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DEVELOPING TRANSFORMATIONAL HOMES IN POST-DISASTER RECONSTRUCTION; A TRANSFORMATIVE SPACE PERSPECTIVE

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Abstract: Reconstruction is a highly valued task following any disaster. In most post-disaster reconstruction, housing schemes take precedence over other projects. In this context, the expectation is to provide the affected community with an environment that is either same or better than the pre-disaster condition. However, reaching a stage where the affected community will have a permanent housing solution that would help them to return to complete normalcy in terms of physical, economic and social conditions is still a challenge faced by the donors and the community. This paper attempts to establish the concept of ‘transformational homes’ to ensure the transformation of temporary housing to permanent housing from the perception of production of space considering physical and social transformational needs. A comprehensive literature study has been carried out to achieve the aim of the study. Initially, the theories applicable for post-disaster housing reconstruction such as the theory of the production of space, protection motivation theory and habitability framework have been discussed. Afterwards, a conceptual framework was developed to reflect the need for transformative space for post-disaster housing reconstruction, which enables the transformation of social and psychological aspects and the associated operational and physical aspects based on the lived experience of the affected communities.

Keywords: Post-disaster housing; Transformation; Theory of production of space; Protection motivation theory

1. Introduction

Disaster is the occurrence of an unexpected disruptive event that creates serious consequences (McFarlane and Norris, 2006; Cottrell and King, 2010). While disasters produce dramatic impacts on the natural, social and built environments, they also force local communities to undergo a great challenge for their own future survival and development (Imperiale and Vanclay, 2016). Because local communities are on the frontline and must deal with the tragedy and multidimensionality of the consequences of disasters (Oliver-Smith, 1998). The natural world and systems continually evolve, not only by adapting to external disturbances but also by changing their internal dynamics and recombining their structures and processes for transformation and change (Pelling *et al.*, 2015; Koontz *et al.*, 2015). Especially social systems are arguably learning and transforming (Krasny *et al.*, 2010). Because such transformations are healthy and necessary for the system's continued survival (Magis, 2010; Davoudi *et al.*, 2013). Meantime, Rathnasinghe *et al.* (2021) argued the importance of social and physical transformation along with the post-disaster housing transformation, to ensure the long-term use of temporary housings. Therefore, this paper focuses on enhancing the transformational process of these temporary housings to permanent housings using the lived experience of affected communities and developing a transformational home from the perspective of transformative space. In order to achieve this aim, initially, the transformation in post-disaster housing reconstruction was identified through the literature review. Then, the need for physical and social transformation for the long-term use of post-disaster housing construction was emphasised. Finally, using the theory of production of space, protection motivation theory and the habitability framework, a way of developing the transformational homes was proposed through a conceptual framework from the perspective of transformative space.

2. Transformation in Post-Disaster Housing Reconstruction

Transformation can be defined as physical and/or qualitative changes in form, structure or meaning-making (Folke *et al.*, 2010; Nelson *et al.*, 2007; Pelling, 2011). It can also be understood as a psycho-social process involving the unleashing of human potential to commit, care and effect change for a better life (Sharma, 2007). In most post-disaster reconstructions, housing schemes take precedence over other projects (Karunasena and Rameezdeen, 2010). During a tragedy, the need for housing must be addressed quickly because houses occupy space in

some sort of socio-culturally defined relation to other houses, or perhaps, more accurately, to the occupants of other houses. In other words, houses are physical objects with social meaning expressed in their material components and their location in space. This social space and the situation of houses and other structures within it may have profound implications for the success or failure of post-disaster urban reconstruction in terms of positive social change and development. Meantime, often the post-disaster housing reconstruction programmes put the survivors under mental stress mainly due to community displacement (Varas and Boano, 2013). Therefore, the post-disaster housing reconstruction has a critical influence on the affected community in terms of social and cultural aspects, thereby, the socio-cultural processes of recovery at large cannot be ignored from the transformational process of sheltering and housing in the post-disaster stage (Rahmayati, 2016).

3. Theories Applicable for the Post-Disaster Housing Reconstruction

Several strategies have been identified in the literature in order to overcome the issues in temporary housings. Especially, the need for social and physical transformation along with the transformational process of post-disaster housing reconstruction has been emphasised by Rathnasinghe et al. (2021). In addition to this, the following theories can be incorporated to fulfil the affected communities' needs from their perspective.

