The Mediating Effect of Community Leadership on Community Resilience Elements and Community Preparedness

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Abstract. Disasters can occur in various forms with durations ranging from mere hours to days, weeks, or even months of prolonged damages and losses. Approaches taken to face such situation can build resiliency in a community. Lacking it, important community decisions will be made under the constraints of the crisis or disaster. A community with good disaster preparedness and local leadership engagement will be more capable of responding to, and managing disaster risks, which in turn will reduce damages and losses caused by disasters. This study was conducted to gauge the extent at which community leadership mediates the relationship between community resilience elements (community engagement, community education, and community awareness) and community preparedness. This was done using the results from questionnaires gathered from 318 respondents at Bukit Antarabangsa, Selangor, Malaysia. A structural equation modelling was employed to assess the validity and reliability of the instrument and thus test the research hypotheses. Based on the path model analysis, there are significant correlations to prove that community leadership is a viable partial mediator between community engagement, education and awareness, towards enhancing community preparedness. This also means that the presence of a capable community leader may well be a critical success factor to ensure that the respective community is better prepared and more resilient against disasters.

1. Introduction
Disasters are often a result of the interaction between hazards and varying dimensions of vulnerabilities, such as physical, social, health, and economical, among others. A common setup in any disaster is the exposure of a significant number of vulnerable population to a hazard, resulting in severe damage and/or disruption of their livelihood activities in such a way that recovery is unlikely without external aid [1]. Based on the World Bank estimates, the world's costliest disasters include the 2011 earthquake and tsunami in Japan (US$235 billion); 1995 Great Hanshin earthquake (US$100 billion); Hurricane Katrina in 2005, and the Chile earthquake in 2010 (US$81 billion); and 2011 flood in Thailand (US$46.5 billion) [2]. While Malaysia has relatively lower risk for disasters caused by climate hazards compared to its neighbouring countries, there were several cases of landslide disaster in the country’s history. One such instance is the collapse of the Highland Towers at Hill View Garden on 11 December 1993 due to continuous heavy rain that went on for ten days, leading to a major landslide that resulted in 48 deaths [3]. Other major landslides include the one that occurred on 15 May 1999 at the vicinity of Athenaeum Tower, Bukit Antarabangsa, the landslide on 1 November 2002 at Hill View Garden which killed a...
family of eight, and the landslide of 6 December 2008 at Kampung Pasir, Hulu Kelang which destroyed 49 houses [4].

Community resilience describes the collective ability of a neighbourhood or geographically defined area to deal with stressors and efficiently resume the rhythms of daily life through cooperation following shocks [5]. Disaster research has long recognized that communities need to work together regularly to survive and recover from catastrophic impacts [6]. However, there is insufficient clarity for a precise resilience-building process [7]. Approaches that can be correlated with achieving resilience for communities include reducing pre-disaster vulnerabilities and conducting pre-event prevention activities to minimize the negative consequences of disaster. While these have been identified, the domains involved are rather broad and lack the specificity required for implementation [8].

One of the dimensions that can be associated with building disaster resilience is leadership. Leadership has been defined as the ability to guide and motivate individuals, groups or communities to achieve a specified goal, by guiding them and providing focus and inspiration. It is not a quality reserved only for those at the top of a hierarchy, but can be practiced by anyone with the right skills. For a community, leadership is usually used in reference to a key person for the community’s structure, networking and collaboration. Scholars have identified that in a community, the leader’s role is to guide, direct, lead and serve its members in order to make them feel safe, comfortable and protected throughout any issue they may face [9]. A leader can make use of self-organising processes to promote community interests and support groups not only to address emergency stresses but also to improve their capacities [10], [11]. In managing disaster and emergency preparedness, community leadership is a mutual relationship between the leader and his/her followers. A community that is going through a disastrous event will typically be in a state of confusion and uncertainty, lacking direction and control, as well as agonized with losses of life and property. Such conditions demand a community leader to step into action, and take charge of the daunting tasks ahead. Immediately post-disaster, a community leader is required to set the direction in the midst of confusion, encourage rescue and rebuilding efforts, be a comforter, besides being a source of support, hope and purpose [12]. Additionally, another dimension contributing towards building resilience is disaster preparedness, which is the state of readiness of an organisation or community to respond to a disastrous event, while also reducing the negative aftermaths [13]. Preparedness involves actions to ensure that, when an emergency occurs, the communities, resources and services are available and capable of taking appropriate actions for response and recovery. Community preparedness in particular is the ability of communities to prepare for, withstand, and recover in both the short and long terms from public health incidents. Community preparedness will improve the ability of individuals and groups to reduce the effects of the hazard impact and manage their resources until assistance is available. Being prepared for, and being aware of the risks of hazardous events and taking steps to reduce them can eventually reduce their negative effects and/or resulting damage.

