



Factors Influencing Post-disaster Reconstruction Project Management for Housing Provision in the Gaza Strip, Occupied Palestinian Territories

Adnan Enshassi¹ · Tarik Chatat² · Jason von Meding³ · Giuseppe Forino³

Published online: 11 December 2017

© The Author(s) 2017. This article is an open access publication

Abstract In the Occupied Palestinian Territories, the Gaza Strip has suffered regular cycles of reconstruction due to systematic destruction during Israeli military operations, as in 2006, 2008–2009, 2012, and 2014. In this context of ongoing conflict this article aims to identify, rank, and discuss the most important factors influencing post-disaster reconstruction project management (PDRPM) for housing in the Gaza Strip. A set of key factors that influence PDRPM were assembled as a result of a global literature review. A questionnaire survey was conducted, and the obtained data were analyzed using a relative importance index for each PDRPM factor. Findings are presented in six groups: housing approaches, organizational behavior, project funding, supply chain and logistics, communication and coordination, and PDRPM context. Findings indicate that the most significant factors that influence PDRPM for housing provision in the Gaza Strip are related to issues associated with financial resources. It is critical that sufficient funding should be available in order to allow organizations to undertake housing projects in an effective and efficient way. Joint efforts are required from international donors and local organizations in order to effectively manage financial resources with the ultimate goal of improving PDRPM for housing provision.

Keywords Gaza strip · Israel–Palestine conflict · Post-disaster housing · Post-disaster project management · Post-disaster reconstruction

1 Introduction

According to the United Nations International Strategy for Disaster Reduction (UNISDR), disasters represent “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” (UNISDR 2009, p. 9). A post-disaster reconstruction context is therefore invariably complex and unpredictable (von Meding et al. 2016). Its functioning diverges significantly from routine scenarios and represents a challenge for decision makers, practitioners, and communities (Chang et al. 2010, 2011).

Post-disaster reconstruction is often considered from a project management perspective (Hidayat and Egbu 2010; Ismail et al. 2014; von Meding et al. 2014; Chang-Richards et al. 2017). The Project Management Institute (1987) considers a project as a unique transient endeavor undertaken to achieve a desired outcome. A project can also be a vehicle of change, including a defined scope, that needs to be delivered in a defined time and at an agreed cost (Geraldi et al. 2008). Project management can also be described as a set of models and techniques for the planning and control of complex undertakings (Packendorff 1995), or the application of knowledge, skills, tools, and techniques to project activities and to meet project requirements (Moe and Pathranarakul 2006).

Project management applied in post-disaster reconstruction is commonly known as post-disaster

✉ Giuseppe Forino
g.forino@gmail.com

¹ Civil Engineering, Islamic University of Gaza Ringgold Standard Institution, Gaza, State of Palestine

² UNDP Gaza of the United Nations Development Programme, Gaza, State of Palestine

³ School of Architecture and Built Environment, University of Newcastle, Newcastle, NSW 2308, Australia

reconstruction project management (PDRPM) (Moe and Pathranarakul 2006). Similar to project management, PDRPM intends to produce unique products, so no project before or after will be exactly the same; to use a novel process, so no project before or after will use exactly the same approach; and, to be transient, so the project has a beginning and an end (Moe and Pathranarakul 2006). Barriers to implementation continue to emerge in PDRPM with regard to collaboration, consistency, quality, and accountability of projects (Project Management Institute 2005; Chang-Richards et al. 2017).

Conflict is considered a frequent driver of disasters (Meyers 1991). Conflicts challenge everyday life by killing, injuring, and displacing people, disrupting settlements, infrastructure, and livelihoods, and leading to long-term impacts on the economy, politics, and wider society (Sakalasuriya et al. 2016). Conflicts also erode governance institutions, weaken public expenditure management systems, and increase transaction costs (Anand 2005; Fengler et al. 2008). Post-conflict settings pose challenges for governments and communities that need to be rebuilt while maintaining stability and working towards lasting peace. The reconstruction of countries affected by conflict is a major challenge (Seneviratne et al. 2017) that is often managed both by the internal governments and external actors (Sakalasuriya et al. 2016).

Against this background, this article discusses PDRPM for housing in an area exposed to cycles of violence—the Gaza Strip, within the Occupied Palestinian Territories (OPT). The Gaza Strip consists of five governorates: North, Gaza, Middle, Khan Yunis, and Rafah (UNEP 2009). It is located at the southwestern end of the OPT, with a length of 41 km and a width ranging from 6 to 12 km, covering a total area of 360 km² (Fig. 1). The Gaza Strip has a total population of 1,588,691, with a 3.3% annual increase in population (Enshassi et al. 2015). Housing provision has always been challenging in the Gaza Strip (Barakat et al. 2004). After the July 2014 Israel–Gaza conflict, also known as Operation Protective Edge, for example, more than 90,000 homes in the city of Gaza were damaged or destroyed, and one in four inhabitants (over 100,000 people) was internally displaced (Barakat and Shaban 2015). Public services were devastated, leading to scarcity of water, sanitation, energy, food, and shelter. This has exacerbated the impact of systematic violations of human rights in the area. Before these military operations, 80% of the residents in Gaza were already dependent on aid, 47% were food insecure, and 40% were unemployed (Barakat and Shaban 2015). An already vulnerable population was therefore further compromised, and the impacts on women, children, the elderly, and people with disabilities were amplified. Agriculture, industry, and trade came to a standstill. Significant environmental damages occurred,

such as loss of biodiversity and the contamination and degradation of land, water, and air due to toxic substances (UNDP 2014). In addition, a long-term blockade imposed by Israel has prevented inhabitants from accessing 35% of farmland and 85% of fishing waters, and reduced exports by 97%. After the overthrow of Muhammad Morsi in Egypt in July 2013, the tightening of restrictions along the Gaza Strip/Egypt border brought further political and economic isolation (Barakat and Shaban 2015).

In the Gaza Strip, PDRPM for housing provision is therefore a contentious issue. This article creates space for the discussion of key related factors based on the perceptions of organizations involved in PDRPM in the area. The article aims to identify, rank, and discuss these factors according to their relative importance index. The following literature review on factors that influence PDRPM is organized into six main categories. We then explain the questionnaire survey method we chose for the study and present the findings according to the most significant factors as ranked within each group, and recommend a baseline for future studies in the Gaza Strip.

