incentive to reduce costs beyond meeting the set cost frame, although some of them pursued that goal due to their own motivation: "You shouldn't stick to the cost frame but base your steering on the contractor's price plus an acceptable buffer" or on "what's reasonable for the project". Another project manager had set his own personal goal to "end up 10% under the internal cost frame, and at least not to use the project owner's reserve". To align the objectives of the construction project managers with those of top management, cost reduction was permanently included in a key performance indicator (KPI). Even though an additional KPI was not popular in the organization, the KPI contributed to formalizing the objective of cost reduction by increasing both project managers' and project owners' commitment to the objectives of the strategic initiative and their incentives to work on cost-efficiency. However, integrating the created value into the KPI to fully align it with the initiative's objectives is still a challenge.

Another challenge was top management's diminishing commitment to the project, as the steering group turned to other urgent tasks after the strategic initiative's official period was over. This inhibited a thorough and timely implementation of remaining actions from the initiative in the permanent organization. Initially, there was a plan to provide project support in order to pursue the identified cost-reducing actions. Yet due to a lack of resources in the initiative, the projects had to follow up the actions themselves. This situation made it more arbitrary if and how the initiated cost-reducing actions were to be continued in the construction projects. With better access to resources, especially at the initiative's conclusion, it would have been easier to assist the project managers when implementing their actions and control mechanisms if these actions had been in line with strategic policy.

Achieving a mindset change is difficult. Reducing investment cost by 20% without loss of customer satisfaction and increased life cycle cost and measuring the effects of this reduction, has proven to be more complex than expected. A diversified portfolio contains a number of projects with different preconditions, which inevitably results in different costs per square meter. Another cost reduction indicator that can be used is the ratio of final cost and the project's cost estimate when the decision to build was made (cost frame). While this indicator shows construction phase cost performance, positive or negative cost development in earlier project phases before the decision to build has been taken must also be accounted for. Working towards a solution which solves the client's needs in a less expensive way can be very cost-efficient.

However, data on projects' cost development before the decision to build is not easy to capture. There is often no complete record of cost development in early project phases, at least not one that is easily accessible at the portfolio level; moreover, it is difficult to consider cost development in relation to value creation. There is also the possibility that increasing cost estimates might be caused by higher value creation, which, although it can be seen in individual projects, is difficult to achieve and measure at the portfolio level. Having the ability to fulfill a client's needs at lower cost creates a great deal of potential for cost savings at this stage; however, additional data on early project phases' scope and cost development must be registered in a central database to allow the project portfolio to be fully measured.

The cost performance of the project portfolio shows a positive trend for projects that have a "normal" size. The current trend towards megaprojects (with an estimated cost of over EUR 2 million) is, however, moving in the opposite direction with respect to comparing the (expected) final cost to the cost frame. The strategic initiative concluded

that the dynamics in megaprojects seem to be different; subsequently, an initial focus on these projects should be initiated. At the same time, cost increase in megaprojects seems to be a generic problem not limited to the case study organization, as pointed out by Flyvbjerg (2014). Zaman et al. (2021) found that authoritarian leadership has a negative impact on public megaprojects' success rates, as incremental negligence due to project team members' silence can hinder megaprojects from reaching their goals (an aspect which can be explored further).

Project managers appeared to think that making incremental changes towards cost-efficiency was easier to accept than taking more radical actions with unknown consequences (by for example using new contract formats). As one project manager commented during a value meeting, "You always tend to choose the well-known strategies because you feel comfortable with them". Most project managers have a conservative approach to new ideas and show a high degree of risk aversion, a characteristic that makes them hesitant to use their project as a pilot project for testing new contractual models. Also, a lack of external pressure to try new models contributes to this reluctance. There might be a need to educate project managers information on how other organizations use these types of contracts to make them more comfortable with trying out new contract formats. A reward (or punishment) system for trying out these formats might also contribute to a higher number of project managers choosing them.