3.1 Theory of Production of Space

In the *Production of Space*, Lefebvre (1974) introduces a 'spatial triad' that intends to discover and appreciate the complexity of space. Lefebvre was the first to explicitly introduce space as an analytical category (Reijnen 2011:71). Here, the author views space not as a 'container' in which human activity takes place, but as actively interacting with human activity and actively produced by it. Lefebvre views space as a fluid, momentary social construct and a process. The spatial triad is being used increasingly in the field of human and cultural geography; related to policy and planning (Buser, 2009; Carp 2008; Gatrell and Worsham 2008; Leary, 2009; Ng et al., 2010); rural studies (Bunce, 2008; Halfacree, 2007; Frisvoll, 2012; Johansson 2008), and leisure and tourism (Bunce, 2008; Frisvoll, 2012; Leary, 2009; Lengkeek 2002; Ng et al., 2010, Urry 1995). Nevertheless, potential application in post-disaster housing has been given minimal consideration in the reviewed literature. Accordingly, Lefebvre's spatial triad tries to integrate physical, mental and social space into a unitary theory

of production of space (Lefebvre 1991:21). These elements are also denoted by the respective terms ‘perceived’, ‘conceived’ and ‘lived’ space (by Edward Soja in 1996) and in ‘spatial terms’ Lefebvre calls them ‘spatial practice’, ‘representations of space’ and ‘representational spaces’ (Lefebvre 1991: 40). Accordingly, Table 1 presents the main respective terms to describe the three realms of the spatial triad.

Table 1: The respective terms to describe the three realms of the spatial triad by Lefebvre (1974)

Author	First space	Second space	Third space
Lefebvre (1974)	Physical space	Mental space	Social space
Lefebvre (1991)	Spatial practices	Representations of space	Representational space
Soja (1996)	Perceived space	Conceived space	Lived space

To provide more clarity on Lefebvre’s thinking on ‘space’, Soja (1996) presents the space as a (social) product, or a complex social construction (based on values, and the social production of meanings) which affects spatial practices and beliefs. So, Soja viewed ‘space’ as a combination of three spaces (i.e., first space, second space, and third space) which also can be considered as another interpretation for Lefebvre’s ‘Spatial Triad’. The First space perspective is focused on the material world. The Second space perspective interprets this reality through imagined representations of spatiality, which are combined to form the Third space. This is a creative recombination and extension of the first two perspectives (Soja, 1996). According to Lefebvre, there is no first, second or third space. However, Edward Soja introduced such classification only for the purpose of analysing the space.

3.2 Protection Motivation Theory

Protection motivation theory (PMT) was developed by Rogers (1975) as a framework for understanding the impact of fear appeals. This was focused on the conditions under which fear appeals may influence attitudes and behaviour. A revision of PMT (Rogers 1983) extended the theory to provide a more general account of the impact of persuasive communications, with an emphasis on the cognitive processes that mediate behaviour change. Subsequent research on PMT has typically taken two forms: as a framework to develop and evaluate persuasive

communications and as a social cognition model to predict health behaviour. PMT as a health promotion model, states that some form of risk information can motivate an individual to determine the degree of risk severity, their vulnerability, and their ability to reduce those risks. PMT was first proposed by Rogers in 1975 (and revised in 1983) to describe the mechanisms people use to adopt protective behaviours and reduce perceived threats. It explains that a cognitive process informs the efforts taken to protect oneself from harm and can be used to analyse both maladaptive behaviour and adaptive response. PMT suggests that health protection behaviours and disaster preparedness intentions are motivated by the same principles. Therefore, PMT can be used to explore disaster preparedness behaviour. Thus, PMT has become one of the most widely applied disaster prevention decision-making models. It provides motivation for individuals to determine the degree of risk severity, their vulnerability, and their ability to reduce that risk (Grothmann and Patt, 2005; Becker *et al.*, 2013).

3.3 Habitability Framework

The relationship between buildings and occupiers is constantly changing, with frequent clashes between operational requirements and physical facilities (Bordass and Leaman 2005). The basic performance requirements of a building pronounced by a famous Roman Architect Vitruvius (1960) was later transformed and synthesized into the “Habitability Framework” (Preiser, 1989). This framework systematically relates buildings and settings to building occupants and their respective needs in relation to the product or the environment. It represents a conceptual, process-oriented approach that accommodates relational concepts to applications in any type of building or environment (Preiser, 1989). Figure 1 presents a detailed habitability framework which is adapted by combining the study of Roman Architect Vitruvius (1960), Preiser (1989) and Standards and guidance for designers to avail themselves (Preiser, 2001).