2 Literature Review: Factors Influencing PDRPM for Housing Provision

A range of scholars have investigated the numerous factors that come into play and exert a positive or negative influence on PDRPM for housing provision (Moe and Pathranarakul 2006; Chang et al. 2010, 2011; Hidayat and Egbu 2010; Ismail et al. 2014; Bilau and Witt 2016; Bilau et al. 2017). For the purpose of this article, six principal groups of factors that influence PDRPM for housing provision were identified (Fig. 2). The factors included in each group tend to interact, inform, and influence each other. An overview of these groups of factors is presented and discussed below.

2.1 Housing Approaches

In post-disaster reconstruction, several housing approaches can be adopted, and differ markedly from routine construction (Lizarralde et al. 2009; Jha et al. 2010; Bilau and Witt 2016). The most suitable approach should be locally assessed and principally relates to the degree of household control over the project. The selection of a housing approach to be adopted should consider factors such as the reconstruction costs, the improvement in physical and social safety, the restoration of livelihoods, and communities' goals (Jha et al. 2010; Karunasena and Rameezdeen 2010). Scholars have proposed five housing approaches, which do not mutually exclude each other and are

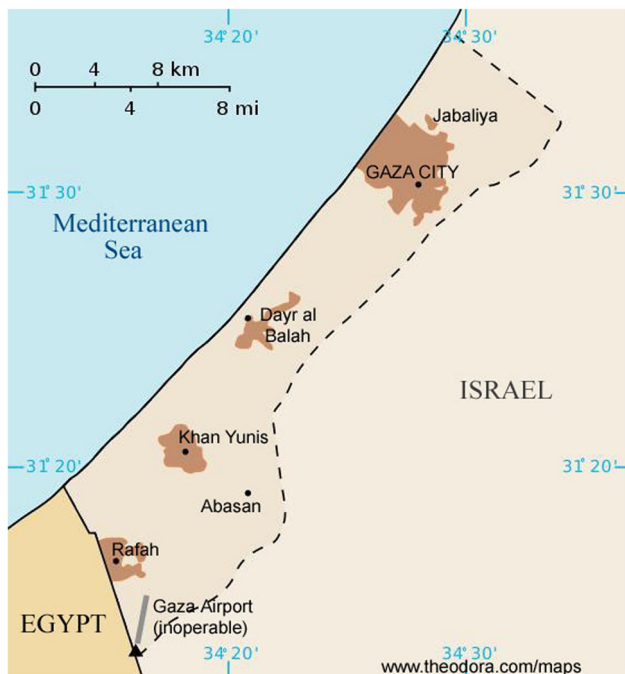


Fig. 1 Gaza Strip map. Source: <https://www.theodora.com/maps>

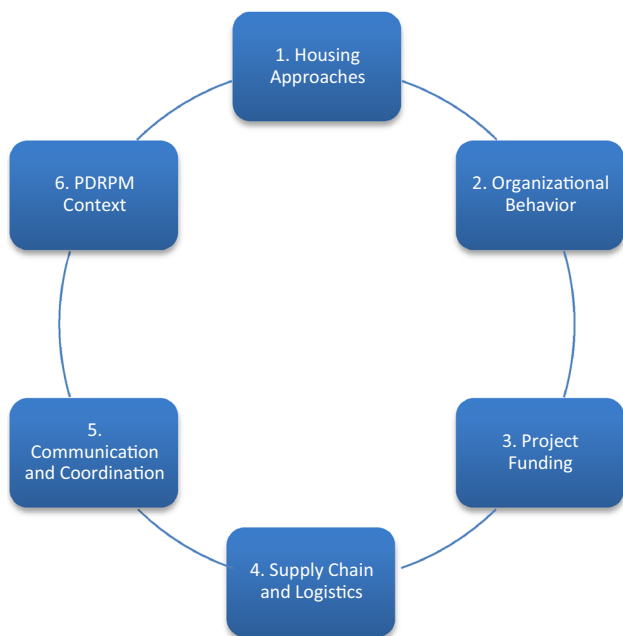


Fig. 2 Principal groups of factors that influence post-disaster reconstruction project management (PDRPM)

sometimes combined (Davidson et al. 2007; Lizarralde et al. 2009; Jha et al. 2010):

- *Cash-based approach* unconditional financial assistance is given without technical support;

- *Owner-driven reconstruction* conditional financial assistance is given, together with regulations and technical support;
- *Community-driven reconstruction* financial and/or material assistance is provided through community organizations actively involved;
- *Agency-driven reconstruction in situ* a governmental or nongovernmental agency hires a construction company to replace damaged houses on their pre-disaster sites;
- *Agency-driven reconstruction in relocated site* a governmental or nongovernmental agency hires a construction company to build new houses at a new site (Jha et al. 2010).

Examples of both success and failure exist for these approaches. Success or failure depends on a complex set of challenges and opportunities that arise in terms of resource access and availability, logistics and material availability, labor issues, as well as communities' involvement or empowerment (Davidson et al. 2007; Lizarralde et al. 2009; Chang et al. 2010; Ophiyandri et al. 2013; Ismail et al. 2014; Bilau and Witt 2016; Seneviratne et al. 2016; Bilau et al. 2017).

2.2 Organizational Behavior

The behavior of organizations including multilevel governments, NGOs, and donors is highly influential on PDRPM for housing provision. Governments are pivotal stakeholders in post-disaster housing provision (Moe and Pathranarakul 2006) and should support communities and operational actors in selecting the most appropriate strategies, in determining the level of assistance to be provided, and in agreeing on performance benchmarks and procedures (Jha et al. 2010; Ophiyandri et al. 2013). Donors and NGOs often assess the capacity of government to cope with the impacts of conflict and whether that capacity needs to be supported or substituted to differing degrees (Harvey 2005). But communities should decide on the most suitable and preferred reconstruction approach, and have the right to select the supporting organizations and the form of assistance to be provided (Davidson et al. 2007; Lizarralde et al. 2009; Jha et al. 2010). Communities need to be informed and adequately empowered in PDRPM in order to mobilize their creativity, desires, resources, and capacities (Davidson et al. 2007; Chang-Richards et al. 2017).