Next, while cost-efficiency actions also show a varying impact on project costs, not all actions are easily quantifiable. For instance, it is relatively easy to evaluate the effect of actions such as constructing prison buildings in a standardized and industrialized manner, which leads to shorter construction times and cost savings (Økland et al., 2017), selection of turnkey contracts with design proposals, or a reduction of building area by reusing existing buildings. However, it is difficult to quantify the more diffuse effect of making changes to the project team's organization or investing in new technology. Furthermore, some actions can be expensive to run in pilot projects and may only show their effects in subsequent projects.

4.4. Implementing measures from the strategic initiative

An implementation strategy was established towards the end of the strategic initiative whose aim was to ensure an implementation of activities which would have a positive effect on project cost in future construction projects. The strategy was also meant to ensure a prioritization of further strategic cost-efficiency work that was anchored in the permanent organization after the strategic initiative had concluded. At the start of the initiative, a continuous implementation of changes was planned. However, analyzing the status of cost-efficiency, creating and testing actions and implementing them during the two-year period of the strategic initiative proved to be a goal that was too ambitious to achieve. This was mainly due not only to a lack of time and resources in the initiative but also to the long duration of most construction projects. It therefore became necessary to establish an explicit implementation strategy that assured the deployment of successful actions, including after the conclusion of the initiative.

As part of the strategic initiative's overall plan, a PMO was established in the organization whose aim was to gather expertise on project governance in one unit. The PMO was to counter the problem of a lack of resources and provide better support to all project management teams. The initiative's project team and steering group decided in the end to place the ownership and future responsibility for coordinating cost-efficiency activities in the newly established PMO. The implementation strategy document, which was established during the initiative period, gives an overview of strategic and operational tasks designed to continue the work towards achieving cost-efficiency, including clear task ownership and responsibility for execution as well as the need for any additional staff. The PMO was designated as the main force behind any further implementation of strategic initiative actions.

In the final report, a number of actions are proposed for the

permanent organization to continue to implement. Some of these actions have already been approved and integrated into the governance system including mandatory creation of a benefits realization plan, use of a systematic completion approach (cf. Beste, 2020) and more precise requirements for making a thorough analysis of needs in early project phases. Other actions have not been included in the project's governance system, either because their relevance for the majority of projects is limited (e.g. subsequently refurbishing similar buildings) or because they lack maturity and so their implementation has not been prioritized (e.g. using alternative contractual approaches). There is also a plan currently under development to include the interactive process of developing cost-efficiency actions as a standard checkpoint into a digital, process-based project governance system.

Project managers and team members gather valuable experience when working on a project. As one project manager expressed it during a value meeting: "Based on what happened in this project, I'd definitely include this point in the specifications of the next project." To avoid stickiness of knowledge to single persons and enable diffusion of information to other projects, it is essential to implement organizational learning as a central element in strategic initiative measures. Following the strategic initiative, the PMO worked towards registering cost-reducing actions together with the project managers and thus improve the quality of an internal project database. The database allows for continuous knowledge sharing between the projects and serves as a central tool for sharing best practice approaches.

Another tool for knowledge transfer is a microlearning series that was developed during the initiative. Seven short thematic lessons on cost-efficiency were distributed weekly to 334 employees of the organization (Beste, 2021). Almost half of the employees completed all the lessons, which were perceived as being relevant by over 90% of this group. There was also an increase in their perceived knowledge on cost-efficiency after completion, especially for the employees having a low level of perceived knowledge before taking the microlearning lessons. These lessons were made available to all employees via the organization's online training platform; additionally, the PMO plans to further develop them in the future.

