A comprehensive Emergency Management using VIKOR MCDM Method

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Abstract. Emergency management is also known as emergency response or disaster management. It is the control management of assets and liabilities to deal with all humanitarian factors including prevention, preparedness, response, mitigation, rehabilitation. Aims to prevent and minimize the hazardous effects of all hazards. Emergency Planning Control refers to the coordination and control of sources and responsibilities for emergency mitigation, preparedness, reaction, and recuperation. It entails the collection, management, and analyses of large statistics for the motive of integrating a statistically-pushed approach into every segment of the emergency manage cycle. From this analysis the VIKOR technique determines the maximum correct solution with the shortest distance and the worst-good solution with the longest distance from the solution, although the variance of these distances is not taken into account. The VIKOR approach is a multi-criteria choice (MCDM) or multi criteria choice evaluation technique. Alternative: No influence, Low influence, High influence, Very low influence. Evaluation Preference: Well-planned emergency relief supply system, Application of modern logistics technology, Reconstruction and staff comforting, Education campaign on disaster prevention and response, Applicable emergency response plan and regulations, the involvement and support of army. The result it is seen that the involvement and support of army is got the first rank where as is the Education campaign on disaster prevention and response is having the lowest rank. In this paper the involvement and support of army is got the first rank whereas is the Education campaign on disaster prevention and response is having the Lowest rank.

1. Introduction

Emergency management of a plan the ultimate goal, communities are affected identify and reduce, disaster to cope with the consequences and disaster response plans and data driven to help improve is to provide structure. Big data in disaster management, emergency management response teams efficiency and effectiveness for improvement, from the affected community real-time analysis of collected information uses. Disaster management data collection and urgent management software crisis mapping, mute media mining and phenomenology innovative emergency such as simulations facilitates management efforts, this is for emergency management directors and helping their teams grow precautionary, safety lots of real-time and historical data uses. Strategies of previous calamities statistics disaster management a very large scale through data analysis data improve emergency preparedness, which is immediate big data analytics that can generate insights it is possible by using the sites. Emergency management and response skills for employees are all physical, organizational, social or economic resources; leaders, managers and a community, community or skilled workers in the company, risks of disaster or minimize consequences. Emergency management is also known as emergency response or disaster management. It is the control management of assets and liabilities to deal with all humanitarian factors including prevention, preparedness, response, mitigation, rehabilitation. Aims to prevent and minimize the hazardous effects of all hazards. From this analysis the VIKOR technique determines the maximum correct solution with the shortest distance and the worst-good solution with the longest distance from the solution, although the variance of these distances is not taken into account. The VIKOR approach is a multi-criteria choice (MCDM) or multi criteria choice evaluation technique.

2. Emergency Management

The idea of social networks and they are an ability tool acceptance is emergency management students have been surveyed investigate. The results of this study research, dissemination of information in the emergency field should be considered as a possible solution show great agreement the first era of the internet changed into personal and on company websites focuses, wherein individual's information sought. Web 2.0 is a generation that supports mass collaboration wikis, blogs, forums and all social networks specifically provides netgen3 younger people (topcoat et al Williams, 2006). In a few agencies nearby or there are subsets of special chapters. For instance, international association of emergency managers (IAEM) Europe there are both, which it is the idem for members of the European council [1]. Emergency management federal, state and local governments as an important function. Several of laws, regulations and ordinances in the background, emergency management are involved as a process of formulating and implementing policies is defined. Public administration, a as regulation, the core of its operations to consider emergency management within the stream generally

