Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 35 (2017) 783 – 787

International Journal of Project Management

www.elsevier.com/locate/ijproman

Editorial

Disaster recovery project management: A critical service

A decade has elapsed since the Indian Ocean tsunami in December 2004. This period has seen an increased number of major disaster events in areas of high risk. With the tremendous havoc that these events wreak, determining better techniques for recovery is something that many of us feel duty bound to pursue. Knowing how to rapidly reconstruct the damaged built environment is a matter of core interest to policy makers and project management practitioners who are involved in disaster recovery projects. It is at the project level that value is created and the quality of the rebuilt environment is determined, whether in the public or private sector. It is here that relatively small changes in decision-making, the heart of management, can mean the difference between mediocre and fully effective outcomes. It is the aim of this special issue to dig a little deeper and go beyond some of the usual project management practices to understand the core knowledge, tools and methods needed for managing projects in a post-disaster recovery environment.

Disaster recovery is not emergency, life-saving response to disasters, but it is much more than preliminary planning and mitigation activities. Approaches to managing post-disaster reconstruction projects have varied widely, depending on the scale of damage, sources of funding, local capacities and structures of governance (Chang et al., 2010; Comerio, 1998; Daly and Feener, 2016). In presenting cutting-edge work from the field, this special issue explores often complex, challenging, but also rewarding knowledge and practices from disaster recovery projects. These critical investigations raise questions about the role of a growing number of stakeholders, especially local communities and government agencies, who seem to always play a prominent part in deciding what needs to be done and how project-oriented rebuilding should be undertaken.

This special issue is a timely discussion of how experiences and lessons learned from previous and ongoing reconstruction projects can contribute to rethinking project management methodology, practice and associated training to meet a set of unique post-disaster demands. Each of the papers in this issue is unique in its emphasis, but there are a number of consistent themes and areas which overlap:

- The paper by Steinfort sets the tone for this special issue by positioning project management within the community and post-disaster settings and highlighting a number of strategic requirements to fulfil emerging challenges over the course of managing a disaster recovery programme/project.
- The paper by Vahanvati and Mulligan presents longitudinal case studies on good reconstruction project practice and a cross-case comparison allows the identification of critical success factors for achieving long-term effectiveness in post-disaster housing reconstruction projects.
- Both the paper by Gacasan and Wiggins and that by Trivedi and Singh examine the critical skills (sense making and decision making, respectively) necessary to comprehend the complexities associated with disaster recovery projects and offer ideas for training and capacity-building of project managers operating in such contexts.
- The papers by Kalkman and Waard; by MacAskill and Guthrie; by Levie et al.; by Walker et al.; and by Mojtahedi and Oo investigate a number of theoretical and practical aspects of organisational arrangements with a view to achieving better performance in disaster recovery projects.
- Sadiqi et al.'s and Lin et al.'s papers shed light on the role of communities in participating in and/or leading disaster recovery projects and offer pragmatic solutions for community capacity-development activities. This perspective highlights how effective participation can enable affected communities to positively influence project success.

1. Project management methodology in context

The "Project Management Methodology for Post Disaster Reconstruction" developed by the Project Management Institute (PMI) has provided definitions of 'reconstruction project management' and associated practice guidelines for those in the disaster recovery field including relief agencies, non-government organisations (NGOs) and/or governments. It is based on 'A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Third Edition', and is meant to enhance the collaboration and consistency, as well as the quality and accountability, of projects undertaken in a crisis/disaster rebuild environment (Project Management Institute, 2005). However issues arising from using the standard PMI tools in disaster, resilience and climate change programmes, as Steinfort has highlighted, raise a host of questions in regard to the very contexts to which they apply, the integration of

http://dx.doi.org/10.1016/j.ijproman.2017.03.003

new knowledge and skills and, most importantly, how they can be used to include key stakeholder values to enable sustainable project results. Steinfort elaborated on this last point by suggesting that:

> It is essential to define programme to project value with the key stakeholders before commitment so that one can monitor and evaluate through programme agreement to project. What all of the above leads to is the need to develop a programme to project management methodology, education and training which is sustainable amongst communities of practice in essentially high risk, high need situations where it can be first understood, and then applied widely and effectively.

