



# The impact of stakeholder attributes on performance of disaster recovery projects: The case of transport infrastructure

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## Abstract

How stakeholder attributes might influence the performance of disaster recovery project remains ambiguous. Stakeholder attributes are socially constructed variables and have been classified as power, legitimacy and urgency based on stakeholder theory. They are not the only factors to predict the overall performance of a project, the environmental factors such as socio-economic and project conditions should also be considered. We, therefore, hypothesised that direct relationship between stakeholder attributes and performance of disaster recovery projects might be mediated by socio-economic and transport infrastructure conditions. Using structural equation modelling with partial least square estimation approach, we analysed data collected from structured questionnaire survey involving local councils in New South Wales, Australia. The results suggest that stakeholders with more power, legitimacy and urgency attributes have managed disaster recovery projects with better performance. The results also show that the socio-economic and transport infrastructure conditions have mediating effects on performance of disaster recovery projects.

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## 1. Introduction

Damage from disasters has increased 14-fold since the 1950s (UNISDR, 2011) and worldwide estimates of annual expenditure on disaster recovery projects has increased to US \$200 billion since the 1980s (IPCC, 2012). In a review of management science research in disaster risk management, Altay and Green (2006) noted that almost 90% of research addressed mitigation, preparedness and response phases of disaster risk management, while less than 10% of the research contributed to managing disaster recovery projects. There are poor understanding and little consideration of managing disaster recovery projects (Kim and Choi, 2013, Chang et al., 2012).

Disasters cannot be eliminated, even with proper planning. When a disaster does occur, recovery activities involve rehabilitation (short-term) and reconstruction (long-term) to restore vital support systems and return life to normal such as rebuilding residential and non-residential buildings, roads, bridges and infrastructure, and coordinating government activities (Altay and Green, 2006, Moe and Pathranarakul, 2006, Peek and Mileti, 2002). Disaster recovery requires timely, quality, high-performance and low-cost disaster recovery activities. A wide range of stakeholders, such as local governments, state emergency services, road and maritime services have a key role in disaster recovery (Mojtahedi and Oo, 2014, Boshier et al., 2009). Understanding the impacts of the wide range of stakeholders involved in disaster recovery projects is essential to achieve recovery performance targets. Effective stakeholder management can improve the performance of disaster recovery projects, while poor management can lead to low project performance in terms of schedule, cost, quality, environment, return on investment

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and communications (Bosher et al., 2009, Brilly and Polic, 2005). In addition, poor management of reconstruction projects can itself lead to disasters such as less resilient temporary buildings, waste of construction materials and environmental degradations and the highest ratio of recovery costs to losses (Yu et al., 2015).

Although scholars have evaluated project performance in general, there has been little focus on the performance of disaster recovery projects, and there has not been much work in assessing the performance of disaster recovery projects. Although there are many factors involved in stakeholders' organisational capacity and performance in managing disaster recovery projects (Raschky, 2008), stakeholder attributes in managing disaster recovery projects have not been studied. This paper, therefore, addresses stakeholder management for disaster recovery projects by focusing on three stakeholder attributes: (i) power; (ii) legitimacy and (iii) urgency (Phillips et al., 2003, Mitchell et al., 1997, Freeman, 1984). These stakeholder attributes have not yet been evaluated in managing disaster recovery projects for good performance. Stakeholder attributes might influence the performance of disaster recovery projects. For instance, power enables stakeholders to use social and political forces and benefit from disaster recovery project management resources from their respective organisations. This might result in completing disaster recovery projects on time and on budget. On the other hand, legitimacy enables stakeholders to abide by beneficial or harmful risks pertinent to disaster recovery project management because legitimacy is a generalised assumption that a stakeholder will behave properly within socially constructed systems of norms, mandates and procedures. Legitimacy, hence, improve the quality of disaster recovery projects and finally, urgency enables stakeholders to coordinate immediate response and recovery activities in disaster recovery project management. Urgency accelerates the mobilisation tasks for sub-contractors during the reconstructing phase of disaster recovery projects.

The paper is structured as follows. Section 2 reviews stakeholder engagement in disaster recovery projects, Section 3 reviews disaster recovery project performance, Section 4 provides a theoretical framework and hypothesis development, Section 5 outlines the research methodology, Section 6 presents the results, Section 7 discusses stakeholder attributes and Section 8 concludes.

## 2. Stakeholder engagement in disaster recovery projects

A stakeholder is a person or an entity who gives an input into decision-making as well as one who benefits from the results of decision-making (Phillips et al., 2003). Stakeholders have an interest in the actions of an organisation, and have the ability to influence or be affected by the achievement of the organisation's objectives (Donaldson and Preston, 1995, Savage et al., 1991, Freeman, 1984). For disaster recovery projects, stakeholders are groups or individuals who can affect or be affected by the performance of a recovery project and include local councils, project managers, designers, subcontractors, suppliers and most

importantly users and community (Amaratunga and Haigh, 2011).

Based on Freeman (1984) and the definition of project stakeholder management by the Project Management Institute (2013), disaster stakeholder management is the process of developing appropriate management strategies to effectively engage stakeholders throughout the mitigation, preparedness, response and recovery phases of the disaster risk management life cycle, based on analysis of their needs, interests, and potential impact on project success. One of the main aims of disaster stakeholder management is improving the performance of disaster recovery projects by engaging stakeholders effectively and strengthening stakeholders' attributes.

Power, legitimacy and urgency are three distinct stakeholder attributes (Mitchell et al., 1997). Power allows a stakeholder to carry out its own will. The power of a stakeholder may arise from its ability to mobilise social and political forces as well as its capacity to withdraw resources from the organisation. Legitimacy gives the opportunity to a stakeholder to identify some sort of beneficial or harmful risk pertinent to its organisation. Urgency is the degree to which a stakeholder is able to call for immediate attention.

Previous studies have focused on the role of stakeholder involvement in disaster risk management in the mitigation phase (Brilly and Polic, 2005). Only a few studies have scrutinised stakeholders' views and perspectives in the disaster recovery phase. For instance, Walker et al. (2016) studied the legitimacy attribute of stakeholders in Christchurch post-earthquake reconstruction in New Zealand. Almoradie et al. (2013) studied flood disaster in Cranbrook catchment (London, UK) and the Alster catchment (Hamburg, Germany) using web-based platforms. Bosher et al. (2009) studied flood disaster in the UK using questionnaire survey, and Vari et al. (2003) studied flood disasters in collaboration with Swedish and Hungarian researchers. This paper, therefore critically examines the role of key stakeholders and their characteristics in disaster recovery project performance.

## 3. Disaster recovery project performance

Research has focused on different variables to measure project performance in general, including schedule, cost and quality variables (Yun et al., 2016, Popaitoon and Siengthai, 2014, Swarup et al., 2011), safety performance (Yun et al., 2016, Yeung et al., 2007, Cox et al., 2003), sustainability (Rankin et al., 2008, Yeung et al., 2007), and effective communication (Yeung et al., 2012, Yeung et al., 2007). Cox et al. (2003) developed a measure of performance in construction projects by combining six key performance indicators including quality control, on-time completion, cost, safety, cost per unit, and units per person-hour.

Although time, cost, quality and safety are considered essential factors to measure project performance, this simple approach is not adequate in many complex cases such as disaster recovery projects because it involves a range of project types, urgent project planning with limited financial budget and different stakeholders engaged in project management. Although previous research has developed indicators, methods and procedures to evaluate project performance, there were some limitations in

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