ignored. Historically, emergency management is law enforcement and firefighting human response and technical corrections from health and civil protection organizations with support in a major disaster event. The primary focus of research is in the area of management and that the use is in the public domain should be noted. Public policy/general on public problems from an administrative point of views little in the way of better understanding and finding solutions not achieved. Federal, state or local level or intergovernmental action or emergency management is general should become a central activity of management. Field complexity and our problems and needs [2]. Hurricane Katrina was a national emergency management system disrupted; its communities effective for immediate needs is on the gulf coast in unresponsive and necessary to support recovery prepare to coordinate massive relief efforts no. Criticisms of disaster relief at all levels have focused on the lack of leadership and the inability of the us department of homeland security (DHS) and the federal emergency management agency (fame) to coordinate. Unfortunately, critics of emergency management consider the effort akin to emergency response. Emergency management is search and rescue, emergency medical services, temporary accommodation and feeding and beyond just retrieving lifelines a broad set of functions. Emergency management from the 1940s to the 1950s the department is very cooperative [3]. Emergency management disaster is all government preparedness and management also seeks partnerships across levels. In collaborative networks relationships in trust and finality based on commitment to the goal have no hierarchical order. Hierarchical goal in management process prevent displacement and decision making argued that continuous monitoring. EM networks from below above-built, above- not imposed by subordinates. The identified several more important variables after reviewing 137 collaborative governance cases from policy sectors. Historical pasts include imbalances in stakeholder incentives, power and resources, management, organizational design, and face-to-face communication within collective action. [4] Hence, local governments, public safety and their responsibilities to provide security develop an emergency management plan to execute to be maintained. Local emergency management corporation, local government and private sector institutions a natural threat to society in conjunction with the departments or to any man-made hazard responsive emergency plans and capabilities emergency management is usually the responsibility of the mayor or in an agency reporting to the city manager or such as police, fire or public safety placed in existing fields. Traditionally, local emergency managers are mainly preparedness and focus on responding. Real during an emergency, government and non-government forces and between higher and adjacent governments the highest, with responsibility for ensuring coordination they act in a staff capacity to the local authority [5]. Many areas in emergency management and society introduction of new technology and work patterns and associated changes in organizational forms of opportunities and threats along with faced with a fundamentally altered reality. Emergency in the Norwegian oil and gas sector new technology and new work in management in this paper how processes affect we are studying. Emergency management is in line with this development to adapt, it is emergencies opportunities and challenges for improvement provide. Before, after, and after an event to control emergencies later on, or more or conducted in a less integrated manner total operations (administrative procedures and both informal processes) emergency we define as management. Analysis of this includes; planning; training; handling; learning; expectation; and monitoring. Emergency our definition of management is the nurse standard z-013 'hazard and emergency preparedness analysis' in emergency preparedness assessment implies a broader definition than appears, this is key to emergency management planning best practice. Emergency management is more recent than ever more strategic in practice approaches to management those styles should be used. Strategic management in emergency management of this research integration explores the following benefits highlights: forward thinking, professionalism, competence development, target identification, increased public help, multiplied investment and more duty. Strategy in emergency management practice these are the following suggestions for developing planning study provides planning and implementation decentralization, intergovernmental response strengthen process, public and profit cooperation between non-profit organizations developing, implications for destiny studies also are provided [7]. In the field of emergency management, a scenario is a reconstruction of the past occasions, the future imaginary construction of events, courses a second approach to design is contingency wrap they revolve around key concepts of management includes framing. Thus emergency management through implementation principles is taught. These methods the first third of the listed approaches predict the level of experience in the increasing field emergency management [8]. Emergency management (EM), disaster or relief work after a different type of disaster the decision-making involved in running, the stakes are high because of this, there is a great deal of public and private concern is the problem. Emergencies and especially mass due to the nature of emergencies, EM teams are mentally stress situations, information ambiguity and overload and a significant degree of uncertainty are faced with decision-making. A of EM the important characteristic is that of teams is the group; many from different companies groups, different organizational goals and so on organizational cultures, they are the negative of emergency they work together to reduce the effects. Of this as a result, better coordination and information for EM communication is required [9] the four general phases of emergency management are, regardless of the specific disaster agent more on specific steps for each can be separated. Reduce disaster damage and disaster improving disaster response operations preparation of operations closest to commencement includes usually, at this stage of administration planning, warning and mostly general information and include training activities. Disaster struck then the activities carried out very closely the answer includes these activities are eviction inclusive maybe, but disastrous nonetheless early evacuation, mobilization, emergency assistance to victims [10].