Traditionally, the evaluation of project performance has consisted of either physical monitoring and progress measurement or client/end-user satisfaction reports. But these two positions have not been well aligned in disaster recovery projects as they cut across the disciplines of project management and social science. For this reason, the project management methodology has been criticised for the following limitations in post-disaster recovery:

- It focuses on a single project life cycle and has inflexible timeframes for project completion (Steinfort and Walker, 2007);
- It fails to identify the complexities and unique challenges of large disaster settings (Chang-Richards and Wilkinson, 2016; Hayes and Hammons, 2000); and
- It measures project success in terms of project outcome rather than on-going processes (von Meding et al., 2016).

The paper in this issue by Vahanvati and Mulligan explores the long-term effectiveness of post-disaster reconstruction work in relation to resilience of affected communities 15 years after the earthquake in Gujarat and seven years after the flooding events in Bihar, India. A comparison of four case studies suggested four critical factors for ensuring that post-disaster recovery projects have long-term benefits for the disaster resilience of communities. The research demonstrated that the long-term gains of post-disaster recovery projects are greatly enhanced when

> it is built on a strong foundation of community trust and technical support, sustained through an agile approach for on-going project development. However, the most significant finding of the research is flexibility of timeframe – allocation of more time in planning phase and thinking well beyond the completion of reconstruction phase and this is where the traditional PM (project management) approach to PDR (post-disaster reconstruction) management has been lagging behind.

An emerging issue, therefore, is whether traditional project management methodology and tools can be used to negotiate the different expectations and interests of a larger and broader group of stakeholders, from the non-government organisations (NGOs), through government and social agencies, to communities themselves. This is not simply a task of forging a 'common goal' for reconstruction projects, but a means of understanding and thereby being able to navigate how these projects can assist community livelihoods and resilience development from the community's points of view. A progressive spiral project life-cycle approach proposed by Vahanvati and Mulligan might be the answer. There is a need for an 'agile' or incremental strategy to address changes caused by the volatility of post-disaster environments, and a significant time investment for gaining and maintaining the trust of affected communities. In considering the long-term effects of housing projects that go beyond the duration of reconstruction, there is a need to introduce a variety of building technologies and to upskill local residents so that the reconstruction can be used as a 'window of opportunity' to create a resilient housing culture and to build a community's capacity for safe construction and managing their own projects.

2. Sense-making and decision-making

The complexity associated with information processing challenges disaster project managers with there being either too little or too much information, and this can create difficulties in project coordination and communication (Preece et al., 2013). In a fast-changing environment post-disaster, project practitioners often find it difficult to comprehend dynamic situations over time. Disaster recovery operations, however, require practitioners to have the capacity to recognise risks, opportunities, critical timing and emerging issues so that resources can be allocated properly (Crawford et al., 2013; Rapp, 2011). The paper by Gacasan and Wiggins makes the further important suggestion that effective and efficient sense-making is critical in disaster recovery projects. There is little emphasis on sense-making in contemporary models of training and assessment in disaster management. This is possibly due to the perception that sense-making is a non-technical skill that is ubiquitous and difficult to clarify.

By comparing the project performance of experienced and inexperienced project managers during simulated disaster recovery scenarios, Gacasan and Wiggins presents the first study to show evidence of cue utilisation in the context of disaster recovery project management. The authors argue that sense-making is a critical skill that involves organising and prioritising information to achieve an accurate representation of project conditions. It was evident from the comparative results that the naïve cohort demonstrated reduced performance in aspects of cue utilisation (e.g. cue identification, cue precision and cue prioritisation) in comparison to the experienced group. The results from this study provide the basis for an assessment tool that could be used to assess the capability of project managers prior to deployment, and/or to evaluate the outcomes of project management training initiatives.

Population displacement has been a major recurring issue following major disasters (IDMC, 2013). For example, in Japan, following the devastating earthquake and tsunami on March 11, 2011, there was a net emigration of 31,109 people in 2011 from Fukushima (equivalent to 1.5% of the total Fukushima population). This number also accounted for around

80% of the total net emigration from three Tohoku prefectures affected by the event (Higuchi et al., 2012). The steep rise in net emigration from the Fukushima Prefecture, however, related to the impact of the accident at the Fukushima Daiichi Nuclear Power Station as well as the impact of the earthquake. Those emigrants, however, faced significant challenges in finding shelter and housing elsewhere (Nogawa, 2012). A review of disaster relief shelter programmes suggested that the provision and performance of most shelter and relocating programmes were not effective due to the selection of their locations (Bashawri et al., 2014).