Considering the above-mentioned dimensions, it should be noted that theoretical and empirical literature examining community resilience elements, community leadership and community preparedness are undoubtedly scarce, so our understanding of this distinction is limited. Hence, the objective of this study is to gauge the extent at which community leadership mediates the relationships between community engagement, education, and awareness with community preparedness.

2. Literature Review

2.1 Community Resilience Elements, Community Leadership and Community Preparedness

Based on past studies available on community resilience elements, education, leadership, self-reliance, resource availability and engagement are all associated with community preparedness against disasters [14]. A study on communities affected by Typhoon Katrina found that the community members conducted activities focusing on establishing social networking, engagement, and understanding local leaders’ instructions, which helped in building the community’s disaster resilience [15]. Another study on households in Kuching, Sarawak who are living in flood-prone areas found indications that critical awareness, attitude, subjective norm, risk perception, appropriate disaster education, trust in agencies and intention to prepare for flood disaster affect flood disaster preparedness within the community.
members [16]. For another community at Bukit Antarabangsa, Selangor, proper awareness, experience, exposure, reaction, attitude, awareness, education, engagement and leadership were all found to contribute towards increasing their preparedness in facing future disasters [17], [18], [19]. One of the most common findings from these past studies is the importance of community education towards building their knowledge and thus disaster preparedness and resilience. An educated community is more ready to respond properly to disaster events, subsequently suffering lesser damage and casualties [20].

A study on ENLA (Emergency Network of Los Angeles) and LACDPH (Los Angeles County Department of Public Health) found that communities with sufficient knowledge about disasters are more capable to coordinate resources to increase resilience and will support each other during a disaster [7]. Similarly, community knowledge was identified as the main factor towards increasing community preparedness against earthquake disasters in Tehran [21].

Resilience Theory suggested that community involvement is vital in any activities related to disaster preparedness [22]. The same theory also suggested that every community program needs to be planned with the aim to enhance community knowledge in order to reduce environmental risks in their locality, and to complement community-based disaster risk management processes undertaken by the particular community [23]. Another relevant theory for this study is the Cultural Theory, which claimed that humans perceive and act towards the world around them based on their social aspects and cultural adherence [24], [25]. These two theories, combined with the Trait Theory which revolves around individual personalities and characteristics, led to the development of leadership theories which explain the approaches to be taken by a community leader in engaging his/her community members [26]. The traits identified in the Great Man Theory are applied today to describe leadership skills such as confidence, judgement skills, and adaptability among others. These skills are indeed considered as pre-requisite skills for community leaders in exercising their role as a leader. In correlation to the theories mentioned above in this paragraph, the application of resilience and leadership theories in previous studies served as evidence that community resilience elements and community leadership if properly implemented will lead to an enhancement in community preparedness.

2.2 Conceptual Framework and Research Hypothesis

Findings from literature studies as per section 2.1 were used as the basis to develop a conceptual framework for this study, as shown in Figure 1 below.

![Figure 1](image-url)

**Figure 1.** Community leadership mediate the relationship between community resilience elements (community engagement, community education and community awareness), and community preparedness.

Based on the framework, it can be hypothesized that:

Hypothesis 1: Community leadership mediates the relationship between community engagement and community preparedness.

Hypothesis 2: Community leadership mediates the relationship between community education and community preparedness.

Hypothesis 3: Community leadership mediates the relationship between community awareness and community preparedness.

3. Methodology
A cross-sectional research design was employed because it allowed the researchers to combine community resilience literature, and the survey as the main process of collecting data to achieve the research objective. This research design is also appropriate to enhance data accuracy, reduce bias and ensure high data quality [27], [28]. This study involved local community at Zone 1 – 4 (Hulu Kelang), Zone 5 – 9 (Bukit Antarabangsa), Zone 10 – 15 (Lembah Jaya), Zone 16 – 19 (Cempaka), and Zone 20 – 25 (Teratai) of Bukit Antarabangsa in Ampang Jaya Municipality, Selangor, Malaysia. At the initial stage of data collection, a survey questionnaire was drafted based on the community resilience literature followed by a pilot study to verify the questionnaire’s content and format. Due to familiarity of the target respondents with the national language (Malay), a back-translation technique was employed to translate the content of the drafted questionnaire from English into Malay in order to enhance the validity and reliability of research findings. Information gathered from the pilot test was then utilized to develop the content and format of the survey questionnaire. The questionnaire consisted of four major sections developed from many validated scales such as “Getting to Resilience a Coastal Community Resilience Evaluation Tool” by New Jersey Office of Coastal Management, “National Strategy for Disaster Resilience”, and the “Communities Advancing Resilience Toolkit (CART)” by Pfefferbaum, Pfefferbaum, and Van Horn [29], [30], [31]. In total there were five items of community engagement, three for community education, four items on community awareness, another four for community leadership, and six items for community preparedness. All items used in the questionnaires were measured using a 7-item scale ranging from “strongly never/strongly disagree” (1) to “strongly always/strongly agree” (7). Demographic variables were used as the control variables since the study focused on community resilience and community leadership towards community preparedness.