3. VIKOR

The VIKOR method is implemented within the MCDM problem introduced as a matching technique, also it is incompatible different units and unique decision making multi attribute decision making with conflicting criteria method for

the problem solving was created. This method is ranking and focus on choosing alternative means of payment and from conflicting criteria determines a compromise option to the problem, which help decision makers arrive at a very last solution. Reconciliation multi standards dimension for ranking, compromise programming used as an integrating function in the method generated from LP-metric [11]. The VIKOR method solves MCDM problems with contrasting and comparable different units criteria created to resolve, conciliation is for conflict resolution deeming it acceptable, for the decision maker ideal a closer solution prefers, and evaluates alternatives are done. All installed criteria. This time is contradictory an alternative to the presence of criteria ranking from set and focuses on selection, and compromise solutions (one or more) propose. VIKOR systematic weight stability intervals deterministic stability analysis and trading compared to decision-making methods the extended VIKOR method has three variations. TOPSIS, PROMETHEE and ELECTRE a numerical example is the VIKOR method explains the application and four the results of the considered methods are compared [12]. VIKOR method is inconsistent or inconsistent (MCDM) multi criteria decision making, with criteria created to solve problems. For conflict resolution this method assumes that the compromise is acceptable. VIKOR method used in multi-criteria analysis (MCA). Although a popular method, MCDM problems there are some problems with solving. This study is traditional discussed the problems with VIKOR method. This intention of the take a look at is to resolve issues with the traditional VIKOR technique to keep away from numerical troubles in fixing is modified VIKOR approach to create. Modified in MCA solution efficiency of VIKOR method several artificial experiments to verify the improvement were designed and evaluated [13]. VIKOR for solving complex decision making problems in addition to using the method successfully, the result depending on the type detailed victor, busy victor, shot theory-past victor, victor modified etc., interval VIKOR methods genres are also in the picture. The decision maker's problem relating to requirements. They have different results are used in situations; there are general properties and math formulas. These five of the VIKOR method the ranking performance of categories is their original there is a better chance to compare with no. This the main focus of the thesis is two demonstrations all six types while solving the examples comparing the ranking performance of VIKOR methods aims to spearman's rank correlation using coefficient values works best it tries to detect the VIKOR method [14]. Extended fuzzy VIKOR method, risk based on the overall risk on the factors used sorting out failure modes. This consequently, risk assessment issues in FMEA to deal with, joint weight ambiguous VIKOR risk assessment method using method is provided. To verify the applicability of the model and to study its effectiveness, proposed the setting is general at a university hospital risk of anesthesia to analyze procedure is used. Fuzzy VIKOR and AHP client using methods dancer and hacioglu in turkey based on skills evaluated the performance of banks. Meet the changing needs of customers many people. Meet the changing needs of customers using fuzzy VIKOR method to do the concept deals with design choice in an appropriate context [15]. Classical VIKOR method is fuzzy VIKOR, interval-valued VIKOR, intuitive fuzzy VIKOR, and interval valued various like the reluctantly obscure VIKOR extended in forms. Contradictory VIKOR on dealing with MCDM problems with criteria as the method is observed to be very powerful, this covering the main idea in the thesis VIKOR within hesitant ambiguous linguistic situations we are motivated to explore an extended [16]. Multiple criteria decision making (MCDM) VIKOR method evolved from compromise programming an agglomerative denoting 'closeness to ideal based on activity. Interval numerical decision making VIKOR method for problems. In this paper is the confidence level of the decision maker introducing. Distribution supplier selection issues in chain organization for inter-interval comparisons, VIKOR to deal with fuzzy set theory a hierarchical MCDM using model fuzzy VIKOR method based on the proposed method best alternative under each of the selection criteria the best alternative under each of the selection criteria and chen and wang to create a compromise solution they provided a rational and systematic process. The findings of the study were unclear on several criteria for solving decision problems gives an important hint [17]. A new one that includes incomplete scale weights we propose the VIKOR method. Incomplete our about scale by scale weights can express preferences effectively. The proposed VIKOR method is the intensity of weights ranks the alternatives using points. VIKOR for decision making under uncertainty we re-explain the method from scratch. VIKOR the method is multi scale of complex systems developed for optimization. Compromise by proposing a solution conflicting criteria from the set of alternatives available in presence this method of ranking and selection attention VIKOR method, on the other hand, is the risk of the result when considered less important, suitable for situations where profit maximization is the goal [18]. Given the material selection characteristics identified short of materials in engineering use after making the list, VIKOR's proposed rank the detailed version, optimized material select can also be used. VIKOR method multiple criteria in complex systems developed to improve and wide enjoys acceptance. It is contradictory and ranking with criteria of different units and focuses on choosing from alternatives. A compromise is the ranked VIKOR approach, optimal by comparing the size closest to the replacement is done, and compromise is by mutual concessions an established contract. By traditional to skip the VIKOR method number complications in solving the problems, chang developed a modified VIKOR method [19].