2.3 Project Funding

Funding availability is essential for any project, including PDRPM (Ophiyandri et al. 2013). Financial arrangements for PDRPM can be quite complex as funding is channelled

through multiple sources (for example, domestic and international NGOs, and bilateral and multilateral donors), with different accounting requirements and allocation time frames (Fengler et al. 2008). The influx of funding to a location may also cause local price inflation. These issues can lead to compromises in housing provision, often regarding efficiency and quality of the process and the final product (Bilau and Witt 2016). Therefore, funding constraints represent a significant challenge to implementing organizations. The lack of control of how funds are effectively spent is also a major challenge (Jha et al. 2010). The majority of funding often comes from organizations and donors that are external to the context and might use funding to meet individual or specific agendas, regardless of local needs and priorities. Therefore, challenges exist in terms of funding availability, time scales over which funding can be spent, specific donor objectives, and the short-term perspectives of donors (Ophiyandri et al. 2013). These issues should be taken into account when funding is requested and distributed, by tracking expenditure, creating anticorruption mechanisms, and allocating and delivering funding directly to the affected communities (Jha et al. 2010).

2.4 Supply Chain and Logistics

PDRPM is dependent on the effective delivery of required supplies, and relies on a high degree of logistics expertise (Bilau et al. 2017). However, resources, infrastructure, service provision, and markets in the affected areas tend to be disrupted. Even where local markets still operate, the scale of demand can cause local shortages, price hikes, and difficulties in material procurement (Bilau and Witt 2016). High transportation costs (for example, due to volatile price fluctuations of fuel) and lack of alternative access to affected areas are major concerns related to logistics and supply chain (Chang et al. 2011). Labor issues also challenge PDRPM (Chang et al. 2011; Bilau and Witt 2016; Seneviratne et al. 2016). In post-earthquake Bam (Iran), for example, the combination of unskilled laborers and inadequacy of supervision and mentoring led to several failures in employing new construction methods (Bilau and Witt 2016). To minimize disruption to the supply chain and ensure its continuity, post-disaster supply chain maintenance and management should be enhanced through a flexible blend of government facilitations and market-driven inputs (Chang et al. 2010).

2.5 Communication and Coordination

In PDRPM, a multi-organization and multi-stakeholder approach is essential. Communication and coordination among these stakeholders are of critical importance.

Disjointed reconstruction can lead to unnecessary competition, overlapping of projects, and excessively costly or incomplete implementation (Ophiyandri et al. 2013). Communication systems for fast, accurate, reliable, and up-to-date information are crucial. Maintaining and enhancing effective mechanisms of social interaction between organizations can help to avoid overlaps and the waste of time, material, and financial resources (Fengler et al. 2008). Improving coordination and communication can enhance trust and team cohesion between task managers and coordinators, as well as between project owners and managers (Pathirage et al. 2008; Singh and Wilkinson 2008; Chang et al. 2010). Communication and coordination also contribute to other goals of PDRPM, such as transparency, accountability, participation, consensus-building, and mitigation of corruption risk (Jha et al. 2010).

2.6 PDRPM Context

The PDRPM context is generally expected to be more volatile than a routine context. The delivery of such projects is therefore strongly influenced by contextual factors. These can relate to the use of special procurement procedures, conflicts between speed and quality or short- and long-term goals, and proper institutional set-up (Jha et al. 2010). In addition, political and social issues such as cultural norms, internal ethnic conflicts, the influence of religion within institutional and community life, as well as demographic issues and trends, contribute to shape and drive PDRPM (Jha et al. 2010). All of these factors put PDRPM in a quite unique position, deriving from the fact that PDRPM must be adapted and embedded into a complex disaster scenario, with sensitivity to a vast range of issues that include the socioeconomic, cultural, institutional, technological, environmental, and legal/regulatory circumstances of the existing context (Kaklauskas et al. 2009). For this reason, most PDRPM experiences are not replicable; rather, they are useful as evidence to be weighed in arriving at suitable local approaches (Jha et al. 2010).

3 Methodology

A questionnaire survey (Fink 2003) was designed to collect the required data based on the six suggested groups of PDRPM factors. The survey was administered in September 2014 as a consolidated research approach used for the assessment of factors that influence the construction sector in the Gaza Strip (Enshassi et al. 2007, 2009, 2011, 2013, 2015). The research gathered survey responses focusing on the main factors that influence PDRPM as perceived by different stakeholders in

2013–2014. It explored in detail the context of multilevel organizations within the Gaza Strip.

Ninety-seven (97) factors were initially identified for the questionnaire and then divided into the six aforementioned groups of factors that influence PDRPM for housing provision. A pilot study was conducted in the Gaza Strip in October 2014 by distributing the questionnaire to two panels of experts with experience in related research fields, in order to evaluate the questionnaire and test its validity. The first panel consisted of 10 experts—3 experts from different governmental organizations, 3 experts from the Gaza Strip municipalities, and 4 from United Nations (UN) organizations and international nongovernmental organizations (NGOs). This panel was asked to verify the validity of the questionnaire topic and its relevance to the research objectives. The second panel consisted of 2 experts in statistics, who were asked to verify that the instrument used was statistically valid, and that the questionnaire was designed well enough to allow relationships to be observed and tests to be conducted among factors. Comments and suggestions by experts were collected and evaluated carefully. At the end of this process, modifications and additions were introduced into the final survey instrument, which proceeded with a total of 80 factors. A clear distinction between factors within and across the six groups is not always possible and overlaps do exist. Therefore, some of the factors have been simplified for the sake of synthesis.

The research population was primarily identified based on experience and knowledge of PDRPM in the Gaza Strip. The research population consisted of governmental organizations, municipalities, UN organizations, and international and local NGOs involved in PDRPM. The groups contained in the population include:

- Governmental organizations—Ministry of Local Government, Ministry of Public Work and Housing, Ministry of Health, Ministry of Education, and Civil Defence;
- Municipalities—Gaza City, al Zahra, Wadi Gaza, Beit Hanoun, Beit Lahia, Jabaliya, Dayr al Balah, El Magazi, Khan Yunis, Bani Suhaila, Garara, Foukhari, Shouka, Rafah, el Msader, Nusseirat, Beriej, Zawaida, Wadi Salga, Um el Naser, Abasan el Kabira, Abasan, Khuzaa, El Naser, and Johr el Dik;
- Local NGOs—Palestinian Council of Housing, Al Rahmah Society for Charity, Islamic Consulted Societies, Dar Alkitab Wa Alsonna Society, The Arab and International Commission to Build Gaza, Qatar Charity, and Islamic Relief World Wide;
- UN organizations and international NGOs—United Nations Development Programme (UNDP), United Nations Relief and Works Agency (UNRWA), Norwegian Refugee Council (NRC), Global Communities,

Partners for Good, United Nations Office for Coordination of Humanitarian Affairs (OCHA), and Development Alternatives Incorporated (DAI).