5. Discussion

5.1. An enhanced analytical model

Cost-efficiency actions in the organization partly reflect the factors either found by Flyvbjerg (2005) and Klakegg et al. (2018) or collected by Doloi (2013) and Adam et al. (2017), particularly the insight that project costs are largely determined in early project phases. The strategic initiative's objectives were aligned with the strategy of the organization (Dietrich & Lehtonen, 2005), and strategic considerations from the initiative led to an adaptation of a future organizational strategy. An initial top-down strategy implemented by top management was later augmented by a bottom-up approach (Himme, 2012) of involving construction projects in the co-creation of cost-efficiency actions. The actions from the projects were compiled and analyzed to determine what actions had a general relevance to all projects, which in turn allowed shifting focus from the individual project to the entire project portfolio (Martinsuo & Gherardi, 2020). Inter-project learning is also an important aspect in the strategic initiative. In addition to informal knowledge transfer, this type of learning also includes formal elements such as value meetings, databases and microlearning. These tools can help to make the tacit knowledge gained from projects visible to other project teams (von Hippel, 1994; Wiewiora et al., 2009) thereby creating a knowledge transfer network between projects (Ayas & Zeniuk, 2001; Garvin et al., 2008; Fitzgerald, 2003).

In the following, we will look at how the temporary strategic initiative translates to the permanent organization. Modelling the elements which are important for implementation can help us structure relevant factors and provide guidance also for other organizations that

are intending to implement strategic initiatives.

The dynamics of the implementation process at the interface between a strategic project and permanent organization is as much an organizational as a project management issue. Looking at the organizational sociology domain may therefore be useful when approaching this issue, as proposed by Arto & Wikström (2005). The Pentagon model is an organizational model with a holistic system perspective. It provides a way of considering the different dimensions to successfully developing organizational capabilities and performance through considering the organization as a socio-cultural system (Rolstadås & Schiefloe, 2017). The model is made up of five main dimensions:

- (1) "structure (defined roles, responsibilities and authority in the formal organization, defined procedures, regulations, and working requirements);
- (2) technologies (different tools and infrastructures the members of the organization use or are dependent on to perform their activities);
- (3) culture (language/concepts, values, attitudes, norms, knowledge and established "ways of working");
- (4) interaction (management, leadership, work processes and information flow connected to communication, cooperation, and coordination); and
- (5) social relations and networks (the informal structure and the social capital of the organization, i.e. trust, friendship, access to knowledge and experiences, informal power, alliances, competition and conflicts)." (Rolstadås & Schiefloe, 2017, p. 302).

The model has been previously applied in project management contexts, for instance as a tool for modelling project complexity (Rolstadås & Schiefloe, 2017), analyzing completed megaprojects (Rolstadås et al., 2014) and "to develop the project management organization and assess its performance in the course of project delivery" (Rolstadås et al., 2014, p.638).

The Pentagon model was considered to be useful for structuring the dimensions in the investigated strategic initiative and implementing initial results in the permanent organization. Some important elements which are needed to reflect the presented study's results are, however, missing in the original model. Inspired by Saunders et al.'s (2008) framework listing both soft and hard factors for the deployment of strategic initiatives, the elements "organizational strategy" and "learning & knowledge transfer" were therefore added by the authors. These elements facilitate placing the strategic initiative into the context of the permanent organization. Fig. 2 shows the adapted model, which is inspired by the original Pentagon model and conceived by the empirical data.

The core of the model is characterized by a continuous interplay of these three elements: (1) organizational strategy, (2) organizational capabilities and performance, and (3) learning and knowledge transfer. The strategic cost reduction initiative was developed based on the organizational strategy to develop organizational capabilities in order to increase the organization's construction project cost performance at a portfolio level. As a result of the strategic initiative, the future organizational strategy was changed to better accommodate a continuous focus on cost-efficiency. The new strategy for the period 2021-2025 explicitly reflects cost-efficiency in the objective: "We deliver cost-efficient public buildings." This study relates to one of the objective's sub-ordinate targets: "We ensure good project management and conduct cost-efficient construction projects." Clear annual milestones combined with the KPI are expected to ultimately result in a 20% cost reduction by 2025. Learning through actively sharing knowledge from projects also has the potential to increase organizational cost-efficiency capabilities and performance. Organizational capability is created by enabling project managers to take actions in their projects and by establishing a PMO to support the construction projects towards achieving cost-efficiency.

