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Project Systemic Risk: Application Examples of a Network Model

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Abstract

Projects are increasingly perceived as complex systems, yet little work has been done in developing methodologies that are theoretically grounded on complex systems theory. In response, this article argues the practical utility of a recently introduced model that draws on notions from Network Science (NS) – a prominent domain in the study of complexity. Its utility is exemplified in the context of Project Management (PM), tackling two specific challenges: risk and conflict management. In the case of the former (risk), shifts in the susceptibility of a project to systemic risk (in the form of inter-linked failures) are identified. In the case of the latter (conflict), the effect of (sub) contractor activity – in terms of variance and activity pattern – to project systemic risk is assessed. To do so, numerical methods are developed and applied on an empirical dataset of widely-captured data (Gantt charts). In the context of the two challenges proposed, it is shown that: (a) the exposure of a project to systemic risk varies in a non-trivial manner as it evolves, at both micro and macro level; (b) (sub) contractor activity substantially impacts the emergence of locally important tasks (i.e. tasks able to disrupt the operation of a