Emergency Operation and Coordination Center (EOCC) for Disaster Response Management

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Abstract
Disaster management is often portrayed in negative rather than positive terms. Although, it is claimed that proper preparation for any disaster has been planned, it frequently fails to achieve positive outcomes from the planning itself. The emergency operation and coordination center (EOCC) which is the central point for all coordination and organising works is normally to be blamed for disaster response failure. Hence, the objective of this study is to examine issues with effective emergency operation and coordination center (EOCC) during disaster response. This study uses a qualitative research method. The researcher conducts an interview survey and focus group discussion for data collection in order to gain a comprehensive overview of the situation and understand the phenomena involved. The population for this study is infantry army officers. Purposive sampling is used such that only those personnel involved in disaster response are interviewed. This study found that the EOCC organization structure is clear and it follows the command and control military hierarchy. The leader with the relevant rank, having the experience and knowledge on managing disaster and having the respect and control from subordinates is appointed for the leadership role in the EOCC. However, inter-agency cooperation can be an issue as there is an overlapping of roles and responsibilities and inter-agency power struggle. Therefore, this issue leads to chaos and tension in the EOCC as there would be variance and inconsistency in the coordination and communication among infantry personnel and inter-agency.

Keywords: Disaster response; command center; Chain of command; Emergency coordination center; Organization structure; Leadership; Inter-agency relationships.

1. Introduction

In order to achieve its full potential, an organization's structure must be aligned with its mission and objective and it must make effective use of the elements that make up this structure (Crumpton, 2013). These basic elements are usually job design, delegation, span of control and chain of command. Furthermore, no matter how the organization is structured, a strong and proper chain of command will provide increased benefits during difficult periods of financial instability. Chain of command also refers to an organization's hierarchy and the reporting relationships within the organization itself (Elsaid et al., 2013). It is important because it provides both direction and guidance and also allows the resolution of problems related to the accomplishment of the organization's goals. Other than that, the chain of command sets out an organization's lines of authority and decision-making power (Builder et al., 1999). In addition, a proper chain of command ensures that every task, job position and department has one person assuming responsibility for performance (Shea and Garson, 2010).

Indeed, leaders with greater experience of leadership roles may use their influence in achieving a job well done, and this may also be linked to having high social status (Amit et al., 2009). Moreover, leaders, who have more experience of influencing people than non-leaders, tend to have enhanced self-perceptions as leaders and strengthened self-efficacy in their ability to influence people, which gives them knowledge about their personal leadership and can serve as a basis for deeper understanding of the development processes of leaders in everyday life, either in organizations or in the community (Atika and Tripti, 2008).

Regarding inter-agency relationships, there are several factors that contribute to the successful growth of such relationships. Firstly, both agencies should adopt a positive and collaborative outcomes-focused approach. Secondly, both organizations have to identify the benefits of working together and appreciate each other's expertise, experiences and contribution (Somasundaram and Davies, 2014). Next, these organizations must admit their own development needs and view feedback as an opportunity to grow and improve. All of these factors ensure the sustainability of long-term relationships beyond individual staff movements (Atul and Jagdish, 2001).

Emergency management is often portrayed in negative terms. Although it is praised for addressing the need for crisis management planning, it frequently fails to achieve positive outcomes from the planning itself (Pollard and

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Hotho, 2006). One example is the missing MH370 flight in Malaysia. This leads to concern for the military to protect their countries from disaster or crisis.

Organizations such as Emergency Operation and Cooperation Centers (EOCC) should be conducted properly in order to achieve systematic management of disaster. When disaster strikes, every minute counts in terms of saving lives. Thus, a coordinated and pre-planned response is essential. The EOCC thus has a vital role to play. It should be committed to providing disaster response in a timely and efficient manner and should also ensure that the assistance meets the real needs of the affected population. The organization structure, leadership and inter-agency relationships also play an important role in disaster management. Those concerned should have clear awareness of their own roles and responsibilities towards their tasks (Phelan, 2008).

The reality is that the coordination for helping the victims is not systematic during the disaster. This situation causes chaos in emergency operations for disaster management where the community leaders do not take responsibility for their own role, such as failing to spread aid to flood victims once they have received it, meaning that some victims do not receive aid (Haslinda et al., 2015). As a consequence, leaders' bad behaviour causes the community to perceive them as possessing somewhat weak and poor leadership traits. Moreover, the community also loses trust in such leaders and ceases to obey their orders. Irresponsible leaders lose the community's respect (Fakir, 2009).