The selected governmental organizations are primarily responsible for interventions in PDRPM such as providing goods, organizing the procedural chain for sheltering and housing evacuees, establishing and allocating funding, and technical expertise. Municipalities were selected because they suffer the most severe burdens of conflicts and provide deep expertise and knowledge of context and site-specific factors that influence PDRPM. The UN organizations and international NGOs selected represent key organizations with responsibility in this particular PDRPM context. Local NGOs were among those most involved in cooperation with governmental institutions in providing shelter and primary goods to the affected communities, as well as coordinating community involvement in PDRPM.

One-hundred (100) questionnaires were administered to staff members in the selected population, utilizing convenience sampling (Babbie 1990), and 81 valid responses were received. The high response rate indicates an acceptable sample bias and suggests that the findings have the potential to be generalized to the larger population. A five-point Likert scale was employed in the questionnaire where the respondents were required to select and circle the most appropriate number of the response scale (1 = not important; 2 = of little importance; 3 = somewhat important; 4 = important; and 5 = very important). The rationale of a Likert scale is the attitude (opinion), which varies on a bi-polar continuum from negative to positive (Johns 2010; Holt 2014). The data resulting from the use of the response scale are analyzed by using the relative importance index (RII) method, which is considered a suitable research method for investigating attitude data (Holt 2014). Subsequently, the RII for each factor was calculated using the following equation:

$$\text{Relative Importance Index} : \frac{\sum w}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

where “*w*” is the score given to each factor by the respondent, ranging from 1 to 5; n_1 = number of respondents for not important; n_2 = number of respondents for little importance; n_3 = number of respondents for somewhat important; n_4 = number of respondents for important; n_5 = number of respondents for very important. “*A*” is the highest score (that is 5 in the research) and “*N*” is the total number of responses. The RII ranges from 0 to 1 (Le and Tam 2007; Enshassi et al. 2013).

The internal validity of the questionnaire was measured by scouting sample, consisting of 20 questionnaires that

measured the Spearman correlation coefficients between each factor in the six groups. The p values (significance) were all less than 0.05, and the Spearman correlation coefficients of all factors are significant at $\alpha = 0.05$, so the factors of the groups are reasonably consistent and valid to be measuring what the questionnaire set out to.

The structural validity of the questionnaire was tested by measuring the correlation coefficient between each group against all the factors of the questionnaire. The p -values (significance) were all less than 0.05, and the Spearman correlation coefficients of all the groups are significant at $\alpha = 0.05$, so the groups of factors are reasonably valid to measure what they set out to.

Cronbach's Alpha test was then applied to the scouting sample for measuring the consistency of the questionnaire. This test is designed as a measure of internal consistency to determine whether all items within the instrument measure the same thing. Cronbach's Alpha equals 0.944 for the six groups, indicating excellent reliability. Therefore, the tests conducted on a scouting sample demonstrated that the questionnaire was valid, reliable, and ready for distribution in the population.

3.1 Respondents' Profile

Table 1 illustrates 19 governmental institution respondents, 18 municipal respondents, 23 local NGO respondents, and 21 UN organization/international NGO respondents, for a total of 81 participating in the questionnaire survey. Over 75% of the respondents had more than 6 years of experience in their organization, suggesting a high level of quality in the information supplied. Furthermore, 51.8% of the respondents had over 6 years of experience in PDRPM. It was observed that most of the post-disaster reconstruction projects were implemented by governmental organizations and UN organizations like UNDP and UNRWA.

4 Findings

This section reports the results for the final 80 factors, themed according to the six groups of factors that influence PDRPM (see Fig. 2). The findings are presented in six tables. Each table reports the mean values, RII, and the ranks of the overall groups of factors and individual factors influencing PDRPM in the Gaza Strip. The two most significant factors in each group are discussed in depth. For all tables, the p value is significant when $\alpha = 0.05$.

4.1 Group 1: Housing Approaches

Table 2 reports that respondents ranked "Speed of delivery in cash-based approaches" as the most important factor

influencing housing approaches. This finding illustrates that cash-based approaches are considered a preferred option in PDRPM. Previous research about satisfaction among beneficiaries of cash-based approaches for housing provision in the Gaza Strip has demonstrated that high levels of satisfaction existed in terms of the general conditions of the building, the methods of supervision by the donors, the value of financial assistance, and the flow of payments (Enshassi and Zaiter 2013). However, cash-based approaches represent unconditional financial assistance to beneficiaries, and therefore the ability of donors or implementing agencies to monitor the ways people actually utilize cash is often limited (Jha et al. 2010). Great care is required considering the disadvantages of such approaches in a conflict area such as the Gaza Strip, where housing is not the only urgent concern for affected people. The second ranked factor was "Misuse and misappropriation of funding," which confirms the concern about cash-based approaches going potentially wrong. Although cash-based approaches are popular among implementing organizations, the application of these approaches in the Gaza Strip has an inherent risk of failure, misuse, and misappropriation (Schiavo-Campo 2003), which needs to be evaluated in PDRPM.

4.2 Group 2: Organizational Behavior

Table 3 reports that respondents ranked "Sufficient funding" as the most important factor influencing organizational behavior, confirming similar results in previous research (Kusumasari et al. 2010; UNDP 2014). Funding availability can be a very complex issue since funding may originate from multiple sources (domestic and international NGOs, bilateral and multilateral donors), all adopting their own requirements and time frames. This leads to decision-making processes that can compromise PDRPM implementation in terms of efficiency and quality (Bilau and Witt 2016). The second ranked factor was "Effective structure," suggesting that respondents valued organizational characteristics such as staff efficiency, proper task delegation, and clearly assigned responsibilities, as well as organized communication channels. An effective organizational structure can increase the incentive for various actors within PDRPM to act appropriately.