To improve the effectiveness of disaster housing projects on relocated sites, decisions need to be made by practitioners in regard to the location and design of those shelters. In this special issue, Trivedi and Singh responded to this need by proposing a hybrid multi-objective decision model based on analytic hierarchy process (AHP), fuzzy set theory and a goal programming approach. The objectives are to

> minimise distance, risk, number of sites and uncovered demand and simultaneously maximise suitability based on qualitative factors while taking into consideration demand, capacity, utilisation and budgetary constraints.

While the majority of relocation decisions involve incommensurable and conflicting objectives which require the striking of a balance, addressing selection and relocation issues by collectively taking both qualitative and quantitative factors into consideration raises the more challenging aspect of decision making in disaster recovery projects. Trivedi and Singh's hybrid decision support approach can generate recovery projects plans including shelter site location and relocation recommendations and enhance the location-relocation decision capability of managers immediately after a disaster strikes. In spite of the proven benefits of this approach, the extent to which such a decision support tool can reference its parameters to other contexts remains unknown and needs to be tested in future research.

3. Organising and governance

Stakeholders of disaster recovery projects involve not only government agencies of various kinds, but also multiple groups of non-government stakeholders such as non-government organisations (NGOs), private sector businesses, communities, families and individuals. To achieve a project's goals, organisations need to work with others to share information, resources and coordinate efforts in the project life cycle. During this process, multi-level stakeholder relationships form and evolve, which include both inter-organisational and cross-organisational networks and partnerships (Baroudi and Rapp, 2014). As demonstrated in this special issue, stakeholder relationships within disaster recovery projects can extend beyond the traditional roles and responsibilities defined within the project management discipline to encapsulate formal or informal collaboration.

A considerable amount of work exists regarding project stakeholder engagement in addressing the challenges posed by a post-disaster environment. Perhaps one of the most consistent issues is the reconciliation of varied stakeholder interests through engaging stakeholders effectively and strengthening stakeholders' attributes. The paper by Mojtahedi and Oo reports how stakeholder attributes influence the performance of disaster recovery projects. The results suggest that stakeholders with higher power, legitimacy and urgency attributes managed disaster recovery projects better. Socio-economic and transport infrastructure conditions also tend to have mediating effects on project performance. The importance of the legitimacy of key stakeholders is echoed in Walker et al.'s paper which draws on a case study of a major, post-disaster reconstruction project in Christchurch, New Zealand and identifies how stakeholder engagement was achieved through processes centred on achieving legitimacy.

Both the paper by Walker et al. and by MacAskill and Guthrie examine an innovative organisational arrangement – a project-based alliance organisation called SCIRT (Stronger Christchurch Infrastructure Rebuild Team) – created for managing extensive infrastructure reconstruction following major earthquakes in Christchurch, New Zealand. Walker et al. focus on analysing the legitimacy issues SCIRT faced, whereas MacAskill and Guthrie focus on procurement, governance and coordination in addressing organisational complexity within SCIRT. A key finding in the paper by Walker et al. was that establishing the internal and external legitimacy of SCIRT was a critical element that determined the effectiveness of recovery work. The authors further suggested that managing legitimacy perceptions among the multiple stakeholders should be considered a core task when creating an alliance for large-scale disaster recovery projects. As summarised,

> The SCIRT systems address many of Moe and Pathranarakul (2006)'s list of critical success factors for managing disaster-related public projects. It provides a new project-based institution which is authorised to coordinate the recovery programmes, and secures resources for this. The partnership involves collaboration among key stakeholders as part of a shared entity, with those stakeholders all committing to defined and agreed goals. The project funders are united with the planners, delivery agents, and project beneficiaries within the same organisation. The model ensures effective communication and information sharing, fostering trust and a team approach among all parties. Overall, the alliance efficiently delivers its outcomes in terms of time, cost and quality.

