Chapter 18
Practical Use and Effects of Scope Reductions in the Form of Reduction Lists: Cost Control at the Price of Sustainability?

Andreas Økland
Norwegian University of Science and Technology, Norway

Nils O. E. Olsson
Norwegian University of Science and Technology, Norway

ABSTRACT
Scope management in the form of reduction lists was integrated in the quality assurance scheme for Norwegian public projects in 2001. This article presents findings on the actual use of reduction lists for major public construction projects. Project representatives were contacted to obtain information about the actual use of pre-defined potential scope reductions. Eight of the 14 studied projects did not implement any of the predefined reductions. Six projects implemented some of the reductions. The scope reductions on the reduction lists are very specific and detailed, unlike general theory on scope management and cost control. However, the findings from the study are in line with the general theory; it was the most general scope and cost reductions that were used in practice. The study subsequently looked into the relationship between scope reductions and sustainability. Although the most frequently observed reduction was of the category “reduced quality or functionality”, sustainability was rarely affected with the notable exception of the railway infrastructure projects.

INTRODUCTION
Large public construction projects have a well-known tendency for delayed delivery and cost overruns. According to Chevroulet, Giorgi, and Reynaud (2012) the majority of transport infrastructure projects in the European Union are subject to cost overruns, in the area of 15–20% over budget, with one in four even above that. Chevroulet et al. (2012) goes on to state that the most important reasons for cost overruns are

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changes in project specifications, the rise of environmental and safety requirements, technological risks, and changes in material costs, in decreasing order. Several studies, including Hall (1982), Flyvbjerg, Bruzelius, and Rothengatter (2003), Shane, Molenaar, Anderson, and Schexnayder (2009) and Doloi (2012) found cost overruns in investment projects. Flyvbjerg et al. (2003) claim that 90% of studied investment projects had cost overruns of between 50 to 100% compared to initial cost estimates, even though the exact reference point as to what overruns are measured were not clearly stated. In addition, they mean that cost overruns have been common during the last 70 years.

Love, Wang, Sing, and Tiong (2012) found a mean cost overrun of 12% on construction and engineering projects. Cheng (2014) points to a clearly defined scope of project in the contract and cost control as major determinants for cost overruns of construction projects. Tesfaye, Berhan, and Kitaw (2016) showed that the dominant risk assessment tools used for the past twenty years is statistical analysis and fuzzy expert system, however, practitioners and academics in project management continuously strive to find means of avoiding and controlling the overruns.

Scope management materializes as a key issue in construction projects in order to manage costs. The typical focus in scope management is to avoid scope increases, as these generally are accompanied by cost increases. This article looks at another approach, asking how scope reductions can serve as a tool for cost control. One approach to scope reductions is the development of reduction lists in the early phases of projects, in which non-critical elements of projects are identified. Reduction lists have been a mandatory part of large Norwegian public projects since 2001.

This paper maps the use of potential scope reductions (as expressed by the reduction lists) and project contingencies. The reduction lists consist of scope reductions that are not desirable, yet can be implemented without affecting the overall effects of the project in large Norwegian governmental investments if there is a risk of cost overrun. Such reductions are a part of a Quality Assurance (QA) scheme required by Norwegian Ministry of Finance for large government investment initiatives over 750 million NOK (Concept, 2017). The bulk of the investments that are subject to the scheme are construction investments in the sectors of public facilities, defense and transport.

Project management and the public attention to projects have changed since 2001, however, most importantly due to concern for the effects of climate change (Morris, 2016) and sustainability (Gemünden, 2016). Sustainability and environmental concerns can be categorized as a mega trend that shape current transformations and developments in many industries (Nidumolu, Prahalad, & Rangaswami, 2009) including management of projects in general (Gareis, Huemann, & Martinuzzi, 2013) and construction projects in particular (Haberl, Fischer-Kowalski, Krausmann, Martinez-Alier, & Winiwarter, 2011; Ortiz, Castells, & Sonnemann, 2009).

“Sustainability” denotes a holistic concept that revolves around balancing local and global, short- and long-term consequences within the environmental, economic and social dimensions. Scope reductions as an approach to cost control on the other hand can be interpreted as a biased tool for prioritizing the short-term cost over long-term performance. In this chapter questions are raised about how these potential reductions were used during project execution, and if there are any indications of short-term bias. This article analyzes the use of such scope reductions for major projects. In particular, it follows up projects that are completed to see to what extent the reduction is used.

The purpose of the study is thus to follow up the use of potential reductions for a range of completed construction projects. The research questions in the study are:
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