Community stakeholder perspective on construction industry-related needs and skills for enhancing disaster resilience

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Abstract

Although scientific research community has shown increased interest in enhancing disaster resilience of societies, yet effort at identifying the needs and skills of stakeholders affected by disasters has not received adequate attention. Therefore, the purpose of this study is to identify and assess the needs and skills of communities affected by disasters from four different countries. Community as one of the stakeholders in disaster resilience is considered as respondent in this study, due to the fact that they are on the frontlines of both the immediate impact of a disaster and the initial emergency response. Thus, identification of specific needs and skills requirement for the community in enhancing disaster resilience becomes imperative. The study adopted literature review and semi-structured interviews. The interviews were conducted with fifteen purposively selected experts in four different countries to include the UK, Estonia, Lithuania, and Sri Lanka. Data obtained were analysed using Nvivo (version 10). The study identified different needs and skills of communities related to built environment professionals towards enhancing disaster resilience. The identified needs and skills were grouped into five disaster resilience dimensions. This includes economic, environmental, institutional, social, and technological dimensions of disaster resilience of societies. These five groups were further structured into five different stages of the property lifecycle to include preparation, design, pre-construction, construction and use stages of a property development. Also, the overall identified needs and skills at different disaster resilience dimensions were filtered to generate twenty-nine major classifications of skills and needs of communities in enhancing disaster resilience of societies. This study would be beneficial to all construction professionals and other stakeholders in developing their competencies on the main classifications of needs and skills of communities identified in this study.

Keywords: Communities, Construction professionals, Education, Disaster resilience

1. Introduction

Today, it is increasingly evident that the unprecedented frequency and costs of natural disasters and the projected increase in their severity due to climate change are posing significant economic challenges and new risks for vulnerable communities (World Economic Forum, 2008). For instance, the projections of Swiss Reinsurance Company indicates that the flooding in Great Britain and Hurricane Dean in the Caribbean cost the global reinsurance industry US$35 billion compared to US$12 billion for natural disasters in 2006 (WEF, 2008). This is corroborated by World Bank (2013) reports that between 1980 and 2012, the estimated losses due to a different form of disasters amount to about US$3.8 trillion. In which, hydro-meteorological disasters accounted for 74% (US$2.6 trillion) of total reported losses, 87% (18,200) of total disasters, and 61% (1.4 million) of total lives lost. Against this backdrop, Asia-Pacific Economic Cooperation (2010) avers that the core values of a society cannot be entirely protected at all times and the disruptions are inevitable. It is on this premise that UNISDR (2007) emphasises that communities are on the frontlines of both the immediate impact of a disaster and the initial emergency response. APEC (2010) reports that economies have shifted from a protection focus to resilience focus; thus disaster resilience is gaining importance as a core conceptual approach to building capacity in economies in the disaster-prone regions to respond and recover from impacts. This is affirmed by World Bank (2013) that disaster can be reduced by strengthening resilience: the ability of societies to resist, cope with, and recover from shocks.

Therefore, in a globalising world there is a considerable interest in disaster resilience as a mechanism for preparedness, mitigation, response, and recovery. Due to this, many countries across the globe as well as many international organisations like United Nations International Strategy for Disaster Reduction (UNISDR), World Bank among others are geared efforts toward strengthening disaster resilience, and adopting policies that emphasise the importance of community disaster resilience as a priority for preparedness. For example, in 2005, 168 countries drafted and approved the Hyogo Framework for Action (HFA) at the World Conference for Disaster Reduction, held in Kobe, Japan. The HFA provides guidance for achieving a set of outcomes and results towards reducing disaster risk over ten years (2005-2015) (UNISDR, 2005). This triggered a number of studies on disaster resilience. Many of these previous studies were focused on disaster risk reduction (see Camilleri, 2006; Jayawardane, 2006; Bosher *et al*., 2007, 2007b; Kaklauskas *et al*., 2009; RICS, 2009; UNISDR, 2009; Mercer, 2012) among others. Few researchers also focused on disaster resilience education (see Thayaparan *et al*., 2010; Amaratunga *et al*., 2011; Siriwardena *et al*., 2013; Perdikou *et al*., 2014; Zhou *et al*, 2014; Thayaparan *et al*., 2015) among others. In spite of these studies on disaster resilience very few studies attempted to identify the needs and skills of communities affected by disasters (see Perera *et al.*, 2015). Having aware of this gap, this study, therefore, becomes imperative with a view to identifying the specific needs and skills requirement for the community as a stakeholder in enhancing disaster resilience. Thus, achieving disaster resilient communities require a long-term shared responsibility among the stakeholders in the wider environment. In this regard, these study findings would be beneficial to construction professionals and other stakeholders in fostering their competencies towards enhancing disaster resilience of communities at large.