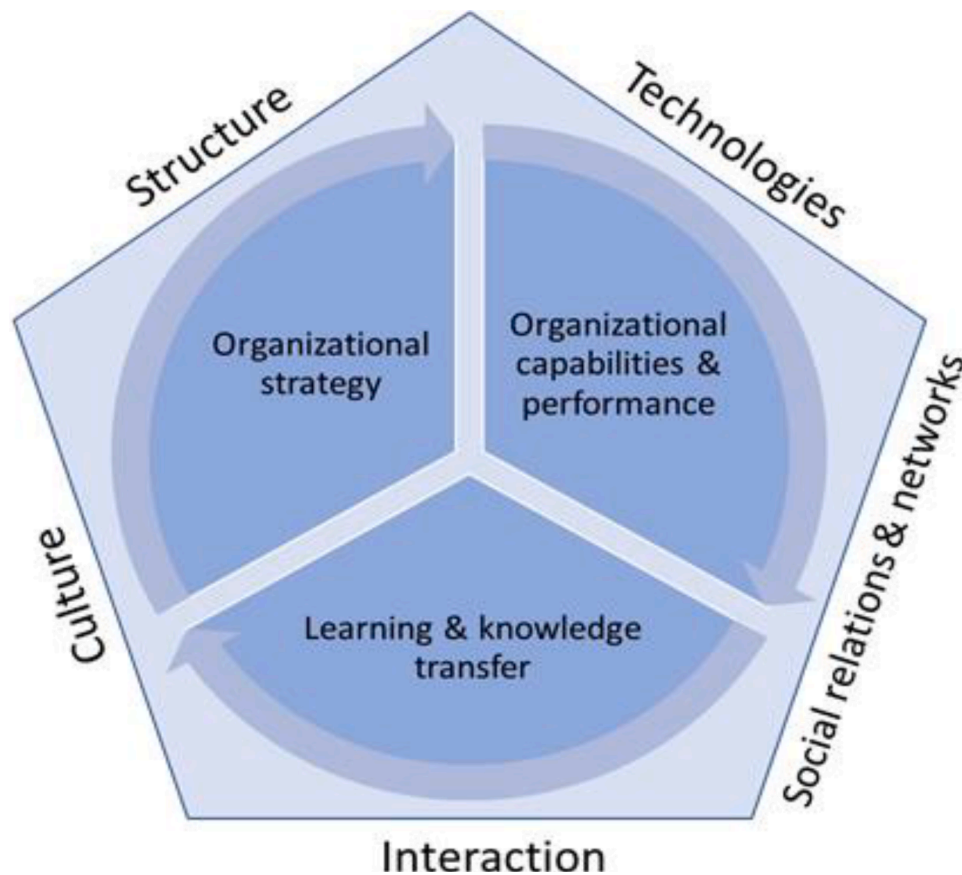


Fig. 2. A framework for implementing a strategic initiative in a project-based organization (based on Rolstadås & Schiefloe, 2017, augmented by the authors with elements from Saunders et al., 2008).

The strategic initiative showed that the construction projects are not only a part of the problem to be solved, but also a key contributor to the solution. The enablers of change are situated in the lower part of the pentagon within the ‘soft’ dimensions of culture, interaction, and social relations and networks. The value meetings were characterized by interaction with the projects through the co-creation of actions for cost-efficiency. Networks were established between projects by actively communicating cost-efficiency actions between them. The initiative therefore prepared a foundation for accepting changes and a mindset where cost-efficiency is an important factor in project execution.

The ‘hard’ dimensions of structure and technologies can be classified as enablers or tools that facilitate efficient cost reduction work in the projects. Based on the meeting results, necessary structures included establishing both a KPI and a mandatory checkpoint for cost-efficiency in the project governance system to replace the resource-intensive meetings. Supporting technologies are dashboards used to show continuous cost performance measurements, a project database to register cost-efficiency actions and microlearning tools for communication and learning.

Based on this study’s findings, all these dimensions are needed to increase cost-efficiency successfully and permanently in the organization. This assertion confirms the findings by Dietrich & Lehtonen (2005), stating that managing strategic intentions entails the necessity to include both formal procedures and informal and invisible processes.