4.3 Group 3: Project Funding

Table 4 reports that respondents ranked "Financial constraints" as the most important factor influencing project funding. This suggests that issues exist around access to and availability of funding for beneficiaries. The second ranked factor was "Competence of local contractors," confirming its importance for managing resources in

Table 1 Respondents' profile of the post-disaster reconstruction project management (PDRPM) for housing questionnaire survey in the Gaza Strip

	Number of respondents	%
Type of organizations		
Governmental organizations	19	23.5
Municipalities	18	22.2
Local NGOs	23	28.4
UN organizations and international NGOs	21	25.9
Job title for respondent		
General manager	10	12.3
Project manager	32	39.5
Office engineer	17	21.0
Construction manager	22	27.2
Years of respondent's experience within the organization		
1–6	19	23.5
7–11	25	30.9
12–16	23	28.4
> 16	14	17.3
Years of respondent's experience in disaster management		
1–6	39	48.2
7–11	36	44.4
12–16	6	7.4
> 16	0	0
Projects implemented by respondent's organization after the 2008–2009 Gaza conflict		
< 10	25	30.9
11–20	18	22.2
21–30	16	19.8
31–40	8	9.9
> 40	14	17.3
Cost of reconstruction projects of respondent's organization after the 2008–2009 Gaza conflict		
< 1 Million USD	9	11.1
1–2 Million USD	15	18.5
2.1–3 Million USD	3	3.7
3.1–4 Million USD	6	7.4
> 4 Million USD	48	59.3

PDRPM (Chang et al. 2012). In the Gaza Strip local contractors experience challenges in acquiring competence and capacities for effective financial management and becoming engaged in large post-disaster reconstruction projects. Challenges are related to contextual issues for the construction sector and built environment professionals in conflict areas, including the lack of construction materials, unemployment and discontinuity in work patterns, as well as insufficient support from multilevel governments (Enshassi et al. 2007). There is a clear need to strengthen local contractors' competences and capacities to use funds more effectively.

4.4 Group 4: Supply Chain and Logistics

Table 5 reports that respondents ranked "Volume of required materials" as the most important factor for supply chain and logistics. In the Gaza Strip a range of issues exist around material procurement and availability. Often, these issues cause widespread supply chain and logistics delay or disruption. According to previous research in the Gaza Strip (Enshassi et al. 2009, 2011, 2013), issues related to material procurement and availability are driven primarily by the blockade and border closure. Blockade and closure cause strong limitations and disruption of markets, which often only partially function when violence escalates. The

Table 2 Factors influencing housing approaches in the Gaza Strip

Factors	Mean	RII (%)	Test value
Speed of delivery in cash-based approaches	4.77	95.31	8.83
Misuse and misappropriation of funding	4.48	89.63	8.49
Effective infrastructure and services	4.40	87.90	7.98
Type of building reconstructed	4.30	85.93	7.83
Beneficiary satisfaction with housing quality and construction process	4.21	84.20	7.00
Delay before start of reconstruction	4.10	81.98	7.60
Beneficiary land ownership	4.06	81.23	7.06
Durability and quality of materials	3.98	79.51	6.00
Adaptiveness for future changes	3.98	79.51	6.30
Beneficiary consultation at design stage	3.90	78.02	6.80
Consideration of relocation due to vulnerability	3.85	77.04	5.54
Market distortion due to external aid	3.84	76.79	6.87
Unrealistic budgeting for reconstruction	3.80	76.05	6.09
Additional transaction costs	3.77	75.31	6.67
Targeting of beneficiaries	3.73	74.57	4.77
Heritage conservation and aesthetic value of buildings	2.84	56.79	1.40
All factors (average of each column category)	4	79.98	8.89

Table 3 Factors influencing organizational behavior in the Gaza Strip

Factors	Mean	RII (%)	Test value
Sufficient funding	4.63	92.59	8.72
Effective structure	4.52	90.37	8.49
Effective process management	4.51	90.12	8.43
Overall disaster damage and loss	4.43	88.64	8.60
Disaster management policies	4.38	87.65	8.49
Roles and relationships between government and nongovernmental organizations	4.37	87.41	8.66
Temporal scale of implementation	4.36	87.16	8.01
Spatial distribution of impact	4.31	86.17	8.43
Community capacity to take action	4.22	84.44	8.01
Political stability	4.19	83.70	7.49
Community risk perception	4.01	80.25	7.09
Identification of vulnerabilities	3.91	78.27	6.81
Instability and underdevelopment	3.85	76.96	6.67
All factors (average of each column category)	4.28	85.70	8.89

blockade and closure also limit the amount, type, and quality of materials allowed through borders, with negative economic impacts, including price escalation and monopolies on the available construction materials by a few suppliers (Enshassi et al. 2011, 2013). The second ranked factor was “Labor issues.” In the Gaza Strip, labor issues in housing provision occur due to, for example, unskilled jobs, lack of site safety, and design and project alteration during execution (Enshassi et al. 2007). These issues can

negatively influence PDRPM for housing provision in the Gaza Strip, and this makes revising inadequate policies urgent.

4.5 Group 5: Communication and Coordination

Table 6 reports that the respondents ranked “Documentation system and archiving” as the most important factor for communication and coordination. In PDRPM, information

Table 4 Factors influencing project funding in the Gaza Strip

Factors	Mean	RII (%)	Test value
Financial constraints	4.25	84.94	6.98
Competence of local contractors	4.19	83.70	7.81
Speed of response from donors	4.16	83.21	7.09
Funding streams available and speed of release	4.12	82.47	7.49
Price hikes	4.04	80.74	6.66
Technical expertise	4.01	80.25	6.40
Lack of communication and coordination	4.00	80.00	5.62
Differing budget mechanisms among multilateral donors	3.96	79.26	6.74
Exceptional arrangements for procurement and/or disbursement of funds	3.86	77.28	6.91
Flexibility in allocation of funds	3.84	76.79	6.04
All factors (average of each column category)	4.07	81.35	7.56