2. Concept of disaster resilience

The concept of resilience has received both theoretical and empirical attention across different fields. This is corroborated by Molin-Valdes *et al*. (2013) that concept of resilience has increasingly popular across academic and policy debates as a way of reducing society's vulnerability to threats posed by natural and human induced hazards. This is further acknowledged by Alexander (2013) that the concept of resilience has been widely adopted and adapted by many disciplines. Christopherson *et al*. (2010) assert that growing popularity of research on resilience is due to insecurity and uncertainty afflicting people across the world. This is affirmed by Modica and Reggiani (2015) that the uncertainty due to the interconnections between economic and environmental crises in the current global networks necessitated the growing attention being paid to resilience. Martin (2012) identifies four major reasons why researchers focusing on the concept of resilience: (i) the impact of natural and man-made disasters afflicted communities; (ii) recognition that major disruptions can affect the whole economic landscape; (iii) the influence of other disciplines, such as ecology, where the main interest is on how ecosystems respond to shocks; and (iv) the effect at both local and regional levels of financial and economic crises and their consequences, due to the austerity policies pursued by many states. Against this backdrop, Carlson *et al*. (2012) recognise the concept of resilience as a multifaceted notion that can be managed differently according to different objectives. Based on this, Modica & Reggiani (2015) conclude that researchers interested in investigating the concept of resilience more deeply may be hindered by the range of definitions, classifications and uses of resilience. This could be attributed to the fact that the term resilience has been used across a wide range of academic disciplines and in many different contexts. For instance, in physics and mathematics (see Brown & Kulig, 1996; Bodin & Wiman, 2004). In psychology expanded to include community and social resilience (see Chenoweth & Stehlik, 2001; Adger, 2000). In ecology expanded to social resilience (see Adger *et al.*, 2005; Gunderson & Folke, 2005).

Similarly, within the context of disaster resilience; resilience has been described by a number of researchers, the most common definitions of resilience relates to the capacity of a society to "bounce back", cope, withstand, "resile from" or "spring back from" a shock (see Cutter *et al*., 2009; Béné *et al*., 2012). Further, Béné *et al*. (2012) and Cutter *et al*. (2008) assert that resilience has two major characteristics: (i) a capacity to recover from shocks, and (ii) a degree of preparedness. It is noteworthy to state the definition of resilience by UNISDR (2009), due to its comprehensiveness and acceptability in both industry and academia. Thus, UNISDR (2009) defines resilience as: "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions". Concerning community resilience UNISDR (2009) further reports that: "the resilience of a community in respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organising itself both prior to and during times of need". It can be deduced that community resilience is about the continued ability of a community to function during and following a disaster. Thus, there is a need for all stakeholders' contribution towards building community disaster resilience.

2.1 Disaster resilience dimensions

There are varieties of domains and indicators used for community disaster resilience. For instance, Twigg (2009) identifies 28 components of resilience, which are grouped into five major thematic areas: governance, risk assessment, knowledge and education, risk management and vulnerability reduction, and preparedness and response. Cutter *et al*. (2010) identify 36 baseline indicators used to measure and monitor the resilience of communities to disasters. Further, Cutter *et al*. (2010) assert that the resilience of a particular community is based on an aggregated resilience index, and therefore categorize community disaster resilience domains into five main categories including social resilience, economic resilience, institutional resilience, infrastructure resilience, and community capital. Burton (2012) identifies six dimensions of resilience, which are called variables. These include: social, economic, institutional, infrastructure, community capital, and environmental resilience. In the same vein, within the context of disaster knowledge factors (i.e. factors that enhance knowledge of managing disasters successfully) Pathirage *et al*. (2012) classify the knowledge factors into eight major categories including: technological, social, environmental, legal, economic, operational/managerial, institutional and political factors based on their characteristics. It is, therefore, evident that there are varieties of domains or dimensions used for community disaster resilience assessment. In this regard, this study would focus on five broad categories of dimensions or domains of resilience including: economic, environmental, institutional, social, and technological dimensions with their property five-stage life cycle to include preparation, design, pre-construction, construction, and use stage. This is illustrated in Figure 1 as follows:

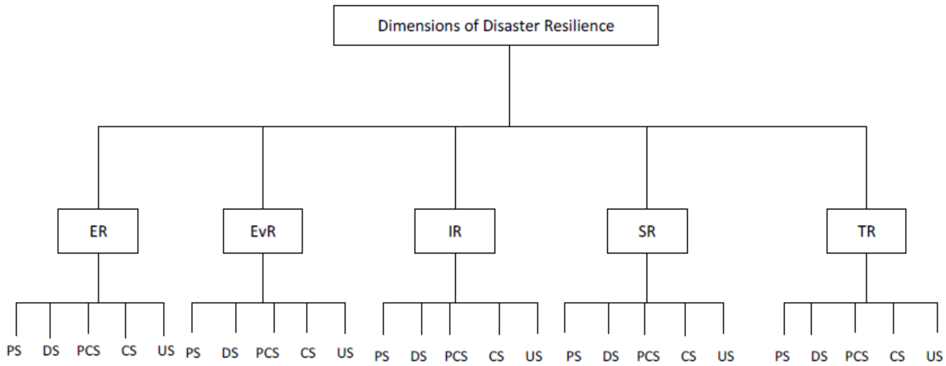

Figure 1: Dimensions of disaster resilience with their property lifecycle stages

Resilience Dimensions: ER-Economic Resilience; EvR-Environmental Resilience; IR-Institutional Resilience; SR-Social Resilience; TR- Technological Resilience

Property Lifecycle Stages: PS-Preparation Stage; DS-Design Stage; PCS-Pre-Construction Stage; CS-Construction Stage; US-Use Stage

It is believed that the aforementioned dimensions of resilience with their property lifecycle stages (see Figure1) covered all the dimensions of resilience identified by previous researchers.

3. Research methodology

The study area, which include the UK, Lithuania, Estonia, and Sri Lanka were selected in terms of disaster impacts like the flood in the UK, Lithuania & Estonia, and Tsunami in Sri Lanka. The study adopted literature review, brainstorming session, interviews, and expert group. The outcome of a comprehensive literature review produced the dimensions of disaster resilience with their property lifecycle (see Figure 1), which form the basis of inquiry for the data collection and analysis. Thus, the outcomes of literature review were subjected to internal brainstorming comprised four researchers and academia in the built environment, which have practical experience of communities affected by disasters with a view to developing and fine-tuning the interview questions. This is, therefore, addressing potential interpretation difficulties of some disaster resilience terminologies.

Semi-structured interviews were conducted on fifteen “community” stakeholder group purposively selected from the aforementioned countries. This approach is similar to the research work by Thayaparan *et al*. (2015) that conducted ten interviews with experts in the higher educations. Purposive sampling technique is adopted because this study involved only respondents that have either experienced disaster events as a member of an affected community or respondents that were deeply involved in the reconstruction and recovery of disaster affected communities. This is supported by a number of earlier researchers. For instance, Marshall (1996) asserted that purposively sampling technique enables the researcher to select the most productive participant. Blaxter *et al*. (2006) advocated for non-probability sampling when the researcher lacks a sampling frame of the target population for the study. The interviews were conducted face-to-face, and each interview lasted between 50 minutes and 60 minutes. During the interviews, the focus was on the needs of communities, and the skills required from construction industry professionals serving these communities. Thus, the interviews were more of a discourse structured around the stages of disaster management cycle. The interviews were recorded using a digital voice recorder and notes were taken during the interviews that were conducted in the second half of 2014. Detailed transcripts were prepared for each interview, resulting in fifteen full transcripts.