This paper focuses on the factors affecting the effectiveness of the Emergency Operation and Coordination Center (EOCC), including organization structure, leadership and inter-agency relationships. The Emergency Operation and Coordination Center (EOCC) refers to the protected site where management decisions are made and coordinated responses are planned in relation to an emergency incident (Botterell and Griss, 2011). Moreover, the purpose of an EOCC is to provide a commander and his staff with a secure centralized location, with adequate communications for command and control during the disaster or emergency. This means that the EOCC is where the disaster or emergency is managed (Lin et al., 2013). Therefore, this research is important to achieve better future disaster management, because all the problems that arise could be managed to improve the country's prosperity.

2. Literature Review
2.1. Mintzberg's Framework

According to the framework devised by Henry Mintzberg, organizations can be differentiated along three basic dimensions: (1) the key parts of the organization; (2) the prime coordinating mechanism and (3) the type of decentralization used (Lunenburg, 2012). The first dimension is the key part of the organization, consisting of five parts: i.e. the strategic apex level, the operative core, the middle line, the technostructure and the support staff. The strategic apex level is where the administrative cabinet, which represent the top management and its support staff, work together. Below this are the middle level management, who ensure that the operative core finish the task given, supported by the technostructure, comprising the engineers, accountants, planners, researchers, and personnel managers needed to support the success of the organization. There are also divisions such as instruction, business, personnel, public relations, research and development, through which the organization strives to enhance its quality. The key parts of an organization are illustrated in Figure 1 below:

Figure-1. The key parts of an organization
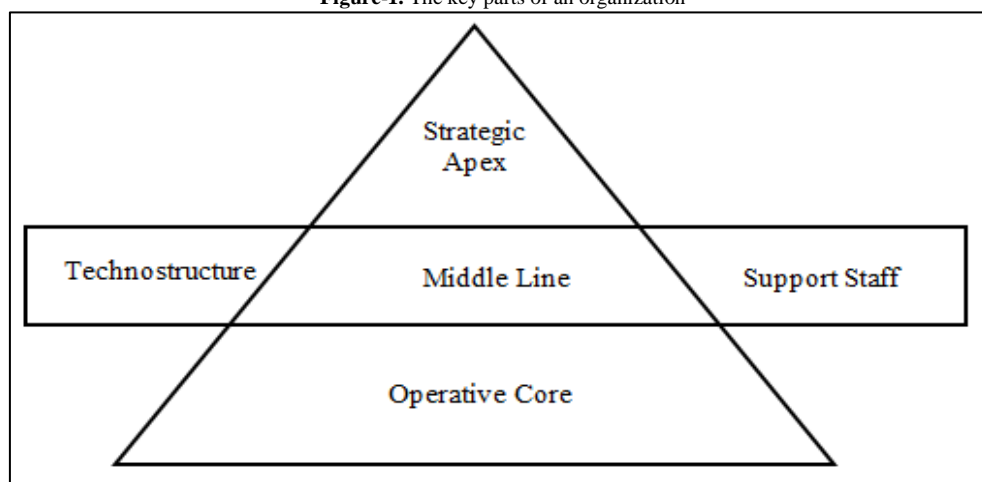
Secondly, the prime coordinating mechanism, which is the second basic dimension of an organization, consists of direct supervision, standardization of work processes, standardization of skills, standardization of output and mutual adjustment. Direct supervision means that an individual is responsible for the work of others. This concept refers to the unity of command and scalar principles. This middle level management is also supported by the support staff, who provide indirect services in the organization such as maintenance, clerical services, food, transport, legal counsel, and consulting. The lowest level of the organization is the operative core, comprising the workers who actually carry out the organization's tasks. Without this level, there are many tasks that could not be completed on time. Standardization of work process refers to job descriptions that govern the work performance. It exists when the content of work is specified or programmed. Standardization of skills is a dimension that exists when the kind of

training necessary to do the work is specified. The employees will be provided with specific training based on the skills and competencies that the organization needs. Standardization of output exists when the results of the work are specified. Mutual adjustment exists when work is coordinated through informal communication.