The augmented Pentagon model is based on experience from this specific strategic initiative in one organization. However, it should be applicable to other project-based organizations as well, as the model takes organizational context and individuality into account.

5.2. Answering the research questions

The study presented here has investigated a strategic cost-efficiency initiative in a public sector organization that works with construction projects. This paper presents how an organization can learn and profit from conducting a strategic initiative – and thus achieve lasting change. Having examined challenges in the strategic initiative and the implementation of results in the organization, we can now answer our research questions.

What challenges did the organization encounter when conducting their strategic initiative on increased cost-efficiency in public construction projects?

The objective of a strategic initiative is to bring about change in an organization (Ponomarenko et al., 2016). In this transformational process, the organization can encounter a number of challenges on the organizational level as reactions to the strategic initiative. Operational challenges with cost-efficiency measures in single projects are not discussed here.

As Paquin et al. 2016 point out, strategic initiatives must conform to organizational objectives. The challenge of non-aligned objectives also manifested in this initiative: Initially, the strategic objective had to overcome the problem, that the objectives of the initiative were not clearly aligned with organizational objectives.

There was both a varying degree of acceptance with respect to actions taken to promote cost-efficiency and reluctance to employ unfamiliar actions with a higher (perceived) risk level. Therefore, continuous focus on participation of the projects and more information about more comprehensive actions for cost-efficiency is needed to increase employee readiness (cf. Himmel, 2012). However, also incremental changes can have cumulative power when transferred from project to the organizational level (Berggren, 2019), something the strategic initiative focused on.

Previous research has pointed to the problem of team members of a strategic initiative being assigned new tasks directly (Stjerne & Svejnova, 2016; Swan et al., 2010; Sydow et al., 2004), thus being unable to follow up the results. The same was revealed in this research, as the individual value meetings with the construction projects' participants were a resource-intensive approach, taking time for administration, facilitation and follow-up. After the end of the strategic initiative, no resources were available to continue this approach in the same way.

Despite the steering group's expectations regarding the initiative, its success is not shown directly due to long duration of the construction projects and the need for a mindset change by the project teams. Whereas many cost-reducing actions have been initiated in "normalized" projects, this is a challenge in the megaprojects of the organization. In addition, measuring cost reductions at the portfolio level proved to be more difficult than expected.

Based on the results of the strategic initiative, what actions can organizations take to effectively deploy the results?

The strategic initiative showed that explicitly addressing the topic of cost-efficiency with each individual project team brought many positive cost reduction actions to the surface. Earlier studies point out well-working integration mechanisms for the institutionalization of change (Willems et al., 2020) and the importance of establishing a common project model (Dietrich and Lehtonen, 2005) as a success factor for the implementation of strategic initiatives. The organization already has an established project governance model. But to institutionalize the practice of investigating possibilities for cost reduction, a suggestion from the strategic initiative is to integrate a cost-efficiency checkpoint into the project governance model.

In line with the findings by Bredillet et al. (2018) on a PMO being instrumental for leading change and Sergeeva and Ali (2020) on a PMO facilitating collaboration between projects, a newly established PMO in the organization has the mandate to continue to focus on cost-efficiency after the conclusion of the strategic initiative. The PMO provides resources, systems and effective tools to do so (cf. Prado and Sapsed, 2016), including a well-developed project database and microlearning in order to share best practices with other projects. Further, using a KPI ensures continued focus on more cost-efficient construction projects.

The organization has also realized that change was not only about reducing project costs in each individual project, but much more about changing a mindset. Considering the reality of the temporary organization of construction projects and involving stakeholders has been crucial to align strategic objectives and create persistent change in the initiative. Successful collaboration with the project teams in this initiative confirms the importance of projects in the implementation of strategy (Lehtonen and Martinsuo, 2009; Himmel, 2012; Löwstedt et al., 2018). Likewise, change is always carried out in the context of the permanent organization (Martinsuo & Geraldi, 2020; Martinsuo, 2013). The presented study combines the two elements of considering the organizational context and the need to involve the projects when creating change.