The fifteen full transcripts from respective interviews were analysed using thematic coding through Nvivo (version10). During the analysis using Nvivo, the themes were presented under two major headings: (i) Needs; and (ii) Skills. The “Needs” cover both the desires and expectations of interviewees during disaster experience, and what should be in place while professionals are working with them in enhancing community resilience. Similarly, some set of skills were identified comprising those displayed by professionals involved in the reconstruction and recovery of disaster affected communities, and those desired/or expected by interviewees. Therefore, all the identified “Needs” and “Skills” were further categorised into five dimensions of resilience (i.e. Economic, Environmental, Institutional, Social, & Technological) and each of the dimension of resilience is sub-headed with the five stages of property lifecycle to include:

Preparation, Design, Pre-construction, Construction and Use stage (see Figure 1). In this regard, similar identified "Needs" and "Skills" were mapped to derive classifications encapsulate the "Needs" and "Skills" of communities related to professionals towards enhancing economic, environmental, institutional, social, & technological dimensions of disaster resilience of communities.

In addition, the derived classifications were presented to an expert group involved in CADRE (Collaborative Action towards Disaster Resilience Education) from five different countries in June 2015. These group of experts comprised thirteen professionals, researchers and academia in the built environment, which have vast experience in disaster management skills and knowledge among others. The thirteen groups of experts carefully checked and refined the derived classifications under respective dimensions of disaster resilience with their property lifecycle stages. This led to final classifications of "Needs" and "Skills" towards enhancing disaster resilience of communities. The expert group, therefore, suggested recommendations on how the aforementioned classifications can be used to update and upgrade the built environment professionals' competencies and other stakeholders at large.

4. Results and analysis

The outcome of semi-structured interviews using Nvivo (10 version) for the analysis produced a long list of 'Needs and Skills' expected of the construction industry professionals while serving communities in disaster-related situations under the respective dimensions of disaster resilience with their property lifecycle stages. Thus, due to the limitation of space, the sample portion of identified 'Needs and Skills' is presented in Figure 2 as follows:

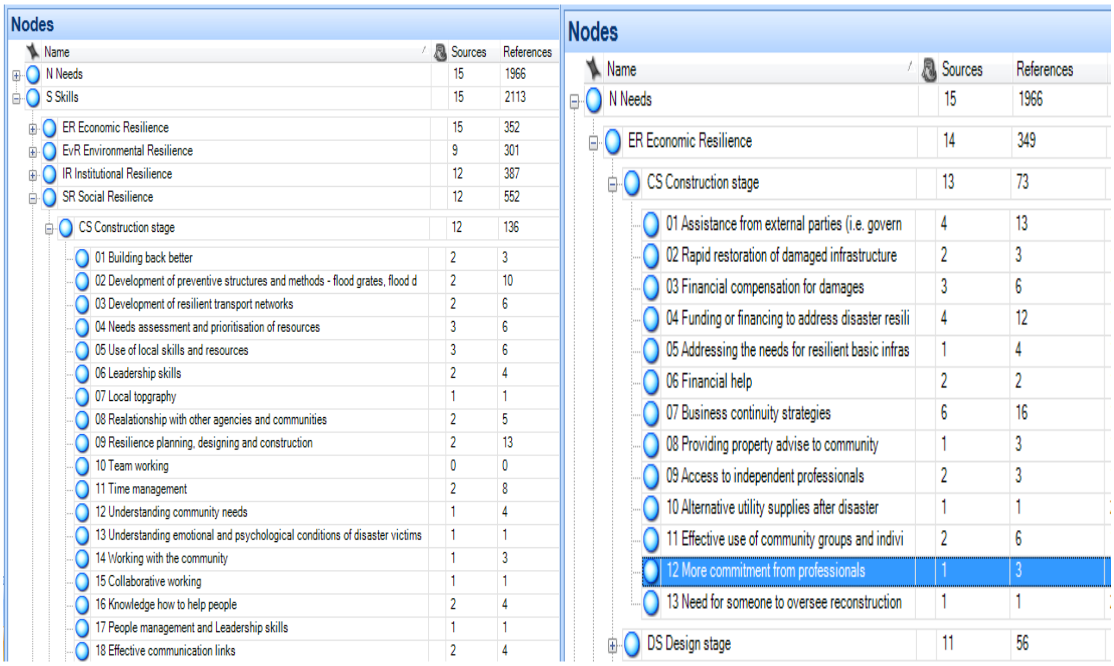

Figure 2: Sample portion of identified 'Needs and Skills' under the respective dimensions of disaster resilience with their property lifecycle stages