The issue of inter-organisational collaboration is multi-faceted, as a result of the differing perspectives of the various authors and the interdisciplinary nature of post-disaster reconstruction. The paper by Levie et al. investigates project governance in a non-government organisation (NGO)'s response to the Haiti earthquake in January 2010. The findings show that project governance is critical for NGOs to successfully manage their disaster reconstruction projects and acts as a bridge between disaster relief and project management. In another paper, by studying inter-organisational disaster response and recovery in the Netherlands, Kalkman and Waard shed light on the trust-control

nexus. Implications for response and recovery project managers include,

- Stakeholder relationship management in the pre-disaster phase is key for building solid inter-organisational connections for when a disaster strikes;
- Trust and control mechanisms need to be balanced in order to reach a fast and efficient as well as an effective and adaptive response and recovery. The key challenge, however lies in a combination of contracts and informal relationship-building activities;
- Inter-personal and inter-organisational relations need to be managed in such a way that the former strengthens the latter without substituting it. This suggests that the socialisation of the project team members should not be in conflict with the priorities of their parent organisations.

4. Role of communities

Given that community engagement and participatory approaches take on heightened significance in post-disaster recovery situations, two papers in this special issue offer insights on where community perspectives and leadership can be included as an important component for evaluating the success of community-involved projects. Research into post-disaster housing reconstruction advocates that well-informed and adequately-empowered communities are able to effectively participate in reconstruction projects and positively influence project outcomes (Barenstein, 2006; Comerio, 2013; Davidson et al., 2007). The paper by Sadiqi et al. identified five common barriers to community participation, including lack of community capacity, gender issues, lack of professional competence in NGOs, government policies and practices, and lack of adequate security. A framework for effective community participation which was suggested by the authors can be used to inform a participatory approach when planning and developing post-disaster reconstruction projects.

Lin et al.'s paper explores the nature and role of active leadership in the context of a community-led recovery project in Minami-sanriku, Japan, an area affected by the March 11 earthquake and tsunami in 2011. The paper critiques the use of a conventional project management framework in a socially and culturally sensitive disaster situation. In this Nagasuka beach recovery project, community leaders played a significant role in identifying, engaging and managing project stakeholders as they possessed soft social skills such as compassion and an understanding of the local culture/context. Compared to conventional projects, the authors suggested that,

> This recovery project placed tougher demands on the project leaders. They had to set and meet project objectives and manage stakeholder relations according to these objectives in the context in which the main stakeholder (the community) was still in distress and therefore vulnerable. Furthermore, their decisions were at time restricted by the authoritative, hierarchical and seniority-based culture in which the project unfolded. Therefore, the social skills needed to navigate effectively such a complex social and cultural map were as important as the technical skills required for managing conventional projects.

There is an increased number of cases in past disaster events where communities played a major role in managing disaster recovery projects, which raises an important issue pertinent to future training. The paper by Lin et al. highlights a need to train community leaders, if they take on a project manager role, in both technical and soft leadership skills: while the former ensures project management methodologies are clearly understood and applied, the latter facilities the adaptation of these methodologies to the specific socio-cultural contexts in which recovery projects are undertaken. For Sadiqi et al., the future lies with community capacity development activities in which practitioners engage local community members to achieve the following objectives: to reestablish community structure, to encourage project ownership, to provide support needed by community members, and to utilise recovery projects as a means of livelihood generation.

The lessons from this special issue have profound implications for the improvement of disaster recovery project performance. The papers challenge the conventional body of knowledge on various aspects of project management. They illustrate the need to account for innovation in methods, techniques and practices, and even thinking 'outside the box' about the ways we can improve in order to yield better results for disaster recovery projects. Implicit in this is a need for a greater understanding of the contexts to which a project management approach is applied. The good practice project examples shown in this special issue will have varying relevance and applications in different situations and, as most authors implied, what is suitable for one project organisation may not be relevant for others due to different goals, concerns and interests.

Most importantly, while the academic world often credits thoughts and ideas as impactful, practitioners who understand what disasters demand are duty-bound to look beyond abstract, rather incomplete project performance metrics to see what really matters to disaster affected communities. In addition to making disaster recovery projects successful from the standpoint of plans and designs, practitioners also need to create mechanisms that will measurably improve the efficiency and effectiveness of actual recovery activities by the organisations that perform the essential restoration and reconstruction on work sites. In the final analysis, if schedule, budget, quality, and safety do not reach prescribed objectives, then project success shall remain elusive.

We hope that people who restore and reconstruct the buildings and infrastructure in disaster struck regions are able to look at our intellectual developments in this special issue to see their value and be drawn to apply them in their recovery project planning and operations. The details of disaster types and magnitudes vary, as well as the regions stricken, but the lessons we distil and teach can shrink the experience curve to enhance disaster recovery worldwide.