Table 5 Factors influencing supply chain and logistics in the Gaza Strip

Factors	Mean	RII (%)	Test value
Volume of required materials	4.49	89.88	8.49
Labor issues	4.42	88.40	8.19
Transportation costs	4.40	87.90	8.12
Unskilled labor force	4.32	86.42	7.72
Delays in reconstruction	4.30	85.93	8.54
Design of the project	4.20	83.95	7.62
Transportation methods and material transfer through informal border-crossings	4.12	82.47	7.64
Overall health of economy	4.11	82.22	7.42
Competence of procurement manager	4.04	80.74	7.33
Quality of urban infrastructure	4.00	80.00	8.07
Identification of beneficiaries	4.00	80.00	6.91
Logistic coordination with local government and organizations	3.89	77.78	5.62
Qualification of contractors	3.88	77.53	5.89
Inappropriate reconstruction sites	3.84	76.79	5.49
Availability of local resources	3.84	76.79	6.62
Viability of project schedule	3.75	75.06	5.83
Quality of procurement strategy	3.73	74.57	5.46
Understanding of governance framework	3.60	72.10	4.78
Material specifications	3.59	71.85	5.12
Environmental impact of projects	3.10	61.98	0.00
All factors (average of each column category)	4.01	80.13	8

management systems are crucial for communication and coordination. Documentation and archives must be methodically arranged from the outset of a project to ensure that relevant documents and data are retained, available, and accessible both electronically and in hard copy (IFRC 2012). The second ranked factor is “Availability of effective technology.” Technology allows reliable, accurate, and timely information to be collected,

processed, analyzed, and shared (Jha et al. 2010). Effective technology can guide decision makers in making important decisions based on credible information, and enhance organizations’ capacities for coordination and communication (Moe and Pathranarakul 2006; Hidayat and Egbu 2010; Jha et al. 2010). For example, information and communication technology (ICT) tools, applications, and systems, together with the corresponding institutional

Table 6 Factors influencing communication and coordination in the Gaza Strip

Factors	Mean	RII (%)	Test value
Documentation system and archiving	4.58	91.60	8.31
Availability of effective technology	4.53	90.62	8.60
Effectiveness of hardware and software	4.49	89.88	8.60
Shared databases between organizations	4.41	88.15	8.43
Relationships between organizations	4.31	86.17	8.02
Involvement of NGOs at local level	4.17	83.46	7.90
Capacity to work with media	3.99	79.75	5.70
All factors (average of each column category)	4.35	87.09	8.89

arrangements for their use in PDRPM, are vital to create, acquire, store, exchange, analyze, and process data (Jha et al. 2010). Geographical Information System (GIS) hardware and software and geospatial datasets are commonly utilized to provide updated and integrated information (Teeuw et al. 2013). Immediately following the Operation Protective Edge campaign in July 2014, the United Nations Institute for Training and Research (UNITAR) provided timely and high-quality geospatial information about environmental and settlement damage in the Gaza Strip based on GIS, satellite imagery, web-mapping, and information sharing mechanisms.¹ The Internet, smartphone apps, and social media offer further possibilities to acquire and share real-time information and data, and to establish effective platforms for communication and coordination.

4.6 Group 6: PDRPM Context

Table 7 reports that the respondents ranked “Availability of donor funding” as the most important factor for PDRPM context. Similarly, the second ranked factor was “Assistance allocated directly to projects.” These factors demonstrate that funding that is directly allocated to PDRPM is critical for housing provision in the Gaza Strip (Barakat et al. 2004). Both the availability of funding and direct financial assistance often are provided in the initial stages of PDRPM. However, they can quickly end when donors’ attention shifts to another conflict hotspot. Furthermore, once donor expectations are confronted with the realities of implementation, benefits from funding allocation can suddenly disappear due to complicated implementation arrangements, donor-dominated coordination and oversight bodies, short time frames and high expectations (Barakat et al. 2009). This confirms that funding needs to assist the affected population beyond short-term

relief and shelter. However, issues exist around funding being able to secure long-term assistance in conflict areas (Anand 2005). This confirms that organizations involved in PDRPM in the Gaza Strip have problems being adaptive and flexible with funding. Often implementing agencies are compelled to target specific project objectives and meet donor agendas and associated goals.

5 Discussion

The findings revealed that in four out of the six investigated groups, the most important factors that influence PDRPM for housing provision in the Gaza Strip are associated with funding. Without adequate funding, PDRPM cannot take place in the Gaza Strip, where ongoing conflict causes violence, long-term blockade, and market restrictions with a perennial scarcity of resources and a widespread dependence on humanitarian support. These issues undermine the local capacity of institutions, the market, and communities to undertake PDRPM in an effective way and to promote a more sustainable and long-term housing provision (Fengler et al. 2008; Barakat 2009).

The findings also revealed that the “Speed of delivery in cash-based approaches” is important in housing approaches. Rapid delivery can provide beneficiaries with a return to everyday life in conditions of relative safety and comfort without a long waiting period. In the same vein, “Sufficient funding” is also important within organization behavior. Funding allow organizations to exist, to run their operations, and to build solid internal structures and governance mechanisms. However, “Financial constraints” challenge project funding. Solving such constraints would allow organizations to undertake their own projects and maintain long-term vision, objectives, and schedules. Hence, to effectively operate in the Gaza Strip, organizations need sufficient funding that is efficiently and transparently distributed, and is aligned with organizations’ goals. This

¹ See maps and data at <http://www.unitar.org/unosat/maps/PSE> (Accessed 1 August 2017).

Table 7 Factors influencing the PDRPM context in the Gaza Strip

Factors	Mean	RII (%)	Test value
Availability of donor funding	4.74	94.81	8.72
Assistance allocated directly to projects	4.57	91.39	8.31
Short-term thinking	4.49	89.88	8.66
Supportive laws and regulations	4.38	87.65	8.19
Internal structure of organization	4.30	86.00	7.90
Preserving local cultures	4.30	85.93	8.08
Communication and coordination between actors	4.28	85.68	7.22
Adherence to command and control approach	4.26	85.25	7.46
Changes to disaster management policies	4.23	84.69	7.38
Effective information management system among donors	4.19	83.75	8.31
Effective governance arrangements	4.19	83.70	8.02
Availability of funds	3.88	77.53	6.51
Corruption in project delivery	3.73	74.57	4.10
Timeliness of project completion	3.46	69.14	2.34
All factors (average of each column category)	4.21	84.21	8.89

requires clarity about organizations' objectives, effective coordination between funding sources and organizations, and a careful administration of funding receipt and distribution (Jha et al. 2010).

The importance of "Availability of donor funding" was revealed within the PDRPM context. Given the dependence of PDRPM in the Gaza Strip on international donor aid, respondents weighted donor funding as the most important contextual factor. However, in the Gaza Strip, projects are often tailored to serve the interests of donors rather than to address the actual local needs (Qarmout and Béland 2012). This often leads to unrealistic and out-of-context expectations by donors (Schiavo-Campo 2003), and to a lack of involvement of the recipient stakeholders (such as governments and communities). Engaging recipients of aid in a rigorous and conscious capacity-building program is recommended in order to emphasize the need to think long term among governments and communities. This should be done using realistic and transparent procedures, while promoting local voices and perspectives (Schiavo-Campo 2003; Barakat 2009; Barakat et al. 2009; Barakat and Shaban 2015).