Table 1 indicates the twenty-nine final major classifications derived from the identified “Needs” and “Skills” (i.e. after combining similar “Needs” and “Skills” like-for-like) in each respective dimension of disaster resilience and their property lifecycle stages. Further, the final major classifications emanated in each dimension of disaster resilience with their respective stages of property lifecycle were numbered/or coded between 1 and 29 (see Table 1). For example, at Economic Resilience (ER) with its property lifecycle stages comprising Preparation Stage (PS), Design Stage (DS), Pre-Construction Stage (PCS), Construction Stage (CS), and Use Stage (US), the total major classifications emanated in each stage are 14,13,11,12,and 11 respectively (see Table 1 details).

Also, for more clarity Table 2 provides the descriptions of the twenty-nine major classifications derived with their sample portions of the identified ‘Needs and Skills’ under each major classification derived (see Table 2 for details).

Table 1: Coding of the twenty-nine classifications into the dimensions of disaster resilience and stages of property life cycle

Dimensions of resilience	*Stages of property life cycle*				
	PS	*DS*	*PCS*	*CS*	*US*
ER	*1,2,3,4,9,11,14, 15,16,17,19,20, 23,24*	*1,2,3,4,9,14,15,16, 17,23,24,25,26*	*1,2,3,4,5,11,14,17, 20, 23,24*	*1,2,3,4,9,11,14,16, 17,20,23,24*	*1,4,8,9,11,14,15, 17,23,24,26*
EvR	*6,8,9,12,15,16,25, 27*	*6,9,12,15,16,27,10*	*9,12,15,27*	*6,9,12,15,16,27*	*8,9,12,15,16,27*
IR	*4,6,7,8,9,10,11, 12,13,14,15,16, 17,18,19,20,21, 22,23*	*4,6,7,9,10,11,12, 13,14,15,16,18,19, 21,22,23,28*	*3,4,5,6,7,10,11,12, 13,17,18,19,21,22, 23*	*4,6,7,9,10,11,12, 13,14,15,16,18,19, 21,22,23,24,*	*4,6,7,9,10,11,12, 13,14,15,16,19,21, 22,23,24,26,27*
SR	*3,4,5,6,8,9,10,11, 12,14,15,16,17, 18,19,22,23,24,28*	*3,4,6,8,9,10,11,12, 15,16,18,19,22,23, 24,25,28*	*3,5,8,10,11,12,13, 14,15,18,19,22,23, 24,*	*3,4,6,8,9,10,11,12, 14,15,16,18,19,22,2 3,24,28*	*3,4,8,9,10,11,12, 15,16,19,22,23,24, 27,28*
TR	*3,4,6,8,9,12,15, 16,19,26,29*	*3,4,6,9,12,15,16,1 9, 24,26,29*	*3,4,6,9,12,15,19, 24,29*	*3,4,6,9,12,15,16,19, 24,29*	*4,6,8,9,15,16,19,26, 27,29*

Note: Dimensions of resilience: Economic Resilience – ER, Environmental Resilience – EvR, Institutional Resilience – IR, Social Resilience – SR, and Technological Resilience – TR.

Stages of property lifecycle: Preparation Stage – PS, Design Stage – DS, Pre-Construction Stage – PCS, Construction Stage – CS, and Use Stage – US

Table 2: Descriptions of the twenty-nine major classifications with their sample portion of the identified needs and skills

