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MAPPING BUILT ENVIRONMENT PROFESSIONAL SKILLS AND NEEDS TO SENDAI FRAMEWORK

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ABSTRACT

Further to the adoption of Sendai framework for disaster risk reduction in March 2015, there is urgent need to leverage the understanding of disaster management in all its dimensions among the stakeholders working towards enhancing disaster resilience of the built environment through the capacity development and scientific research in the relation to core priority areas of the Sendai framework. Thus, this study aims to identify the skills and needs expected of the built environment professionals by the communities affected by natural disasters with a view to map the identified skills and needs with core priority areas of Sendai framework. In achieving this, a literature synthesis including the CADRE (Collaborative Action towards Disaster Resilience Education) outcomes and Sendai framework were reviewed and a comprehensive desk review to map the identified skills and needs with core priority areas of Sendai framework were conducted. The study findings would be beneficial to the built environment professionals in enhancing their capacity and capability development in all the priority areas of Sendai framework. The study would further be useful for non-governmental organisations (NGOs), governments including national, regional and local government, and the private sector in drawing policy recommendations, monitoring and assessing the capacity required of the built environment professionals in the implementation of Sendai framework.

Keywords: Built environment, capacity development, communities, disaster resilience, Sendai framework

INTRODUCTION

Since the adoption of the Hyogo Framework for Action (HFA) in 2005, progress has been achieved in reducing disaster risk at local, national, regional and global levels by countries and other relevant stakeholders, leading to a decrease in mortality in the case of some hazards (UNISDR, 2015a). Over the same 10-year time frame, however, disasters have continued to exact a heavy toll and, as a result, the well-being and safety of persons, communities and countries as a whole have been affected. For instance, the earthquake in Haiti in January 2010 and New Zealand in September 2010 and February 2011, the floods in Pakistan in July 2010 and in Australia in December 2010 to mention a few (UNISDR, 2011). This is affirmed by Emergency Events Database (EM-DAT) (2016) that in 2015,

there are 346 reported disasters, 22,773 people dead, 98.6 million people affected, and US$66.5 billion economic damage. Thus, it obvious that 10 years after the adoption of the HFA, disasters continue to undermine efforts to achieve sustainable development. Notwithstanding, the HFA has provided a critical guidance in efforts to reduce disaster risk and has contributed to the progress towards the achievement of the Millennium Development Goals (UNISDR, 2015a).

The implementation of HFA has, however, highlighted a number of gaps in addressing the underlying disaster risk factors, in the formulation of goals and priorities for action, in the need to foster disaster resilience at all levels, and in ensuring adequate means of implementation. These gaps indicate a need to develop an action-oriented framework that governments and relevant stakeholders can implement in a supportive and complementary manner, and which helps to identify disaster risks to be managed and guides investment to improve resilience (UNISDR, 2015a). In pursuance of filling these gaps, led to the development of Sendai framework, which was endorsed by the UN General Assembly following the Third UN World Conference on Disaster Risk Reduction held in Sendai City, Miyagi Prefecture, Japan in March 2015. A particular emphasis was given to the Sendai framework for disaster risk reduction 2015-2030, as it is the first major agreement with the post-2015 development agenda. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors. By adopting the Sendai Framework, it is expected to substantially reduce the disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries (UNISDR, 2015)

The Sendai framework has re-emphasised the importance of educational measures in reducing the disaster risk. Education and training on disaster resilience can be provided in numerous ways and Sendai framework highlighted the importance of promoting the incorporation of disaster risk knowledge, including disaster prevention, mitigation, preparedness, response, recovery, and rehabilitation, in formal and non-formal education, as well as in civic education at all levels, as well as in professional education and training (UN-ISDR, 2015a). Thus, there is urgent need to leverage the understanding of disaster management in all its dimensions among the stakeholders working towards enhancing disaster resilience of the built environment. Against this backdrop, the research community including professional bodies and international organisations were triggered to identify the key roles and responsibilities of the built environment professionals in disaster management (see Max Lock Centre 2009; Amaratunga, 2014; Witt et al., 2014). Earlier researchers have also identified the skills that built environment professionals could contribute to disaster resilience (see Thayaparan et al., 2010; Siriwardena et al., 2013; Perera *et al*., 2015; Thayaparan et al., 2015). However, there is a dearth of efforts at identifying and mapping the skills and needs of the built

environment professionals with the core priority areas of the Sendai framework to aid its implementation. In this respect, this study was guided by the following objectives: Identify the skills and needs expected of the built environment professionals by the communities affected by natural disasters; Map the identified skills and needs with core priority areas of Sendai framework.