Third and finally, there are three types of decentralization, which represent the third basic dimension of an organization. 1) Vertical decentralization is the distribution of power down the chain of command, or shared authority between superordinate and subordinate members in any organization. 2) Horizontal decentralization is where the extent to which non-administrators (including staff) make decisions, or shared authority between line and staff. 3) Selective decentralization refers to the extent to which decision-making power is delegated to different units within the organization. These units may include the instruction, business, personnel, public relations, and research and development divisions.

2.2. The Effectiveness of the Emergency Operation and Coordination Center (EOCC)

The EOCC is the physical location where multi-agency response coordination occurs (FEMA, 2017). Most states maintain state-level EOCCs to manage events that require state-level assistance. The EOCC helps in forming a common operating picture of the incident, relieves on-scene command of the burden of external coordination and secures additional resources. The core functions of the EOCC include coordination, communication, resource allocation and tracking and information collection, analysis and dissemination. The EOCC might also be a permanent organization with facilities that are staffed full time, or might be established to meet short-term needs. Similarly, to permanent facilities in a larger community, the EOCC is typically directed by a full-time emergency manager. Moreover, the EOCC might also be organized by a major discipline such as fire, law enforcement and medical services; by a city, county or regional jurisdiction; or more likely, by some combination thereof (Haddow *et al.*, 2011).

According to FEMA (2017), the EOCC can be also staffed by personnel with various levels of training and sometimes collateral duties, representing multiple jurisdictions and functional disciplines and a wide variety of resources. For example, if a flood occurs, the established EOCC can provide the emergency management, public health and medical personnel to help the victims. Other than that, the physical size, staffing and equipment in the EOCC depend on the size of the jurisdiction, the resources available and the anticipated incident management workload (FEMA, 2017). It is also organized and staffed in a variety of ways. Regardless of its specific organizational structure, an EOCC should include the following core functions: coordination; communications; resource allocation and tracking and information collection, analysis and dissemination (Coyle, 2014).

FEMA (2017), also agree that a Fusion Center is needed to cooperate with the EOCC. This is because the term "fusion" refers to managing the flow of information and intelligence across levels and sectors of government and the private sector. It is where the computer network is created to share the information gathered. Fusion supports the implementation of risk-based, information-driven prevention, response and consequence management programs (Homeland Security Advisory Council, 2005). At the same time, the fusion process supports efforts to address immediate or emerging threat-related circumstances and events. Data fusion involves the exchange of Federal and non-Federal information from different sources, including law enforcement, public safety and the private sector. When all the data are combined with appropriate analyses, data fusion results in meaningful and actionable intelligence and information. Thus, the fusion process turns information and intelligence into knowledge (German and Stanley, 2007).

Another function of the EOCC is to support the local efforts in command structure, direct on-scene incident management activities and maintain the command and control of the operations (Vestergren, 2011). Therefore, the off-scene activities are coordinated from the central location of the EOCC. Moreover, some states might also implement and leverage regional operations centers between the local incident command and the state-level EOCC (Goss, 2016). There are chief elected and appointed officials, as well as personnel supporting core functions, located in the EOCC, who are responsible for the positions given. These officials are responsible for policy decisions (Russell, 2016).

Moreover, the key function of EOCC personnel is to ensure that responders who are located at the scene have resources that the victims need, such as personnel, information, tools and equipment to carry out the response and to manage public information (World Health Organization, 2013). Communications systems within the EOCC must be reliable and contain built-in redundancies. The efficient functioning of the EOCC often relies on the existence of mutual aid agreements and joint communications protocols among participating agencies. The established EOCC should be both flexible and scalable (Schwarzenegger and Bettenhausen, 2009).

2.3. Organizational Structure

The organizational structure is defined as the physical environment in which employee behaviour occurs. It can also be categorized as either mechanistic or organic (Dalton *et al.*, 1980). A mechanistic structure is highly formalized, non-participative, hierarchical, tightly controlled, and inflexible, whereas an organic structure is defined by its informality, decentralization of authority, open channels of communication, and flexibility (Khandwalla, 1977). Organizational structure plays an important role in helping management to achieve its objectives and follow the firm's strategy (Robbin and DeCenzo, 2005).

A mechanistic organizational structure has a positive effect towards organizational performance, whereas an organic structure has a negative effect on organizational performance (Jogaratnam and Tse, 2004;2006). The result may be partially attributable to employee work expectations and management styles in Asian sub-cultures, in which mechanistic organizational structures may be more prevalent and effective than organic structures. Moreover,

organizations with a mechanistic structure enjoy a greater relationship between a competitive HR strategy and behavioral performance than their organically structured counterparts because a competitive strategy is a necessary component of any service business, especially at the operational level (Tavitiyaman *et al.*, 2012). Therefore, the mechanistic structure would be a suitable choice for an HR training and development strategy (Toh *et al.*, 2008). According to Simons (2000), a centralized structure can help an organization to control employees at lower levels of the organizational hierarchy, thereby resulting in functional and efficient employee behavior.