1. Budgeting & financial planning - Fund sourcing and financial management skills -Funding or financing to address disaster resilience -Financing flood adaptation strategies	**10. Quality leadership & people management** -Objective consideration of issues-Flexibility -Understanding the community needs -Leadership skills	**19. Communication & negotiation/Information systems** - Language (familiarity with local language) and communication skills - Effective communication links - Negotiation skills
2. Quantification & costing of construction works -Budgeting and estimating construction costs -Pricing and estimating-Construction works	**11. Team working** -Effective use of community groups & individuals -Engaging community - Relationship with other agencies and communities	**20. Project audit & reporting** - Knowledge of loss assessment and loss adjustment - Auditing skills
3. Supply chain management -Alternative utility supplies after disaster	**12. Governance** -Transparency and accountability in adopted processes - Minimising political interferences	**21. Management & dispute resolution procedures** - Knowledge of dispute resolution
4. Consultancy services -Assistance from external parties (i.e. government; NGOs; Private sector, etc.) -Providing property advice to community	**13. Stakeholder management** - Clarity on roles and responsibilities of different parties - Multi-stakeholder engagement	**22. Cross-cultural awareness in global resilience** - Familiarity with local language - Use of local skills and local knowledge
5. Procurement & contract administration/practice -Advice to community on selection of contractors and consultants -Selection of consultants and contractors - pre-qualifications	**14. Business planning** - Temporary business area - Business continuity strategies/plans - Business protection - Needs assessment and prioritisation of resources	**23. Project management** - Project management skills **24. Asset/Resource management** -Use of local skills and resources - Prioritisation of resources
6. Building regulation & planning -Resilience planning, designing and construction -Knowledge on land-use planning	**15. Environmental assessment** - Weather changes monitoring - Awareness of potential disaster threats - Forecasting and warnings	**25. Disaster management** - Management of disaster relief **26. Risk management** - Disaster risk assessments
7. Legal/Regulatory compliance -Knowledge of prevailing laws, need for the flexibility of laws and policies	**16. Management of the built environment** - Development of preventive structures and methods	**27. Continuing professional development** -Awareness & education on disaster resilience
8. Health & safety -Temporary housing provision -Availability and identification of suitable alternative place to relocate	**17. Insurance** - Financial compensation for damages - Knowledge and awareness on insurance - Property insurance - Adequacy of insurance cover	**28. Emergency management** - Rapid recovery after an onset of a disaster - Management of emergency shelters
9. Work progress & quality management -Rapid restoration of damaged infrastructure -Better infrastructure needs	**18. Time management** - Time management	**29. Construction technology & environmental services** - Knowledge on resilient construction practices

5. Discussion of findings

The study identified various needs and skills, which are matched like-for-like and filtered to produce twenty-nine major classifications of needs and skills expected of the construction industry professionals in enhancing disaster resilience of communities affected by natural disasters. The twenty-nine major classifications derived with their respective disaster resilience dimensions and property life cycle stages are briefly discussed as follows:

Economic resilience (ER): The study reveals a total of 18 (out of 29) major classifications emanated from the identified needs and skills requirements for enhancing economic resilience with their respective property lifecycle stage. Thus, the prevalent classifications include budgeting and financial planning, quantification and costing of construction works, insurance, supply chain management, consultancy services among others (see Table 1 & 2 for details).

Environmental resilience (EvR): In enhancing environmental resilience with their respective property lifecycle stage, the study indicates a total of 8 (out of 29) major classifications derived from the identified needs and skills under environmental resilience (see Table 1 & 2 for details). The common major classifications are work progress and quality management, governance, environmental assessment, management of the built environment, continuing professional development**.**

Institutional resilience (IR): The study shows the overall of 25 (out of 29) major classifications emanated from the identified needs and skills in enhancing institutional resilience with their respective property lifecycle stage. These include consultancy services, building regulation and planning, legal/regulatory compliance, quality leadership and people management, management and dispute resolution procedures, cross-cultural awareness in global resilience among others (see Table 1 & 2 for details)

Social resilience (SR): The study further reveals a total of 22 (out of 29) major classifications derived under social resilience with their respective property lifecycle stage. This includes supply chain management, health and safety, quality leadership and people management, team working, governance, stakeholder management (see Table 1 & 2 for details).

Technological resilience (TR): The study indicates the overall of 13 (out of 29) major classifications produced from the identified needs and skills in enhancing technological resilience with their respective property lifecycle stage (see Table 1 & 2 for details). The prevalent classifications are supply chain management, consultancy services, building regulation and planning, work progress and quality management, risk management, construction technology and environmental services.