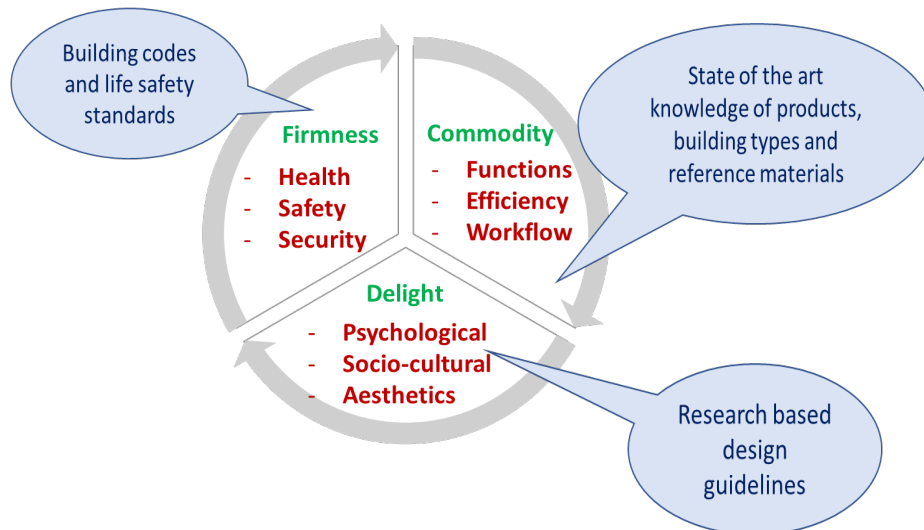


Figure 1: Habitability framework (Adapted from Preiser, 1988)

4. Conceptual Framework

In the developed framework (Refer to Figure 2), consideration was given towards the incorporation of the theory of production of space, protection motivation theory and habitability framework can be integrated into achieving the aim of the study. Accordingly, the top-down approach and the bottom-up approach are the two approaches that have been identified in providing temporary housing for the affected population. In the top-down approach, the government or disaster-related organisations or NGO's may provide temporary housing based on a common standard and specification. On the other hand, in the bottom-up approach, the grass-root level or affected population would involve in deciding the temporary housing option by means of co-designing. In the top-down approach, the first space of Lefebvre; perceived space can be seen in donor funding instances, where top-level authorities have provided temporary housing in an identified geographical location without having much concern about the state of mind or later livelihood of the occupants within that location. However, later, the top-level donors saw a specific unit of temporary housing in a manner, which would provide the maximum value for money. In other words, Planners and donors conceptualise the provided space for housing within the known norms to form a uniform standard on temporary housing while supporting Lefebvre's claim for a second space or conceived space. However, in such instances, it was almost impossible for the relevant designers or planners to have post-occupancy feedback to

ensure whether the provided design was sufficient or satisfactory. Moreover, in such a top-down approach, the provided units were mostly mass-produced based on a common standard without being tailored to any specific needs of a family upon their socio-cultural, economic, and psychological upbringing prior to any such disaster. Therefore, such circumstances led to difficulty in continuing a comfortable life for the occupants resulting in less habitability. Living in any space would normally start with good habitability; however, it would become less habitable in time due to the incompatibility of the conceptualised space with the actual needs of the people. Therefore, it is inevitable that the occupants would transform the existing space (provided by the donor) in a way that fulfils their needs based on lived experiences. Such transformation will be influenced by the operational and physical aspects as well as social and psychological aspects of the occupants. Hence, this framework addresses ‘how to find a space to accommodate those transformations?’

In the bottom-up approach, before conceptualising the lived space, it is essential to think about the lived experiences of occupants, in other words, how occupants have experienced the given space in terms of operational and physical aspects as well as social and psychological aspects. This lived experience leads to physical and social transformations, which has created the ‘lived space’ or the ‘transformative space’. This transformative space comes from the bottom-up approach because the people who are at the grass-root level commence this process to have better habitability (i.e., comfortable life). Thus, this framework identified the space which accommodates occupants to transform the given space based on their lived experiences as ‘transformative space’ (Lefebvre viewed this fraction of space as the third space which is the combination of both first and second spaces).