Meanwhile, an organic structure is more appropriate for situations in which leaders have to deal with rapid changes in the environment and prefer a minimal degree of hierarchy (Covin and Slevin, 1990). Staff work activities are more flexible when an organic structure is implemented. The reason why organizations adopt a flexible structure is to encourage greater staff participation, which, in turn, can improve problem identification and resolution and enhance performance and quality (Maffei and Meredith, 1995). Moreover, as reported, the adoption of a decentralized organic structure can facilitate a quick decision-making process, enhance supplier relationships, minimize costs, and assist in staff training (Enz, 2008). As argued, with regard to IT strategic implementation, organizations with an organic structure enjoy superior behavioral performance to those with a mechanistic structure (Tavitiyaman *et al.*, 2012).

2.4. Leadership

Leadership is a process whereby an individual influences a group of individuals to achieve a common goal (Northouse, 2007). It can also be defined as the quality of the behavior of individuals whereby they guide people or their activities in organized effort (Novicevic *et al.*, 2005). Then, the first definition is associates to leadership with a process while the second definition is relating to behavior (Bishop, 2013). However, both identify the role of individuals within a group to act in a seemingly beneficial manner to the group.

Evidence suggests that levels of leadership can most clearly be differentiated in terms of leadership experience. Students with a rich background of leadership experiences belonged to the highest level of leadership (Atwater *et al.*, 1999). Similarly, in a longitudinal study of leadership, West Point cadets who had more leadership experiences at high school achieved higher initial leadership performance at West Point (Hall *et al.*, 2004). The development of leadership through experiences can be described in terms of qualitative changes in both process and knowledge (Lord and Hall, 2005), whereas the skills are developed from the novice to the expert level (Ericson and Charness, 1994).

Strategic planning and thinking activities have long been assumed to be functions and responsibilities of leadership. Some perspectives on strategy have certain assumptions about the task of leadership, especially in terms of controlling, guiding or shaping the organizational environment (Fairholm, 2009).

Leadership is the key to a shared and distributed process where decision-making is informed by intelligence-oriented problem solving. It is the dynamics and opportunities for shared leadership that remain quite primitive. The more people are involved in the decision-making process, the less likely it is that selfish behaviour will emerge, although it is important to retain a focus on the issues through balanced analysis (Pearce and Conger, 2003). Besides, leadership must be defined at the beginning of public interest. Selfless leadership is thus about acknowledging that all individuals have their own particular values, aims and ambitions but recognizing that leaders must aim for mutual benefit and ideally altruism in seeking to lead in the public interest (Brookes, 2014).

2.5. Inter-Agency Relationships

During the widespread and devastating floods in Queensland in early 2011, two organizations – Environmental Health Australia (EHA) (Queensland) Inc. and the Australian Red Cross – engaged closely in evacuation centers with differing levels of success (Somasundaram and Davies, 2014). Mutually beneficial relationships are formed once the collaboration has commenced and numerous opportunities for cooperation have been identified.

Various problems arise when different organizations with different cultures, procedures, processes and systems attempt to work closely together. Lack of coordination between the organizations involved is one of the more common issues seen during multi-agency activities (Smith and Dowell, 2000).

During emergency responses, coordination between the different agencies involved is a major challenge due to the complex conditions that typically arise. Such scenarios involve great uncertainty, sudden and unexpected events, great time pressure and urgency, severe resource shortages, large-scale impact and damage, and the disruption of infrastructure support necessary for coordination. This is further complicated by factors such as multi-authority, personal involvement, and conflicts of interest (Chen *et al.*, 2008).

Most of the studies in the area have found that the coordination between agencies during disaster or emergency responses is poor (see, for example, (Banipal, 2006; McEntire, 1999; Smith and Dowell, 2000) . In order to optimize coordination between the military and civilian agencies, general guidelines can be used. It is very important to ensure that the roles and responsibilities of the different agencies involved are clearly set out, because some agencies do not know or fully understand who is doing what. Thus, each agency should be aware of the other agencies' role and contribution in the task. Ambiguity in role definition can adversely impact performance, since it leads to confusion over who is doing what, who knows what and who possesses what information (Salmon *et al.*, 2011).

