

System Dynamic Modelling of Construction Cycle*

Toms Širovs and Vladimirs Šatrevičs

Department of Innovation and Business Management, Riga Technical University
Riga, Latvia

Correspondence should be addressed to: Toms SIROVS; Toms.sirovs@gmail.com

* Presented at the 40th IBIMA International Conference, 23-24 November 2022, Seville, Spain

Copyright © 2022. Toms Širovs and Vladimirs Šatrevičs

Abstract

It is necessary to develop a system model, to provide a vision of the complete construction cycle, which would be able to improve the efficiency of project management. As the overall demand in the construction industry increases, the intensity and degree of complexity of projects increases, which contributes to a certain impact on the course of project management. Any construction project is characterized by the overall construction cycle, which includes several complex activities as well as the outcome of which depends on internal and external processes. Various studies have been conducted to system dynamic modelling approach of construction industry although there are not proposed to divide variable elements into groups that would lead to full construction cycle framework from a project management perspective due to its complexity. This study develops five main construction cycle elements (groups of factors) which are affected by the variable elements. By optimizing and simplifying the perception of the complex system, it is proposed to divide the variable elements into 5 groups and 14 subgroups. Through conduction of the interviews with experts in the construction industry, the proposed groups were linked to the main processes of the full construction cycle. Using the modelling program Vensim DN, the main conceptual framework of system dynamics model was proposed, including the effects of groups of variable elements, that explains the full construction cycle. This study is able to explain the complex nature of a system dynamics in project management studies by representing the main conceptual framework of system dynamics model of the full construction cycle.

Keywords: system dynamic, modelling, project management, construction cycle