The researchers obtained an official approval and received advice from the Deputy Director for Development, Ampang Jaya Municipal Office, to conduct the survey. The targeted population for this study was the local community at Bukit Antarabangsa. As the list of local community members was not available, a convenient sampling technique was used to distribute the survey questionnaires. Considering path modelling will be used for analysis, a total of 350 questionnaires were distributed over the 200 suggested in literature sources, to compensate for missing cases or unusable questionnaires [32]. As a result, 318 usable questionnaires were returned to the researchers, yielding a 91% response rate. The survey questionnaires were answered by participants based on their consents and voluntary basis. Subsequently, SmartPLS version 3.2.8 was employed to analyze the survey questionnaires and test the research hypotheses. Data analysis followed a step-by-step procedure: First, a validity test was performed to evaluate both convergent and discriminant validity. Second, a reliability analysis was performed using Cronbach’s alpha and composite reliability. Third, the structural model was assessed by examining the path coefficients using standardised betas (β), t and p statistics. In addition, R2 was used as an indicator of the overall predictive strength of the model. The values of R2 were considered as follows: 0.19 (weak), 0.33 (moderate) and 0.67 (substantial) [33], [34]. In order to predict the role of the mediator, the mediation analysis procedure in PLS-SEM was also performed [37]. The procedure categorized three types of mediation, namely: (1) complementary mediation (partial mediation): the indirect effect and the direct effect both are significant and point in the same direction; (2) competitive mediation (full mediation): the indirect effect is significant but not the direct effect; and two types of non-mediation: (1) direct only non-mediation: the direct effect is significant but not the indirect effect; and (2) no effect non-mediation: neither the direct nor the indirect effect are significant.

4. Results & Discussion
The sample profile for this study (N=318) is as follows: respondents are mostly female (56.1%), Malay ethnicity (94.5%), largest age group being 31 to 40 years old (38.5%), those with married status made up 72.3% of respondents, majority has lived in the area for over 10 years (58.8%), majority of respondents lived in Zone Area 5 to Zone Area 9 (45.3%), salary earned between RM1,001-3,000 (62.2%), ordinary member of community social responsibility (89.2%), and involved in community disaster preparedness activities - never (60.1%).
The outcomes of confirmatory factor analysis were shown in Table 1 and Figure 2. Table 1 shows that community resilience elements (community engagement, community education, and community awareness), leadership in the community, and community preparedness had the values of average variance extracted (AVE) higher than 0.5, indicating that they met the acceptable standard of convergent validity [34], [35], [36]. The table also shows that all constructs which had the diagonal values of $\sqrt{\text{AVE}}$ were greater than the squared correlation with other constructs in off-diagonal, showing that all constructs met the acceptable standard of discriminant validity [34], [37].

![Figure 2. Result from the Confirmatory Factor Analysis (CFA) Test.](image)

### Table 1. Results of Convergent and Discriminant Validity Analyses.

|          | AVE  | Awareness | Education | Engagement | Leadership | Preparedness |
|----------|------|-----------|-----------|------------|------------|--------------|
| Awareness| 0.736| 0.858     |           |            |            |              |
| Education| 0.747| 0.418     | 0.864     |            |            |              |
| Engagement| 0.655| 0.606     | 0.442     | 0.809      |            |              |
| Leadership| 0.631| 0.508     | 0.396     | 0.468      | 0.794      |              |
| Preparedness| 0.690| 0.802     | 0.491     | 0.648      | 0.522      | 0.831        |

Note: $\sqrt{\text{AVE}}$ shows in diagonal

Meanwhile, Table 2 below shows that all constructs loaded more strongly on their own constructs in the model, exceeding the specified minimum (0.7), and proving that the validity of measurement model met the criteria [33], [36], [38]. The composite reliability and Cronbach’s Alpha also had values greater than 0.8, indicating that the instrument used in this study maintained high internal consistency [34], [39].
Table 2. The Results of Factor Loadings for Different Constructs and Construct Reliability Analysis.