6. Conclusions

Understanding and enhancing knowledge on disaster resilience among construction professionals continue to be a matter of significance and importance. Thus, identification of specific needs and skills requirement for the communities in enhancing disaster resilience becomes imperative. As communities are on the frontlines of both the immediate impact of a disaster and the initial emergency response; thus the receivers of all what other stakeholders in disaster resilience have to offer. Against this backdrop, this study identified different needs and skills requirement expected of the construction professionals across the dimensions of disaster resilience with their property lifecycle stages in enhancing disaster resilience of communities affected by natural disasters. The study, through a comprehensive desk review and selected expert group involved in CADRE (Collaborative Action towards Disaster Resilience Education) harmonised like-for-like the identified needs and skills across the dimensions of disaster resilience with their property lifecycle stages to produce a total of twenty-nine major classifications of skills and needs of communities in enhancing disaster resilience of societies. It is believed that this study would be beneficial to all construction professionals and other stakeholders in developing their competencies on the main classifications of needs and skills of communities identified in this study. These study findings would further be useful for professional bodies such as CIOB, RICS, ICE, and RIBA to review and upgrade their existing programmes.

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References

Asia-Pacific Economic Cooperation (APEC) (2010) *Public-private partnerships and disaster resilience*, Report from APEC Workshop held in Bangkok, 24-29 August, (available online: https://www.em.gov.au/Documents/APEC%20- [accessed 20/06/ 2015]).

Blaxter, L., Hughes, C., & Tight, M. (2006) *How to Research*, Maidenhead: Open University Press.

Bodin, P., & Wiman, B. (2004) "Resilience and other Stability Concepts in Ecology: notes on their Origin, Validity, and Usefulness". *ESS Bulletin*, **2**(2), 33-43.

Bosher, L., Dainty, A., Carrillo, P., Glass, J., & Price, A. (2007a) "Integrating Disaster Risk into Construction: A UK Perspective". *Building Research and Information*, **35**(2), 163-177.

Bosher, L., Dainty, A., Carrillo, P., & Glass, J. (2007b) "Built-in Resilience to Disasters: A Pre-Emptive Approach". *Engineering, Construction and Architectural Management*, **14**: 434-446.

Brown, D., & Kulig, J. (1996) "The Concept of Resiliency: Theoretical Lessons from Community Research". *Health and Canadian Society*, **4**(1), 29-52.

Burton, G. C. (2012) "*The Development of Metrics for Community Resilience to Natural Disasters"*. (PhD Thesis), University of South Carolina.

Camilleri, D. H. (2006) "Tsunami Construction Risks in the Mediterranean-Outlining Malta's Scenario". *Disaster Prevention and Management*, **15**, 146-162.

Carlson, L., Bassett, G., Buehring, W., Collins, M., Folga, S., Haffenden, B., Whitfiled, R. (2012) *Resilience: Theory and Applications*, Oak Ridge, USA: Argonne National Laboratory, U.S. Department of Energy.

Chenoweth, L., & Stehlik, D. (2001) "Building Resilient Communities: Social Work Practice and Rural Queensland". *Australian Social Work*, **54**(2), 47-54.

Christopherson, S., J., M., & Tyler, P. (2010) "Regional Resilience: Theoretical and Empirical Perspectives". *Cambridge Journal Regions Economy & Society,* **3**, 3–10.

Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008) "A Place-Based Model for Understanding Community Resilience to Natural Disasters". *Global Environmental Change,* **18**, 598–606.

Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010) "Disaster Resilience Indicators for Benchmarking Baseline Conditions". *Journal of Homeland Security and Emergency Management,* **7**(1), Article 51.

Ginige, K., & Amadatunga, D. (2011) "Capacity Development for Post-Disaster Reconstruction of the Built Environment", In D. R. H. Amaratunga (Ed.), *Post-Disaster Reconstruction of the Built Environment: Building for resilience*. Chichester: Wiley-Blackwell.

Gunderson, L., & Folke, C. (2005) "Resilience – now more than ever (editorial)". *Ecology and Society & Natural Resources,* **10**(2), 22.