3. Methods

This study adopts a qualitative research method. The researcher conducts an interview survey and focus group discussion for data collection in order to gain an overview of the situation and understand the phenomena. The

population for this study comprises infantry army officers. Purposive sampling is used, such that the whole population is involved. The sessions are aimed at obtaining the military personnel's impressions, interpretations and opinions as they talk about the event, concept, efforts, or service.

The focus group discussions on flood disasters have been conducted where thematic analysis was used to analyse the data. This is the simplest way to categorize qualitative data. The researcher reviewed the data, made the notes and began to sort the data into categories. This helped the researcher to move the analysis from a broad reading of the data towards discovering patterns and developing themes.

Ethical consideration in relation to this research was followed. Then, researcher went to the infantry army officers to collect the data. The objectives of the research study were explained to the respondents before the interview started. Participation was entirely voluntary, without any coercion. Having categorized the respondents, the researcher put them into several groups to answer the questions. When the data had been collected, a letter of thanks was sent to the officers as a mark of the researcher's courtesy and respect and also to express appreciation for the respondents' efforts and commitment.

4. Findings
4.1. Organization Structure and EOCC
When a flood disaster strikes, an emergency operation and coordination center (EOCC) was set up to support the disaster response so as to ensure an immediate, well-coordinated and rapid response. Every minute counts for saving lives and livestock. In the case of flood disaster, the EOCC was well established at the military operation room. The respondents believed that the organization structure of the EOCC was structured according to the chain of command. The structure was continually updated and complete with the function of every position and the responsibilities of all levels from the top to the bottom in managing the disaster. The structure of the organization was easily understood and clearly inter-related, and used as a medium to access and share any information regarding the disaster. Organization charts indicate the size and capability of the operation management in the disaster area and are used as a guide when giving orders. A clear structure also helped in building a strong team for disaster management. The staff stated in the organization structure were responsible according to the Standard Operating Procedure (SOP) role. The appointment of the head of EOCC is based on rank, qualifications and experience in managing disaster and in giving command and control. Moreover, all the staff in the organization structure were focused on the same goal and objectives. The coordination of tasks was adjusted for each agency involved. Periodic briefings regarding progress reports were presented by the staff according to their respective responsibilities. All tasks were allocated on the basis of staff competency.

4.2. Leadership and Effective EOCC
Leadership plays an important role in determining the effectiveness of an Emergency Operation and Coordination Center (EOCC). The results indicate that the infantry officers were happier when the leader feels satisfied with the subordinates, especially when the objectives are reached. They were also more comfortable with a leader who listens to ideas from subordinates, which increases the subordinates' confidence in the leader. Moreover, rewards were given to individuals who accomplish the organization's goals. Providing training and teaching the subordinates, and giving moral support, increases their commitment during operations. The officers in charge with high morale also give more attention to those who were demoralised. The leaders delivered briefings about the standards that should be achieved in carrying out the task, explained the procedures that should be followed to complete each given task and when they should be done. The officers in charge also reminded their subordinates about punishment if they make a mistake. In addition, they must always ensure that all their subordinates are working together as a team. They also encourage creativity among the subordinates. Although there is a lot of work to be done, the leaders remained positive and were concerned about their subordinates' welfare and also strive to maintain good relationships with them.

4.3. Inter-Agency Relationships and EOCC
Every agency is coordinated according to its tasks and responsibilities. Any information by agencies involved were shared and coordinated at the EOCC. All the agencies involved in disaster response report to and receive instructions from the EOCC. There is an inter-related operational planning by all agencies involved. Moreover, the agencies involved must understand the competencies of other agencies and must always be ready to help whenever needed. The EOCC is managed by Military officer, the agencies involved in disaster response activities work together and tried to cooperate to manage disaster response. However, as much as individual agency's functions were laid out, there were still issues and an overlapped with the roles and responsibilities. The issue of power-struggle and conflict resulted in ineffective coordination and communication inconsistency in the EOCC. Indeed, clear channels of communication among the agencies so that it is easy to share information and receive any orders is critical.