4. Analysis and Discussion

Table 1. Emergency Management shows the No influence it is seen that Reconstruction and staff comforting is showing the highest value for Education campaign on disaster prevention and response is showing the lowest value. Low influence it is seen that Education campaign on disaster prevention and response is showing the highest value for Application of modern logistics technology is showing the lowest value. High influence it is seen that Reconstruction and staff comforting is showing the highest value for Application of modern logistics technology is showing the lowest value. Very low influence it is seen that the involvement and support of army is showing the highest value for Well-planned emergency relief supply system is showing the lowest value.

TABLE 1. Emergency Management

	Determination of best and worst value			
	No influence	Low influence	High influence	Very low influence
Well-planned emergency relief supply system	0.34	0.85	0.75	0.13
Application of modern logistics technology	0.22	0.71	0.67	0.21
Reconstruction and staff comforting	0.39	0.89	0.93	0.37
Education campaign on disaster prevention and response	0.15	0.93	0.72	0.14
Applicable emergency response plan and regulations	0.27	0.86	0.86	0.26
The involvement and support of army	0.36	0.72	0.81	0.36
Best	0.15	0.93	0.93	0.13
worst	0.39	0.71	0.67	0.37

Table 1 shows the Determination of best and worst value of Alternative: No influence, Low influence, High influence, Very low influence. Evaluation Preference: Well-planned emergency relief supply system, Application of modern logistics technology, Reconstruction and staff comforting, Education campaign on disaster prevention and response, Applicable emergency response plan and regulations, the involvement and support of army.

It is solved by using the VIKOR method. It is the data set of this paper.
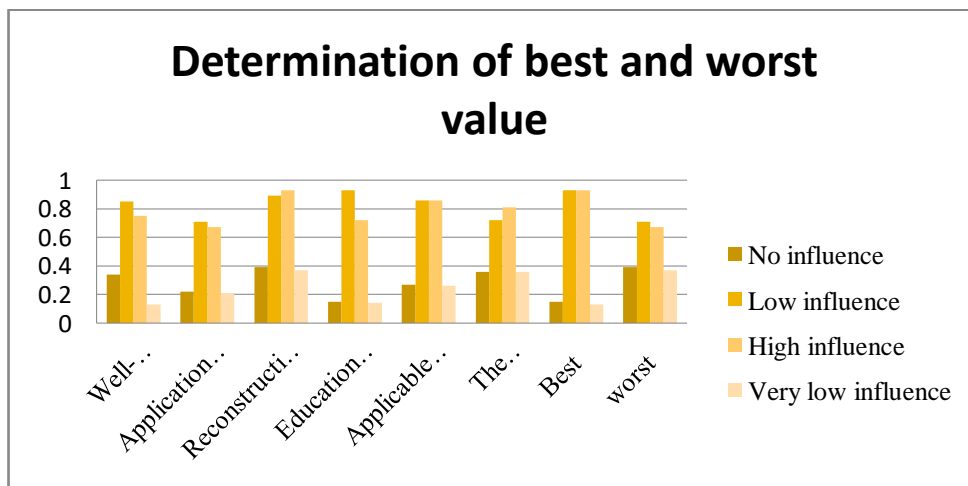
FIGURE 1. Emergency Management