When deploying the results of the strategic initiative, the Pentagon model (Rolstadås & Schiefloe, 2017) can be applied to give guidance on the different dimensions to consider. This includes the "hard" dimensions of structure and technologies, as well as "soft" dimensions of culture, interaction as well as social relations and networks. However, the empirical evidence from this study led to an augmented core to this framework, based on Saunders et al. (2008): In order to develop organizational capabilities and performance, a continuous focus on learning and knowledge transfer and aligning with organizational strategy is necessary.

The presented study confirms many aspects investigated in relevant literature before. But in contrast to previous research focusing on single aspects of implementation, this study gives a more comprehensive picture from the practical realm of a PBO when implementing results from a strategic initiative.

6. Conclusions

In the previous chapter, we have discussed the results of this study and answered the research questions. In the following paragraphs, we will present the study's contribution to both theory and practice and discuss the validity of the study as well as suggestions for further research.

6.1. The study's contribution to project management knowledge

This study contributes to the project management literature by providing a rich empirical account of a strategic cost-efficiency initiative in a project-based organization, which has not been previously focused on in the literature. Applying an organizational sociology perspective to the initiative shifts the focus from individual projects to the portfolio as a unit of analysis. The observed dynamics of the strategic initiative align with previous research on the necessity of sensemaking through action in the implementation of change activities (Stensaker et al., 2008). It also adds the dimension of a project-based organization to the findings by Willems et al. (2020) with respect to how the autonomy of strategic initiatives influences the implementation of results in the permanent organization.

The active involvement of construction project teams in the strategic initiative work contributed to increased ownership of the movement towards greater cost-efficiency. Actively engaging the project teams as contributors makes the study an example of avoiding isolation of the initiative from the permanent organization (Lehtonen & Martinsuo, 2009). The study supports the theory concerning the importance of adapting organizational changes to match the context of the project-based organization using empirical evidence, which helps "project workers find value in the innovations to their ongoing work" (Prado & Sapsed, 2016, p. 1811).

On a methodological level, this study answers the need for a more practice-based approach to project management research (Oddane, 2015). It also represents an example of the importance of including practical knowledge in organizational learning (Cicmil, 2006). The augmented Pentagon model, as shown in Fig. 2, provides a methodological tool for project management researchers and practitioners to structure the dimensions of a strategic initiative, especially in the initiative's implementation phase.

6.2. The study's contribution to practice

This study is an action research study inspired by a "real-life" problem: The contribution to practice is therefore inherent. Through investigating opportunities and initiating actions for achieving cost reduction in the project portfolio, the example of the strategic initiative provides guidance for project management practitioners on how organizations can cultivate a higher cost-efficiency focus (cf. actions listed in Appendix 1). Both cost-efficiency actions in the construction projects and concrete actions for organizational development are highlighted in this study. Practitioners are invited to replicate the interactive approach of creating cost-efficiency actions together with the project teams. The approach also includes incorporating the cost reduction objective into the key performance indicators (KPIs) and strengthening knowledge transfer on cost-efficiency actions. Microlearning and other ways of communication can also be used to contribute to the creation of a cost-efficiency culture. It is recommended to continue using the cost reduction KPI introduced during the strategic initiative. In addition, this study's results will help the organization to continue its cost-efficient construction project work, even after the strategic initiative is over. Other organizations can benefit from the experiences gathered in this study by applying the same principles to similar strategic initiatives.

6.3. Research validity and suggestions for further research

This research project uses an action research approach in a single organization, entailing a high internal validity and practical relevance to the organization in question. Methodological rigor is, however, limited due to the lack of researcher triangulation and the methods being developed during the research to adapt to the dynamics of the organizational context. Further, the fact that the researcher was employed in the organization and acted as a facilitator in the meetings may have caused research bias. Taking all of this into account, generalizability to other strategic initiatives may be limited.