5. Discussion
Based on these research findings, it appears that the organization structure is the fundamental factor and the primary area that requires planning for disaster response management. This has been potrayed in Mintzberg's framework indicating that every function in the organization played an important role in supporting each and everyone in the organization (Lunenburg, 2012; Robbin and DeCenzo, 2005). As such infantry officers are able to

coordinate planning and teamwork by referring to the structure, which should be continually updated. In addition, any information regarding the disaster response management is easy to access and share between the top levels and other military personnel, since both parties are focused on the same goals and objectives. Meanwhile, good leadership can boost spirits and morale in the individual infantry personnel responding to the disaster. It is supported by Northouse (2007) that a leader must be able to influence others to achieve the same objectives. Organization structure, leadership and inter-agencies are three main factors that vital contribution to emergency operation and coordination center (EOCC) in managing the disaster response. A well-organized organization structure of EOCC with the Standard Operating Procedure (SOP) helps the disaster management working systematically. Each information gathered in EOCC can guide the rescuers to safe the victims. A well-structured and updated of chain of command give a lot of advantages to the disaster response management. In addition, Simons (2000), agreed that the efficiency of employees and organization influence by the well-structured of organizational hierarchy. Each person in the organization structure should responsible on their position and job. A well-structure of the organization is a good medium to access and share the information and command in the disaster operation. Meanwhile, leadership in chain of command playing a critical role in organization structure. Each information can be delivered to the right person efficiency. Moreover, providing reward, training, teaching and giving moral support by the leader enhance the moral, motivation and commitment of the subordinate to perform good disaster response management. A leader also need to make the subordinate's welfare as part of the important factor in managing the disaster response. The leader need to have a good relationship with their team members too. It has been proven by Brookes (2014) that a leader should target the mutual benefit and enthusiasm in helping others. In addition, inter-agencies relationships must be strong among each other. All agencies related to disaster response management must understand each responsibility. Besides that, each agency must share and help each other by giving a hand whenever another party lack of skills, assets or anything related toward disaster management operation. This has been supported by Chen *et al.* (2008) that any emergency response management become complicated and chaos without proper coordination and cooperation.

6. Conclusion

This study might have an impact in encouraging all leaders to be more responsible and at the same time cooperate with the bottom line in order to achieve the same goals and objectives. In addition, welfare considerations can increase the commitment from subordinates. Moreover, inter-agency relationships can also impact disaster response management through the sharing of information and resources as necessary during the disaster management. If any of the agencies fail to cooperate, this can hamper the disaster operation. Clear understanding of the responsibilities of each agency is also important, because during the operation, some agencies may need support from others in order to help the victims. Thus, an understanding of each agency's responsibilities, will reduce questions such as "Why do I need to do this?" and allow agencies to get straight to work together to achieve more effective disaster response management. It is supported by the previous studies that a good leadership seek for mutual benefit and aims for positive performance while dealing with the rapid changes environment moderated with the inter-agencies coordination to improves the existence of emergency operation and coordination center (EOCC).

The contribution of this study can be divided into three major aspects, namely expansion of the literature and review of organizations' policies and practice in organization. Firstly, this study will help researchers to explore knowledge and information about the factors affecting the effectiveness of EOCC. It will also help researchers to understand organization structure, leadership and inter-agency relationships in the context of EOCC. Other researchers will also benefit from this research because they can use it for reference for future studies. Secondly, this research will contribute to policy review and to ascertaining whether amendments to existing policies are appropriate. Sometimes, old policies need to be reviewed in order to be consistent with the current situation. Based on this research, the management can review these old policies and refer to this study to review them and thus to improve facility operations. Moreover, this study can be used as future reference in the military. It can also be used to influence practice in organizations. The finding of this research can also be used as a guideline for the Army to manage and develop effective human resources with high leadership characteristics. Information from this research can also improve officers' leadership training and to improve its relationships with other agencies.

This study inevitably has some limitations and recommendations that should be discussed. The first limitation that should be acknowledged is that the study focused only on a qualitative research method. Thus, future research could use both qualitative and quantitative research methods. A combination of both methods might give more accurate information to the readers. Secondly, this study focused only on military infantry officers. It is thus recommended that future research should involve all personnel in the military infantry to provide more wide-ranging information regarding the effectiveness of EOCC before, during and after disasters. Third, only the military perspective was examined. Thus, this study recommends future research involving not only the military, but also other agencies and the community. This is because the disaster response involves not only the military but also numerous other agencies. This may help the readers to be prepared and acknowledge the function of EOCC when disaster occurs.

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