6 Conclusion

This article explored factors that influence PDRPM for housing provision in the Gaza Strip, which is affected by recurrent and systematic conflict. The article aimed at identifying and ranking these factors according to their relative importance from the perspective of multiscale governments and organizations involved in PDRPM. A

questionnaire was administered to a representative sample of individuals working in governmental institutions, municipalities, international and local NGOs, as well as UN organizations operating in PDRPM in the Gaza Strip. Findings revealed that issues associated with funding are the most important factors. Funding availability or shortage can greatly contribute either to promote or reduce the capacity of organizations to implement housing projects.

We must reflect on how funding should be channelled to, managed, and allocated into a post-conflict context such as the Gaza Strip. Establishing clear and solid mechanisms to track how funding is utilized by organizations and to coordinate distribution is critical if we are to meet priorities and to enhance the capacities of organizations for prompt, adequate, and transparent housing provision (Barakat and Shaban 2015). In the Gaza Strip, housing provision should be considered not just in terms of buildings, but also with regard to environmental and social risk reduction. Residents already face everyday constraints, and the lack of access to resources undercuts the potential for individual and collective health, well-being, and participation in political and social life (Barakat et al. 2004). Funding must therefore be available and tailored to local needs, while housing projects should pivot on clear and effective policies, rules, and practices. Based on the presented and discussed findings, future research can investigate how other specific factors contribute to activate, or undermine, effective PDRPM in the Gaza Strip, and how the described issues associated with project funding interact with other intervening factors.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://>

creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

- Anand, P. 2005. *Getting infrastructure priorities right in post-conflict reconstruction*, Research Paper, UNU-WIDER, United Nations University (UNU). <https://www.wider.unu.edu/sites/default/files/rp2005-42.pdf>. Accessed 5 Dec 2017.
- Babbie, E. 1990. *Survey research methods*, 2nd edn. Belmont, USA: Wadsworth Publishing.
- Barakat, S. 2009. The failed promise of multi-donor trust funds: Aid financing as an impediment to effective state-building in post-conflict contexts. *Policy Studies* 30(2): 107–126.
- Barakat, S., and O. Shaban. 2015. *Back to Gaza: A new approach to reconstruction*. Doha: Brookings Doha Center.
- Barakat, S., G. Elkhoulout, and T. Jacoby. 2004. The reconstruction of housing in Palestine 1993–2000: A case study from the Gaza Strip. *Housing Studies* 19(2): 175–192.
- Barakat, S., S.A. Zyck, and J.E. Hunt. 2009. The reconstruction of Gaza: A guidance note for Palestinian & international stakeholders. Post-War Reconstruction and Development Unit (PRDU), University of York, UK. <https://www.york.ac.uk/media/prdu/documents/publications/pub.%20Reconstructing%20Gaza,%20Barakat%20et%20al%5B1%5D.,%20Jan2009.pdf>. Accessed 5 Dec 2017.
- Bilau, A.A., and E. Witt. 2016. An analysis of issues for the management of post-disaster housing reconstruction. *International Journal of Strategic Property Management* 20(3): 265–276.
- Bilau, A.A., E. Witt, and I. Lill. 2017. Analysis of measures for managing issues in post-disaster housing reconstruction. *Buildings* 7(2): 29.
- Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville. 2010. Resourcing challenges for post-disaster housing reconstruction: A comparative analysis. *Building Research & Information* 38(3): 247–264.
- Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville. 2011. Identifying factors affecting resource availability for post-disaster reconstruction: A case study in China. *Construction Management and Economics* 29(1): 37–48.
- Chang, Y., S. Wilkinson, R. Potangaroa, and E. Seville. 2012. Managing resources in disaster recovery projects. *Engineering, Construction and Architectural Management* 19(5): 557–580.
- Chang-Richards, Y., R. Rapp, S. Wilkinson, J. von Meding, and R. Haigh. 2017. Disaster recovery project management: A critical service. *International Journal of Project Management* 35(5): 783–787.
- Davidson, C.H., C. Johnson, G. Lizarralde, N. Dikmen, and A. Sliwinski. 2007. Truths and myths about community participation in post-disaster housing projects. *Habitat International* 31(1): 100–115.
- Enshassi, A., and M.A. Zaiter. 2013. Self-help approach in housing reconstruction and beneficiaries satisfaction in Palestine. In *Proceedings of the international symposium on new technologies for urban safety of mega cities in Asia*, 9–11 October 2013, Hanoi, Vietnam.
- Enshassi, A., A.R. Abdul-Aziz, and S. Abushaban. 2011. Performance of construction projects: Perception of owners in Palestine. *Emirates Journal for Engineering Research* 16(1): 23–32.
- Enshassi, A., J. Al-Najjar, and M. Kumaraswamy. 2009. Delays and cost overruns in the construction projects in the Gaza Strip. *Journal of Financial Management of Property and Construction* 14(2): 126–151.
- Enshassi, A., F. El Shorafa, and S. Alkilani. 2015. Assessment of operational maintenance in public hospitals buildings in the Gaza Strip. *International Journal of Sustainable Construction Engineering & Technology* 6(1): 29–43.
- Enshassi, A., S. Mohamed, and M. Abdel-Hadi. 2013. Factors affecting the accuracy of pre-tender cost estimates in the Gaza Strip. *Construction in Developing Countries* 18(1): 73–94.
- Enshassi, A., S. Mohamed, Z.A. Mustafa, and P.E. Mayer. 2007. Factors affecting labour productivity in building projects in the Gaza Strip. *Journal of Civil Engineering and Management* 13(4): 245–254.
- Fengler, W., A. Ihsan, and K. Kaiser. 2008. *Managing post-disaster reconstruction finance – International experience in public financial management*. World Bank Publications. Washington DC: World Bank.
- Fink, A. 2003. *The survey handbook*. London: Sage Publications.
- Geraldi, J.G., J.R. Turner, H. Maylor, A. Söderholm, M. Hobday, and T. Brady. 2008. Innovation in project management: Voices of researchers. *International Journal of Project Management* 26(5): 586–589.
- Harvey, P. 2005. Cash and vouchers in emergencies. Humanitarian policy group discussion paper. London: Overseas Development Institute.
- Hidayat, B., and C. Egbu. 2010. A literature review of the role of project management in post-disaster reconstruction. In *Proceedings of the 26th Annual ARCOM Conference, 6–8 September 2010, Leeds*, ed. C. Egbu, 1269–1278. UK Association of Researchers in Construction Management. http://usir.salford.ac.uk/10144/1/ar2010-1269-1278_Hidayat_and_Egbu.pdf. Accessed 5 Dec 2017.
- Holt, G.D. 2014. Asking questions, analysing answers: Relative importance revisited. *Construction Innovation* 14(1): 2–16.
- IFRC (International Federation of Red Cross and Red Crescent Societies). 2012. Post-disaster community infrastructure rehabilitation and (re)construction guidelines. Geneva: IFRC.
- Ismail, D., T.A. Majid, R. Roosli, and N. Ab Samah. 2014. Project management success for post-disaster reconstruction projects: International NGOs perspectives. *Procedia Economics and Finance* 18: 120–127.
- Jha, A.K., J. Duynne Barenstein, P.M. Phelps, D. Pittet, and S. Sena. 2010. *Safer homes, stronger communities: A handbook for reconstructing after natural disasters*. World Bank Publications. Washington DC: World Bank.
- Johns, R. 2010. Likert items and scales. Survey question bank: Methods fact sheet, March 2010. https://www.sheffield.ac.uk/polopoly_fs/1.597637!/file/likertfactsheet.pdf. Accessed 5 Dec 2017.
- Kaklauskas, A., D. Amaratunga, and R. Haigh. 2009. Knowledge model for post-disaster management. *International Journal of Strategic Property Management* 13(2): 117–128.
- Karunasena, G., and R. Rameezdeen. 2010. Post-disaster housing reconstruction: Comparative study of donor vs owner-driven approaches. *International Journal of Disaster Resilience in the Built Environment* 1(2): 173–191.
- Kusumasari, B., Q. Alam, and K. Siddiqui. 2010. Resource capability for local government in managing disaster. *Disaster Prevention and Management: An International Journal* 19(4): 438–451.
- Le, K.N., and V.W.Y. Tam. 2007. A survey on effective assessment methods to enhance student learning. *Australasian Journal of Engineering Education* 13(2): 13–20.