Conducting further research in other organizations or using different methodological approaches than action research is suggested to verify the results, preferably using researcher triangulation. Nevertheless, experiences from the study may be useful either in other contexts in PBOs with similar challenges or with other objectives than cost-efficiency. For example, the importance of linking the objectives of the strategic objective to the organizational strategy, co-creation of cost-efficiency actions, and adapting governance structures in the permanent organization to allow a sustained continuation of actions could also be applicable in other organizational contexts. As most of the data for this study was collected before the Covid-19 pandemic, its effect is not seen in this study. It would be interesting to conduct further research investigating the pandemic's effect on the cost-efficiency of the organization's projects.

The presented study also touches upon some aspects of managing strategic projects in projects-based organizations, which inspire to undertake further research: Examples are focusing on the investigation of the role of PMOs in the management of strategic projects (cf. [Sergeeva &](#)

[Ali, 2020](#); [Bredillet et al., 2018](#); [Müller et al., 2019](#)) or how the nature of the projects in the portfolio (e.g. type, size, length) impacts how strategic projects of programs are successfully managed (cf. [Martinsuo & Geraldi, 2020](#); [Martinsuo, 2013](#)).

On a practical level, control measures for further development of project cost reductions in combination with maintaining customer satisfaction can even increase value creation in the future. Furthermore, this initiative identified the need to start a new initiative that specifically investigates cost development in megaprojects.

Language editing of the manuscript was done by Alasdair Graham-Brown (first version) and Speakwrite Communications (revision 2).

Declaration of Competing Interest

The first author is employed in the presented organization and her PhD-project related to the presented strategic initiative is jointly financed by the organization and by the Norwegian Research Council (Grant No. 286373). No competing interests are declared for the co-author.

Acknowledgements

The authors would like to thank Jack Meredith and Miia Martinsuo as well as the other participants in the paper development workshop for this special issue for their constructive comments and valuable suggestions for improvement of this paper. The authors also thank the anonymous reviewers as well as co-editor Jack Meredith for their valuable contributions.

Appendix 1

The following table presents real-life examples of actions for cost-efficiency in construction projects, developed and collected during the value meetings with the construction projects.

Topic & project type	Action and its (potential) effect on project cost
Reduction of area in a courthouse project	By reusing parts of concepts used in other courthouses, planning for co-use of areas by different users and planning with a potential future expansion, it was possible to reduce the area of the planned building by 31% compared to early design proposals. By additionally differentiating the level of quality in public versus internal areas of the building and eliminating cost-driving elements (change from parking garage to protected outdoor parking lot, reduction of ceiling height), the total expected project cost could be reduced by over 30% (≈10 million EUR).
Analysis of needs in an office building project	Even though the client "ordered" the addition of a new floor to their existing office building, the project team took a step back. By optimizing the area in the existing building to adapt to the changed needs of the client, it was possible to realize the client's needs without extra area. The potential savings are estimated to 3-6 million EUR.
Standardization of prison buildings	Together with correctional services, guidelines for a standardized prison concept were developed. The standardized concept was piloted in two projects, and the revised concept applied in the following two projects. Benefits included saving time and money in the planning and engineering phases of the project and simplifying collaboration with the client/user. The invitation for tender could be optimized, avoiding costly changes in the execution phase. This action, combined with a favorable market situation at the moment of tender, led to cost savings of 36% compared to the expected cost for the two most recent prison projects (equaling savings of approx. 60 million EUR).
Use of technology in an office building refurbishment project	The combined use of virtual reality, BIM and a 360-degree view of the building contributes to a better understanding of what has to be done and makes it easier to involve the users of the building in the planning. It also minimizes time and cost for travelling, which is important as the building is located remotely in Northern Norway.
Cost estimation and control in a prison refurbishment project	This action reduces the refurbishment of the building to what is necessary and adds value for the user. In a large prison refurbishment project, one action was to refurbish the two similar buildings in sequence and include both the refurbishment of building no. 2 as well as other works as options in the contract with the contractor. This enabled the commissioner to execute very tight cost control and the contractor could apply learning from the first building to the second. These actions led to a final cost of the project 10% below the already very tight cost frame.

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