It is believed that the study findings will be beneficial to the built environment professionals in enhancing their capacity and capability development in all the priority areas of Sendai framework. Similarly, these study findings will be useful for non-governmental organisations (NGOs), governments including national, regional and local government, and the private sector in drawing policy recommendations, monitoring and assessing the capacity required of the built environment professionals in the implementation of Sendai framework.

INTERNATIONAL POLICY FRAMEWORKS FOR DISASTER RISK REDUCTION

Disaster resilience and management is prominent in international policy agenda and the year 2015 brought together three international policy frameworks; the sustainable development goals; the Sendai Framework for Disaster Risk Reduction and new Climate change agreements (COP21). Therefore, it becomes imperative to understand the current policies related to disaster resilience and management. It is on this premise that Hyogo framework for action and Sendai framework are briefly discussed as follows:

Hyogo Framework for Action (HFA) 2005–2015

In January 2005, the 168 countries at the World Conference on Disaster Reduction in Kobe, Japan, Member States of the United Nations adopted the Hyogo Framework for Action (HFA) 2005–2015, as an ambitious programme of action to significantly reduce disaster losses, in lives, and in the social, economic, and environmental assets of communities and countries (UNISDR, 2007). Thus, the HFA's expected outcomes, strategic goals, and priorities served as a guiding framework for disaster reduction for the decade that followed (UNISDR, 2009). It is worth emphasising that the HFA has been a determinant in strengthening and guiding international cooperation efforts (UNISDR, 2011). It has helped in generating the political momentum necessary to ensure that disaster risk reduction and served as foundation for sound national and international development agendas (UNISDR, 2011). It has given a common language and a framework of critical actions to follow, which governments have clearly responded (UNISDR, 2011). Therefore, since 2005, substantial progress has been made in raising the profile of disaster risk reduction across the globe.

Moreover, it was indicated in HFA that its implementation "will be appropriately reviewed" and requests the UN International Strategy for Disaster Reduction (UNISDR) to "prepare periodic reviews on progress towards achieving its objectives and priorities" (UNISDR, 2011). As a result, efforts have been taken on the HFA monitor, particularly by the World Bank and the UNISDR Secretariat through a participatory approach involving stakeholders at international, regional, and national levels. Progress is being monitored and challenges remaining in the implementation of the HFA are identified. For instance, the disaster risk reduction goals anticipated in the HFA that were not achieved in the time period, identify what was missing in the HFA to provide a more robust framework for disaster risk reduction, highlight the areas for improvement in the HFA instrument and present conclusions that were fed into the Post-2015 framework for disaster risk reduction, which is Sendai framework.

The Sendai Framework 2015-2030

The Sendai framework for disaster risk reduction 2015-2030 was the first major agreement of the post-2015 development, endorsed by the UN General Assembly following the Third UN World Conference on Disaster Risk Reduction held in Sendai City, Miyagi Prefecture, Japan in March 2015. The Sendai framework was developed to build on and ensure continuity with the work carried out by countries and other stakeholders under the aegis of the Hyogo Framework for Action and previous instruments such as the International Strategy for Disaster Reduction of 1999, the Yokohama Strategy for a Safer World of 1994, and the International Framework of Action for the International Decade for Natural Disaster Reduction of 1989 (UNISDR, 2015b). Thus, the Sendai framework provides the basis for a risk-informed and resilient future (COP21, 2015). The Sendai framework specifically address climate change and climate action, providing measures, guiding principles, and means of implementation. Therefore, Sendai framework establishes the significance of ensuring credible links between the sustainable development goals, financing for development, climate change, and disaster risk reduction and the calls for enhanced coherence across policies, institutions, indicators, reporting and measurement systems for implementation (COP21, 2015). In overall, the Sendai framework aims to achieve the following outcome over the next 15 years:

"The substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities, and countries" (UNISDR, 2015a).

RESEARCH METHODOLOGY

This study adopted the 29 disaster resilience needs and skills expected of the built environment professionals identified through an EU-funded research project (CADRE) for stakeholder groups – communities, the

private sector, government, NGOs, academia and others (see Perera et al., 2015). The needs and skills were derived from literature review/desk review and interviews. The literature review and interviews were conducted to identify the needs and skills expected of the built environment professionals towards enhancing disaster resilience of communities affected by natural disaster (see Perera et al., 2015). Thereafter, a comprehensive desk review comprised four researchers and academia in the built environment was carried out to review the Sendai framework in terms of the priorities for action, guiding principles, among others. Finally, the adopted 29 disaster resilience needs and skills and outcome of the desk review of Sendai framework were mapped.