- Lizarralde, G., C. Johnson, and C. Davidson. 2009. *Rebuilding after disasters: From emergency to sustainability*. Abingdon, UK: Routledge.
- Meyers, B. 1991. Disaster study of war. *Disasters* 15(4): 318–330.
- Moe, T.L., and P. Pathranarakul. 2006. An integrated approach to natural disaster management: Public project management and its critical success factors. *Disaster Prevention and Management: An International Journal* 15(3): 396–413.
- Ophiyandri, T., D. Amaratunga, C. Pathirage, and K. Keraminiyage. 2013. Critical success factors for community-based post-disaster housing reconstruction projects in the pre-construction stage in Indonesia. *International Journal of Disaster Resilience in the Built Environment* 4(2): 236–249.
- Packendorff, J. 1995. Inquiring into the temporary organization: New directions for project management research. *Scandinavian Journal of Management* 11(4): 319–333.
- Pathirage, C., R. Haigh, D. Amaratunga, and D. Baldry. 2008. Knowledge management practices in facilities organisations: A case study. *Journal of Facilities Management* 6(1): 5–22.
- Project Management Institute. 1987. *Project management body of knowledge (PMBOK)*. Newtown Square, PA: Project Management Institute.
- Project Management Institute. 2005. *Project management methodology for post disaster reconstruction*. Newtown Square, PA: Project Management Institute.
- Qarmout, T., and D. Béland. 2012. The politics of international aid to the Gaza Strip. *Journal of Palestine Studies* 41(4): 32–47.
- Sakalasuriya, M.M., R.P. Haigh, and D. Amaratunga. 2016. The consequences of post conflict reconstruction: A review of literature. In *Proceedings of the 12th International Conference of the International Institute for Infrastructure Resilience and Reconstruction*, 5–7 August 2016, University of Peradeniya, Kandy, Sri Lanka, 153–159. <http://eprints.hud.ac.uk/id/eprint/29256/1/Maheshika.pdf>. Accessed 5 Dec 2017.
- Schiavo-Campo, S. 2003. Financing and aid management arrangements in post-conflict situations. CPR Working Papers. Social Development Department, Environmentally and Socially Sustainable Development Network. <http://documents.worldbank.org/curated/en/96701146877577384/pdf/266890Conflict0prevention0wp0no-06.pdf>. Accessed 5 December 2017.
- Seneviratne, K., D. Amaratunga, and R. Haigh. 2016. Managing housing needs in post conflict housing reconstruction in Sri Lanka: Gaps versus recommendations. *International Journal of Strategic Property Management* 20(1): 88–100.
- Seneviratne, K., D. Amaratunga, and R.P. Haigh. 2017. Managing housing needs of post conflict housing reconstruction: Sri Lankan perspective. *Engineering Construction and Architectural Management* 24(2): 275–288.
- Singh, B., and S. Wilkinson. 2008. Post-disaster resource availability following a Wellington earthquake: Aggregates, concrete and cement. In *Proceedings of the 4th International i-Rec Conference on Building Resilience: Achieving Effective Post-Disaster Reconstruction*, 3 April–2 May 2008, University of Canterbury, New Zealand. <http://www.irbnet.de/daten/iconda/CIB11583.pdf>. Accessed 5 Dec 2017.
- Teeuw, R.M., M. Leidig, C. Saunders, and N. Morris. 2013. Free or low-cost geoinformatics for disaster management: Uses and availability issues. *Environmental Hazards* 12(2): 112–131.
- UNDP (United Nations Development Programme). 2014. *Detailed infrastructure damage assessment: Gaza – 2014*. Jerusalem: UNDP.
- UNEP (United Nations Environment Programme). 2009. *Environmental Assessment of the Gaza Strip: Following the escalation of hostilities in December 2008 – January 2009*. Nairobi, Kenya: UNEP.
- UNISDR (United Nations International Strategy for Disaster Reduction). 2009. *UNISDR terminology on disaster risk reduction*. Geneva, Switzerland: UNISDR.
- von Meding, J., L. Oyedele, and J. Bruen. 2014. Linking organisational competency to project success in post-disaster reconstruction. *Open House International* 39(3): 7–16.
- von Meding, J., J. Wong, S. Kanjanabootra, and M. Taheri Tafti. 2016. Competence-based system development for post-disaster project management. *Disaster Prevention and Management* 25(3): 375–394.