| Construct | Number of Item | Factor Loading | Composite Reliability | Cronbach Alpha |
|-----------|----------------|----------------|-----------------------|----------------|
| Awareness | 4              | 0.831 – 0.891  | 0.918                 | 0.880          |
| Education | 3              | 0.764 – 0.912  | 0.898                 | 0.836          |
| Engagement| 5              | 0.773 – 0.904  | 0.904                 | 0.868          |
| Leadership| 4              | 0.761 – 0.816  | 0.872                 | 0.805          |
| Preparedness| 6           | 0.774 – 0.852  | 0.930                 | 0.910          |

Subsequently, Figure 3 and Table 3 shows the outcomes of SmartPLS path model testing using bootstrapping procedure. The value of R² is used as an indicator of the overall predictive strength of the model, and can be interpreted as follows: 0.19 = weak; 0.33 = moderate; and 0.67 = substantial [33], [37], [40]. Through the test, the inclusion of community engagement, community education and community awareness in the analysis had a value of R² 0.323 which explained 32.3 percent of the variance in community leadership. The inclusion of community engagement, community education, awareness community, and community leadership in the analysis yielded R² value of 0.703 which explained 70.3 percent of the variance in community preparedness. This indicates that community leadership plays a mediation role in the hypothesized model. The results of SmartPLS path model analysis revealed three important findings with respect to the hypotheses outlined in section 2.2. For all H1, H2 and H3, community leadership acted as a complementary mediator (partial mediation) with significant correlation in the relationship between community engagement, community education, and community awareness with community preparedness, respectively. Statistically, this also confirms that community leadership does act as an important mediating variable between community resilience elements (community engagement, community education, and community awareness) and community preparedness. Further understanding on the mediating effect of community leadership as a complementary mediator between the IVs and DVs was also achieved through the mediation analysis procedure [37].
Hence, in the context of this study at Bukit Antarabangsa, a community equipped with proper engagement, education and awareness, as well as led by a leader with the necessary leadership skills will go on to possess better disaster preparedness. According to majority of the respondents, the level of community education, community engagement, community leadership, and community preparedness are moderate. This situation also posits that majority of respondents feel that the high levels of community resilience among those living in challenging and dangerous environments have increases the capacity and capability of local community towards enhancing their preparedness.

Table 3. Outcomes of SmartPLS Path Model Testing.

| Relationships                | $\beta$ | T Statistics | P Values | $R^2$ |
|------------------------------|---------|--------------|----------|-------|
| Engagement -> Preparedness   | 0.198***| 5.278        | 0.000    | 0.703 |
| Education -> Preparedness    | 0.125***| 4.156        | 0.000    |       |
| Awareness -> Preparedness    | 0.588***| 15.964       | 0.000    |       |
| Leadership -> Preparedness   | 0.081*  | 2.249        | 0.000    |       |
| Engagement -> Leadership     | 0.201*  | 2.420        | 0.016    |       |
| Education -> Leadership      | 0.177** | 3.255        | 0.000    | 0.323 |
| Awareness -> Leadership      | 0.313***| 4.972        | 0.000    |       |

Note. Significant at *$t \geq 1.96$; **$t \geq 2.57$; ***$t \geq 3.29$.

Furthermore, this study offers three important implications. In terms of theoretical contribution, the results of this study confirmed that community leadership and community resilience elements (community engagement, community education, and community awareness) have been important determinants of community preparedness in the studied community areas. This result is consistent with, and has broadened the concept explored by past studies [7], [14], [15], [16], [17], [18], [19], [20], [21]. In terms of robustness of the research methodology, the survey questionnaire used in this study has satisfactorily met the validity and reliability criteria. This may lead to produced accurate and reliable research findings. As for the practical contribution, the findings of this study may be used as useful guidelines by local communities in improving their capability and resilience to cope with unpredictable disasters in the future. In addition to this, public programs, policies, societal norms, values, and other community institutions shape the style and degree to which community are able to fulfil their functions, as well as their ability to acquire and develop new capabilities when challenged. Most of the community members also thought that a disaster education program needs to be provided to the respective community in order to increase their awareness and readiness for disaster response.

5. Conclusion
This study confirms that a community leader may function as a guide for his/her local community towards enhancing their awareness and readiness. It can also be concluded that present and future undertakings on community-based disaster management need to emphasize on community education, community engagement, community awareness, as well as community leadership as critical success factors. A capable community leader with good personal coping capacity during disasters will strongly induce positive subsequent attitudinal and behavioral outcomes (e.g., readiness, compliance with law, cooperation, commitment and ethics) among the community members. These positive consequences may then result in enhanced and sustained community resilience against various disasters. For future research, the community resilience factors as used in this study can be expanded further to include more variables to enhance the contribution of the study towards the field.
6. References

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