RESULTS AND DISCUSSION

Table 2 revealed the identified 29 skills and needs with their respective components expected of the built environment professionals towards enhancing disaster resilience of communities affected by natural disaster. This study finding affirmed the existing literature, particularly Jo da Silva, Lubkowski, Batchelor, and Kabir (2010) that described post-disaster reconstruction or recovery as a complex process that requires multi-sectoral involvement, the range of skills, and consumes very significant resources. This is evident in the number of times that issues relating to community participation and mobilization, use of local skills and local knowledge, empowering and engaging communities, multi-stakeholder management, among others were mentioned and emphasized (see Table 2 for details). In addition, multi-stakeholder management practically implies the deployment of a range of skills and consequentially the consumption of huge resources. Thus, this study has presented knowledge areas and skill sets that built environment professionals could bring to leverage the disaster management process.

Table 2: Descriptions of the identified needs and skills with sample portion of their components

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	13. Multi-stakeholder management - Clarity on roles and	22. Cross-cultural awareness in global resilience - Familiarity with local language

sector, etc.) -Providing property advice to community	responsibilities of different parties - Multi-stakeholder engagement	- 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 needs 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 of insurance - Property insurance - Adequacy of insurance cover	**28. Emergency management** - Rapid recovery after an onset of a disaster - Management of emergency shelters
		29. Construction technology & environmental services - Knowledge on resilient construction practices
9. Work progress & quality management -Rapid restoration of damaged infrastructure -Better infrastructure needs	**18. Time management** - Time management	

Table 3 indicated the mapping of the identified 29 skills and needs expected of the built environment professionals towards the effective implementation of the core priorities area of Sendai framework. Thus, the cross-cutting areas of the Sendai framework have been analysed to identify the skill and knowledge requirements of the built environment professionals. Therefore, Table 3 contained the identified skills and needs with core priority areas of Sendai framework priorities for action (PA) and guiding principles (GP). It is evident from Table 3 that Building regulation & planning, Legal/Regulatory compliance, Team working, Multi-stakeholder management, and Construction technology & environmental services were linked to PA1-PA4 (see Table 3 for details). Table 3 further indicated that expect for 3(out of 29) identified skills and needs, all the identified skills and needs were directly mapped to Sendai framework priorities for action (PA). This implies that the entire identified skills and needs are significant for the built environment professionals towards enhancing disaster resilience of the built environment, and the effective implementation of the core priorities area of Sendai framework.

Table 3: Mapping of the identified needs and skills with Sendai framework

No.	Identified needs and skills	Sendai framework		
		Priorities for action (PA) (With details)	Priorities for action (PA)	Guiding principles (GP)
1	Budgeting & financial planning	PA1NLk, PA2NLc, PA3NLm	PA1, PA2, PA3	GPj, GPm
2	Quantification & costing	PA3NLc	PA3	GPj