Within the framework’s spectrum on top-down and bottom-up approaches, the habitability levels reveal the cause for people’s motivation for a transformation, which are ‘health and safety level’, ‘functional and task performance level’ and ‘psychological comfort and satisfaction level’ (Preiser, 1983). Moreover, these habitability levels are identified to be impacted by the Protection Motivation Theory (PMT) that brings a psychological adaptation of the people, who got affected by a disaster threat. Thus, the habitability levels could be adapted through protection motivation. Since the top-down approach interpreted these habitability levels to conceptualize the space without considering the state of mind of the people, who have gone through a disaster, it leads to lesser habitability. However, the bottom-up approach will consider the state of mind of those people with their lived

experiences that will create better habitability. Further, the incorporation of PMT will allow the victims to explore their disaster preparedness behaviour by providing assistance to deal with various risks. Therefore, in the transformative space, the PMT will impact the habitability levels to energize the idea of better habitability.

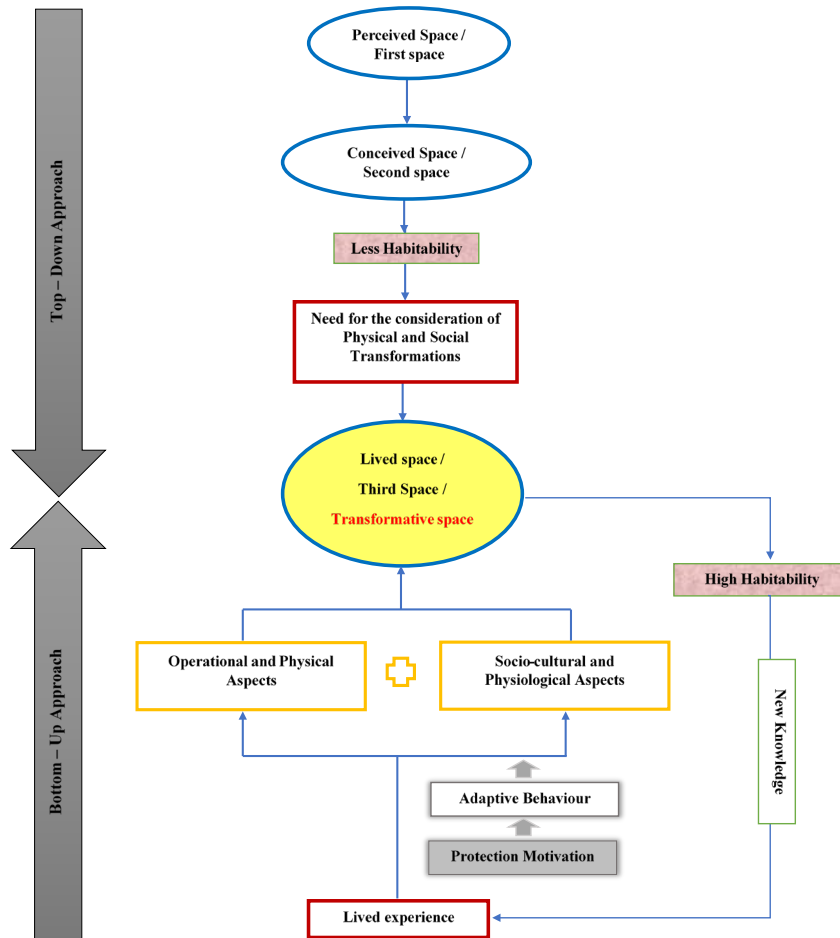


Figure 2: Conceptual Framework

Since creating space is continuously changing with the habitability levels, the new knowledge generated through the process should be

linked to the lived experience by creating a loop, which allows continuously consider the evolving problems and experiences, which need to be changed.

5. Conclusions

The transformational process of temporary housings to permanent housing is being vital during the post-disaster housing reconstruction, for the victims to stay safe along with their physical, social, cultural, and other similar requirements. However, due to several issues such as sustainability and cultural inadequacy, these transformational processes became unsustainable and unacceptable from the perspective of affected communities. Recent studies have identified some solutions such as planning ahead and designing beyond the limit to ensure the long-term use of temporary housings (Johnson, 2007; Félix, 2013). This study focused on further enhancing the transformational process in terms of physical and social transformation from the perspective of fulfilling the victim's requirements. The interlocking of top-down and bottom-up approaches of post-disaster housing construction revealed the need for a space for this physical and social transformation. Therefore, the study has aimed at developing transformational homes from the perspective of transformative space. Moreover, this transformative space can be achieved by the use of lived experience of affected communities, to ensure the fulfilment of social, cultural, and other requirements of victims. Future researches can be focused on extending this study to analyse post-disaster transformational homes for long term disaster relief and recovery based on the lived experience of affected communities. This will follow up on the conceptual framework that has been proposed in this paper.

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