Figure 1 shows the Determination of best and worst value of Alternative: No influence, Low influence, High influence, Very low influence. Evaluation Preference: Well-planned emergency relief supply system, Application of modern logistics technology, Reconstruction and staff comforting, Education campaign on disaster prevention and response, Applicable emergency response plan and regulations, the involvement and support of army.
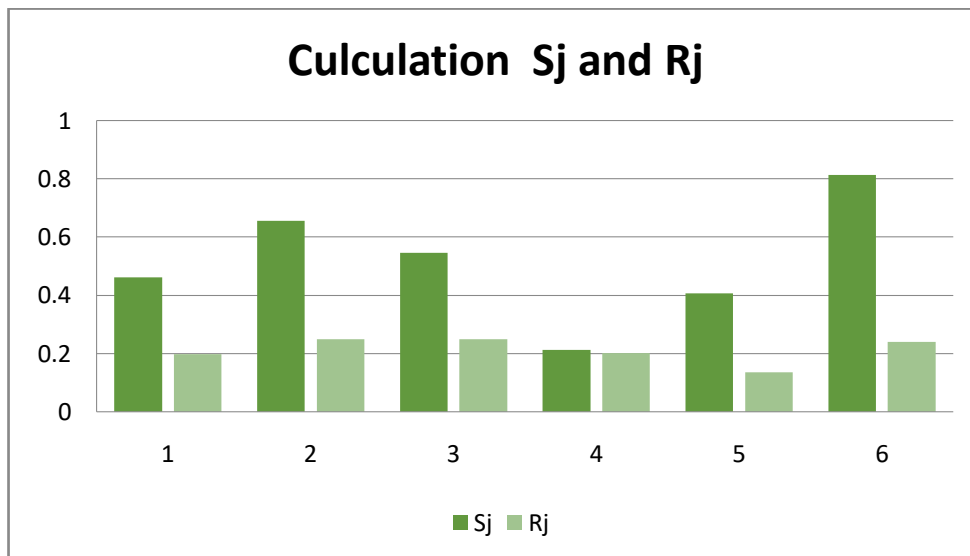
TABLE 2. Calculation Sj and Rj

No influence	Low influence	High influence	Very low influence	Sj	Rj
0.197917	0.090909	0.173077	0	0.461903	0.197917
0.072917	0.25	0.25	0.083333	0.65625	0.25
0.25	0.045455	0	0.25	0.545455	0.25
0	0	0.201923	0.010417	0.21234	0.201923
0.125	0.079545	0.067308	0.135417	0.40727	0.135417
0.21875	0.238636	0.115385	0.239583	0.812354	0.239583

Table 2 shows the calculation of the Sj and Rj , it is calculated.

TABLE 3. Calculation Qj

	Calculation Qj		
	Sj	Rj	Qj
Well-planned emergency relief supply system	0.461903	0.197917	0.480691
Application of modern logistics technology	0.65625	0.25	0.869916
Reconstruction and staff comforting	0.545455	0.25	0.777589
Education campaign on disaster prevention and response	0.21234	0.201923	0.29021
Applicable emergency response plan and regulations	0.40727	0.135417	0.162438
The involvement and support of army	0.812354	0.239583	0.954545
S+ R+	0.21234	0.135417	
S- R-	0.812354	0.25	

Table 3 shows the Sj, Rj, Qj by using the previous tabulation it is the sum of the value. Sj and Rj using the S+ R+ Minimum formula, S- R- Maximum formula.