Jayawardane, A. K. W. (2006) "Disaster Mitigation Initiatives in Sri Lank*a"*, *Proceedings of the International Symposium on Management Systems for Disaster Prevention*, 9-11 March 2006, Kochi University of Technology, Japan.

Kaklauskas, A., Amaratunga, D., & Haigh, R. (2009) "Knowledge Model for Post-Disaster Management". *International Journal of Strategic Property Management,* **13**, 117-128.

Marshall, M. N. (1996) "Sampling for Qualitative Research". *Family Practice,* **13**(6), 522-525.

Martin, R. L. (2012) "Regional Economic Resilience, Hysteresis and Recessionary Shocks". *Journal of Economic Geography,* **12**, 1–32.

Mercer, J. (2012) "Knowledge and Disaster Risk Reduction", In B. Wisner, Gaillard, J.C. and Kelman, I. (Ed.), *Hazards and Disaster Risk Reduction*. Oxon: Routledge.

Modica, M., & Reggiani, A. (2015) "Spatial Economic Resilience: Overview and Perspectives". *Networks & Spatial Economics,* **15**, 211–233.

Molin-Valdés, H., Amaratunga, D., & Haigh, R. (2013) "Making Cities Resilient: from Awareness to Implementation". *International Journal of Disaster Resilience in the Built Environment,* **4**(1), 5 -8.

Pathirage, C., Seneviratne, K., Amaratunga, D., & Haigh, R. (2012) "Managing Disaster Knowledge: Identification of Knowledge Factors and Challenges". *International Journal of Disaster Resilience in the Built Environment,* **3**(3), 237 - 252.

Perdikou, S., Lees, A., Horak, J., Halounova, L., Palliyaguru, R., Ranguelov, B. K., & Lombardi, M. (2014) *The current landscape of disaster resilience education in Europe, Working Paper No. WP5*. Cyprus: Frederick University.

Perera, S., Adeniyi, O., & Babatunde, S. O. (2015) "Analysing community needs and skills for enhancing disaster resilience in the built environment", *Proceedings of 5th International Conference on Building Resilience*, 15 -17 July 2015, Newcastle University, Australia.

RICS (2009) *The Built Environment Professions in Disaster Risk Reduction and Response. A guide for humanitarian agencies*. London: RICS.

Siriwardena, M., Malalgoda, C., Thayaparan, M., Amaratunga, D., & Keraminiyage, K. (2013) "A Disaster Resilient Built Environment: Role of Lifelong Learning and the Implications for Higher Education". *International Journal of Strategic Property Management*, **17**(2), 174-187.

Thayaparan, M., Siriwardena, M., Malalgoda, C., Amaratunga, D., Kaklauskas, A., & Lill, I. (2010) "Reforming HEI to Improve Skills and Knowledge on Disaster Resilience among Construction Professionals", *Proceedings of the Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors (COBRA)*, 2-3 September 2010, Dauphine Université, Paris.

Thayaparan, M., Siriwardena, M., Malalgoda, C. I., Amaratunga, D., Lill, I., & Kaklauskas, A. (2015) "Enhancing Post-Disaster Reconstruction Capacity Through Lifelong Learning in Higher Education". *Disaster Prevention and Management*, **24**(3), 338 - 354.

Twigg, J. (2009) *Characteristics of a disaster-resilient community (Version 2)*, (available online: http://community.eldis.org/.59e907ee/Characteristics2EDITION.pdf [accessed 20/06/2015]).

UNISDR (2005) *Hyogo framework for action 2005-2015: building the resilience of nations and communities to disasters*, (available online: www.refworld.org/docid/42b98a704.html [accessed 20/06/2015]).

UNISDR (2009) *UNISDR terminology on disaster risk reduction*, (available online: www.unisdr.org/eng/terminology/UNISDR-terminology-2009-eng.pdf [accessed20/06/2015]).

World Economic Forum (WEF) (2008) *Building resilience to natural disasters: a framework for private sector engagement*, (available online: http://www.unisdr.org/files/1392_Disasters.pdf [accessed 20/06/2015]).

Zhou, L., Perera, S., Jayawickrama, J., & Adeniyi, O. (2014) “The Implication of Hyogo Framework for Action for Disaster Resilience Education”. *Procedia Economics and Finance*, **18**, 576-583.