No.	Identified needs and skills	Sendai framework		
		Priorities for action (PA) (With details)	Priorities for action (PA)	Guiding principles (GP)
	of construction works			
3	Supply chain management	PA4NLe	PA4	
4	Consultancy services	PA4GRg	PA4	GPj, GPm
5	Procurement & contract administration/practice	PA3NLc	PA3	
6	Building regulation & planning	PA2NLd, PA3NLf, PA3NLh, PA4NLj, PA4NLk, PA4NLl	PA1, PA2, PA3, PA4	
7	Legal/Regulatory compliance	PA1NLn, PA2NLa, PA2NLb, PA2NLd, PA2NLf , PA2NLk, PA3NLj, PA4NLa, PA4NLb, PA4NLp	PA1, PA2, PA3, PA4	GPa, GPh
8	Health & safety	PA4NLj, PA4NLo	PA4	
9	Work progress & quality management	PA3NLc,	PA3	GPk
10	Quality leadership & people management	PA2NLc, PA4NLo	PA2, PA4	GPb, GPd
11	Team working	PA1NLh, PA1NLo, PA1GRe, PA2NLf, PA2NLh, PA2GRa, PA2GRb, PA2GRc, PA2GRd, PA2GRe, PA2GRf, PA3GRc, PA3GRf, PA4GRa, PA4GRf,	PA1, PA2, PA3, PA4	GPa, GPd, GPe, GPf
12	Governance	PA2NLa , PA3GRg	PA2, PA3	GPa, GPb
13	Multi-stakeholder management	PA1GRa , PA1GRg, PA2NLg , PA2NLi, PA2GRa, PA2GRb, PA2GRc, PA2GRd, PA2GRe, PA3GRd, PA4NLi, PA4NLl, PA4GRa, PA4GRf	PA1, PA2, PA3, PA4	GPa, GPe, GPl
14	Business planning	PA3NLo, PA3GRi, PA4NLg,	PA3, PA4	
15	Environmental assessment	PA3NLg, PA4NLb	PA3, PA4	
16	Management of the built environment	PA3NLn, PA3GRa	PA3	GPc
17	Insurance	PA3NLb, PA3GRb	PA3	
18	Time management			GPm
19	Communication & negotiation/Information systems	PA1NLa, PA1NLc, PA1NLe, PA1NLf, PA1GRa, PA1GRc, PA1GRg, PA1GRh, PA1GRi, PA2GRf, PA4NLb, PA4GRb, PA4GRd	PA1, PA2, PA4	GPg, GPm
20	Project audit & reporting	PA2NLe	PA2	
21	Management & dispute resolution procedures			
22	Cross cultural awareness in global resilience	PA1NLc, PA1NLi, PA1NLo, PA3NLd	PA1, PA3	GPa, GPi, GPm
23	Project management			
24	Asset/Resource management	PA3NLa, PA3NLn, PA3NLp, PA3NLq, PA3GRf,	P3	GPc, GPm
25	Disaster management	PA4NLh	PA4	
26	Risk management	PA1NLb, PA1NLaj, PA1GRb, PA1GRg, PA2GRf	PA1, PA2	GPa, GPc, GPl
27	Continuing professional development	PA1NLg, PA1NLi, PA1NLm, PA1GRe, PA1GRf, PA1GRg, PA1GRi, PA2NLj, PA4NLm, PA4GRf	PA1, PA2, PA4	GPk, GPm
28	Emergency management	PA4NLd, PA4NLm	PA4	
29	Construction technology & environmental	PA1NLj, PA2NLc, PA3NLc, PA3NLe, PA3GRc, PA4NLc,	PA1, PA2, PA3, PA4	GPk, GPm

No.	Identified needs and skills	Sendai framework		
		Priorities for action (PA) (With details)	Priorities for action (PA)	Guiding principles (GP)
	services	PA4NLk,		

Legend

GPa - GPm: Sendai framework guiding principle a to m

PA1NLa – PA1NLo: Sendai framework priority for action 1 – National & local levels

PA1NLa – PA1NLo: Priority for Action 1 at National & local levels (sub actions a to o)

PA1GRa – PA1GRi: Sendai framework priority for action 1 – Global and regional levels

PA2NLa – PA2NLk: Sendai framework priority for action 2 – National & local levels

PA2GRa – PA2GRf: Sendai framework priority for action 2 – Global and regional levels

PA3NLa – PA3NLq: Sendai framework priority for action 3 – National & local levels

PA3GRa – PA3GRi: Sendai framework priority for action 3 – Global and regional levels

PA4NLa – PA4NLp: Sendai framework priority for action 4 – National & local levels

PA4GRa – PA4GRh: Sendai framework priority for action 4 – Global and regional levels

CONCLUSION

The Sendai framework has re-emphasised the importance of educational measures to include formal and non-formal education, civic education at all levels, as well as professional education and training in reducing the disaster risk. Thus, the need to clearly understand the required needs and skills for the implementation of Sendai framework cannot be overemphasised. Against this backdrop, this study identified the skills and needs expected of the built environment professionals by the communities affected by natural disasters and mapped the identified skills and needs with core priority areas of Sendai framework. The study revealed the identified 29 skills and needs with their respective components expected of the built environment professionals towards enhancing disaster resilience of communities affected by natural disaster. These study findings affirmed the existing literature that described post-disaster reconstruction or recovery as a complex process that requires multi-sectoral involvement, the range of skills, and consumes very significant resources.

It is evident from these study findings that team working, budgeting & financial planning, quality leadership & people management, communication & negotiation/information systems, insurance, project audit & reporting, business planning, multi-stakeholder management, among others were identified as knowledge areas and skill sets that built environment professionals could bring to leverage the disaster management process. Similarly, the study showed that expect for 3(out of 29) identified skills and needs, all the identified skills and needs were directly mapped to Sendai framework priorities for action (PA). This implies that the entire identified skills and needs are significant for the built environment

professionals towards enhancing disaster resilience of the built environment, and the effective implementation of the core priorities area of Sendai framework. In the same vein, this study has presented the skills and needs that are significant towards effective implementation of the four core priorities of Sendai framework on the respective areas of priorities for actions with the relevant Global & Regional level and National & Local level actions. It is believed that these study findings would be beneficial to the built environment professionals in enhancing their capacity and capability development in all the priority areas of Sendai framework.

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