FIGURE 2. Calculation Sj and Rj

Figure 2 shows the graphical view of Calculation Sj and Rj value Sj The involvement and support of army is high Rj Reconstruction and staff comforting is high, Sj Education campaign on disaster prevention and response is low, Applicable emergency response plan and regulations is low.

TABLE 4. Rank

	Rank
Well-planned emergency relief supply system	4
Application of modern logistics technology	2
Reconstruction and staff comforting	3
Education campaign on disaster prevention and response	6
Applicable emergency response plan and regulations	5
The involvement and support of army	1

Table 4 shows the final result of this paper the Well-planned emergency relief supply system is in 4th rank , Application of modern logistics technology is in 2nd rank, Reconstruction and staff comforting is in 3rd rank , Education campaign on disaster prevention and response is in 6th rank Applicable emergency response plan and regulations is in 5th rank, The involvement and support of army is in 1st rank, The final result is done by using the VIKRO method .
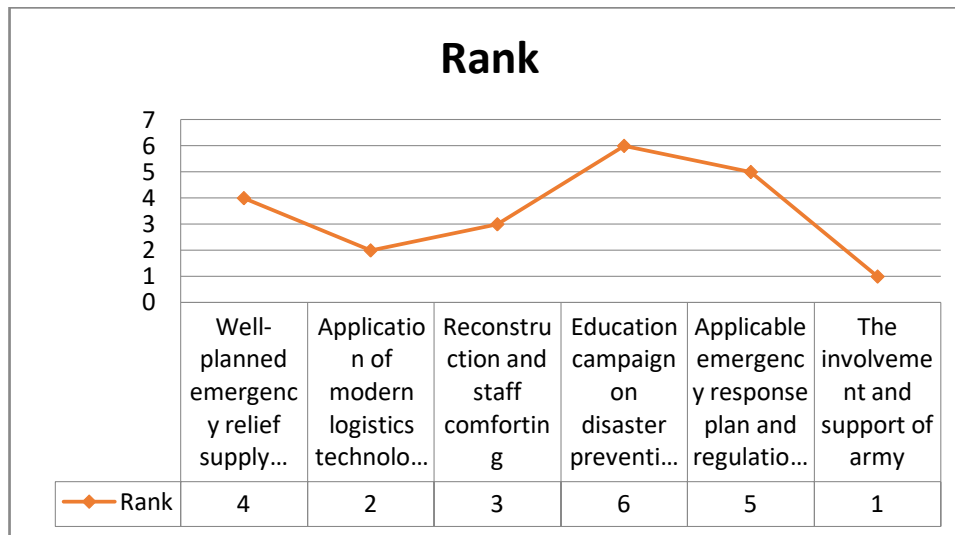

FIGURE 3. Rank

Figure 3 shows the graphical view of the final result of this paper the Well-planned emergency relief supply system is in Fourth rank, Application of modern logistics technology is in Second rank, Reconstruction and staff comforting is in Third rank , Education campaign on disaster prevention and response is in Sixth rank Applicable emergency response plan and regulations is in Fifth rank, The involvement and support of army is in First rank, The final result is done by using the VIKRO method .

5. Conclusion

Emergency management it is also known as emergency response or disaster management. All humanitarian emergencies are features of prevention, preparedness, response, mitigation and recovery that deal with and manage organizational resources and responsibilities. All including disasters harmful effects of hazards prevention of consequences. Distances not considered significant. The VIKOR method is several criterion decision making (MCDM) the analysis method results from multiple criteria. The end of this thesis the result is a well-planned emergency relief distribution the system is in fourth grade, modern logistics the use of technology is secondary, restructuring and comforting employees the third level is disaster prevention and response they said educational campaign is ranked sixth. Emergency response plan regulations ranked fifth, the involvement of the military and the support is top notch.

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