References

Barenstein, J. D. (2006). Housing reconstruction in post-earthquake Gujarat: a comparative analysis. (54). from Humanitarian Practice Network at Overseas Development Institute.

Baroudi, B., Rapp, R.R., 2014. Stakeholder management in disaster restoration projects. Int. J. Disaster Resilience Built Environ. 5 (2), 182–193.
Bashawri, A., Garrity, S., Moodley, K., 2014. An overview of the design of disaster relief shelters. Procedia Econ. Financ. 18, 924–931.
Chang, Y., Wilkinson, S., Potangaroa, R., Seville, E., 2010. Resourcing challenges for post-disaster housing reconstruction: a comparative analysis. Build. Res. Inf. 38 (3), 247–264.
Chang-Richards, Y., Wilkinson, S., 2016. The roles of integrated project management frameworks and the insurance industry in post-disaster reconstruction: recovery after the 2010 and 2011 Christchurch earthquakes. In: Daly, P., Feener, M. (Eds.), Rebuilding Asia: Approaches to Post-Disaster Reconstruction in the Asia-Pacific Region. This work was awarded the Project Management Institute New Zealand Research Achievement Award (2015). Cambridge University Press.
Comerio, M.C., 1998. Disaster Hits Home: New Policy for Urban Housing Recovery. University of California Press, Berkeley and Los Angeles, California.
Comerio, M.C., 2013. Housing Recovery in Chile: A Qualitative Mid-program Review (Retrieved from Berkeley).
Crawford, L., Langston, C., Bajracharya, B., 2013. Participatory project management for improved disaster resilience. Int. J. Disaster Resilience Built Environ. 4 (3), 317–333.
Daly, P., Feener, M., 2016. Rebuilding Asia: Approaches to Post-disaster Reconstruction in the Asia-Pacific Region. Cambridge University Press, Cambridge, UK.
Davidson, C.H., Johnson, C., Lizarralde, G., Dikmen, N., Sliwinski, A., 2007. Truths and myths about community participation in post-disaster housing projects. Habitat Int. 31 (1), 100–115.
Hayes, P.F., Hammons, A., 2000. Disaster recovery project management. Paper Presented at the Industry Applications Conference, 8–12 October 2000, Rome.
Higuchi, Y., Inui, T., Hosoi, T., Takabe, I., Kawakami, A., 2012. The impact of the Great East Japan earthquake on the labour market - need to resolve the employment mismatch in the disaster-stricken areas. Jpn. Labour Rev. 9 (4), 4–21.
IDMC, 2013. Global Estimates 2012: People Displaced by Disasters (Retrieved from Geneva).
Moe, T.L., Pathranarakul, P., 2006. An integrated approach to natural disaster management: public project management and its critical success factors. Disaster Prev Manag 15 (3), 396–413.
Nogawa, S., 2012. The Great East Japan earthquake and a future vision for labour law in Japan. Jpn. Labour Rev. 9 (4), 105–123.
Preece, G., Shaw, D., Hayashi, H., 2013. Using the viable system model (VSM) to structure information processing complexity in disaster response. Eur. J. Oper. Res. 224 (1), 209–218.
Project Management Institute, 2005. Project Management Methodology for Post Disaster Reconstruction. Project Management Institute, Inc., Newtown Square, Pennsylvania, USA.
Rapp, R.R., 2011. Disaster Recovery Project Management: Bringing Order from Chaos. Purdue University Press, West Lafayette, Indiana, the U.S.
Steinfort, P., Walker, D., 2007. A Critique of the PMI Post-Disaster Rebuild Methodology (Retrieved from).
von Meding, J., Wong, J., Kanjanabootra, S., Tafti, M., 2016. Competence-based system development for post-disaster project management. Disaster Prev Manag 25 (3), 375–394.

Yan Chang-Richards (Alice)
Guest Editor
The University of Auckland, New Zealand
Corresponding author.
E-mail addresses: ycha233@aucklanduni.ac.nz; yan.chang@auckland.ac.nz.

Randy Rapp
Guest Editor
Purdue University, USA

Suzanne Wilkinson
Guest Co-Editor
The University of Auckland, New Zealand

Jason von Meding
Guest Co-Editor
University of Newcastle, Australia

Richard Haigh
Guest Co-Editor
University of Huddersfield, UK