



## Identification of Crisis Situations Factors From the Perspective of Crisis Actors of the Large Urban Units in Slovakia

### KEYWORDS

crisis management, flood, municipality, residents

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**ABSTRACT** *The main aim of this study is to analyse the risk management process in the context of (river) catchment basin management and management processes in flood crisis in local government and the specification of the key areas of crisis management from the perspective of crisis/emergency actors - residents of flood areas. Given the large number of studied elements of crisis management was used factor analysis, which aims to characterize the studied reality through a reduced number of factors. Using critical analysis were extracted factors - key elements of crisis management - representing areas of interest of the population during crisis situations caused by water, to which crisis management and crisis communications should focus.*

### INTRODUCTION

Climate changes cause more and more frequent crises caused by water. Historically, there have never been urban units (buildings, construction) so close to watercourses, as is currently. This implies the need for rapid practical dealing with crisis situations.

Managing flood events has potential to reduce the probability of flooding through controlling flood pathways, and significantly reduce the damage that is caused by managing losses and influencing the behaviour of individuals and organisations (Dawson et al., 2011).

An important role plays readiness of the crisis management in public administration to act effectively and adequately during the preparation period, in a time of crisis and after a crisis. To ensure optimal crisis management in public administration activities is implemented broad legislative activity at various levels of the legislative power and applied adequate executive and judicial power in the security area. According Šimák (2004) the task of crisis management that operates in the public sector is to create legislative, personnel, material and technical conditions for crisis prevention and efficient crisis resolution.

The definition of crisis management may differ from country to country and organisation to organisation due to variations in level of turbulence in different situations in different corners of the globe (Eliasson&Kreuter, 2000, in Khodarahmi, 2009); that is why cultural dimensions and legal aspects of each country need to be analysed for appropriate action plans (Khodarahmi, 2009). There is no universally valid and correct crisis management system. As pointed out Unlu et al. (2010) "there is no best crisis management system that fits all countries, research and experience guide experts to look for solutions to strengthen government capability to handle crises".

### MATERIALS AND METHODS

Primary data were collected through a questionnaire survey. Respondents were contacted both personally and electronically. The questionnaire included 17 items - statements and respondents on a 5-grade Likert scale (1-excellent, 2-good, 3-average, 4-below average, 5-failing) express their opinion about them. The research sample consisted of residents living in flood areas of the three largest cities in Slovakia - Bratislava (capital city), Prešov and Košice (each with a population of more than 100,000). In total, 1,770 questionnaires were distributed and the total rate of questionnaire return was 73% (1,295 questionnaires).

Participants were guided through a series of questions about various elements and aspects of crisis management in public administration, namely:

1. In the municipality there is ensured a warning and works related to the protection and evacuation of the population for the necessary time in areas threatened by flood or flooded.
2. In the municipality there is ensured the protection of property in the territories, including the possible early harvest - crop at risk of flooding.
3. In the municipality there are ensured the necessary works on the access roads associated with restoring access to the residential units, including the construction of makeshift bridges or footbridges.
4. In the municipality there is ensured the traffic control, setting out alternate routes and replacement of portable/mobile traffic signs for traffic guidance.
5. In the municipality there is ensured the protection of water resources and distribution of drinking water, electricity, gas and telecommunications.
6. In the municipality there is ensured the closure of the evacuated area and protection of evacuated residents' property.
7. In the municipality there is ensured the emergency supplies of drinking water and food for the population

in affected areas.

8. In the municipality there are ensured the hygienic and anti-epidemic measures caused by floods.
9. In the municipality there is ensured the public order in the territory affected by the flooding.
10. In the municipality there are prepared crisis management processes (cycle of functions and tasks) comprising a prevention, training people, mitigation, solution as a response to the crisis and the recovery process. As a resident of the municipality I am/was informed about these processes.
11. Municipality residents are aware what to expect from the municipality in the event of flooding.
12. Municipality residents are aware who may contact in case of need during the floods.
13. Municipality residents are aware who may contact in case of need outside the period of flooding.
14. Municipality residents are aware what should be done in case of flooding to protect the property.
15. Municipality residents are aware what should be done in case of flooding to protect the persons.
16. Municipality residents are satisfied with the awareness of crisis management of the basin (situation).
17. In the municipality there is ensured the crisis management of the basin (situation).

**RESULTS**

The data obtained from the questionnaire were analysed using Principal component analysis. Factor analysis is focused on getting/creating a reduced set of "derived" variables (factors) from a large set of variables (in our case 17 observed variables – items of the questionnaire). It is based on the assumption that the dependence between the variables is the result of action of a smaller number of (standing in the background immeasurable) variables - common factors that are linear combinations of the original variables. The main purpose of factor analysis is the knowledge and use of the structure of common factors that are considered to be the underlying causes of mutually correlated variables in order to make the best and easiest explanation and clarification of the observed dependence. In the final resolution each variable correlates with the minimum number of factors while the number of factors is reduced (as small as possible).

The value Keiser-Mayer-Olkin's statistics (0,894) indicate that factor analysis was an appropriate method for the analysis of a residents' questionnaire. Also p-value of Bartlett's sphericity test ( $p = 0,041$ ) is smaller than significance level  $\alpha = 5\%$  hence it can be concluded that the factor analysis is suitable for our data.

According Keiser criterion a number of factors in a factor model is equal to the number of factors which have eigenvalue greater than 1. As can be seen from Table 1 these eight factors cumulatively explained almost 52% of the to-

tal variance. Opinions of respondents can be explained by eight common factors (Figure 1).

**Table-1 Factor model Eigenvalues**

Rate	Own number Extraction: Main components			
	Own number	% Total Variance	Cumulative own number	Cumulative %
1	1,176211	6,918888	1,176211	6,91889
2	1,171262	6,889778	2,347473	13,80867
3	1,132108	6,659459	3,479581	20,46812
4	1,090185	6,412853	4,569766	26,88098
5	1,072511	6,308887	5,642277	33,18987
6	1,051284	6,184023	6,693561	39,37389
7	1,047420	6,161293	7,740981	45,53518
8	1,025350	6,031471	8,766331	51,56665

Table 2 shows significant relationships between common factors and individual variables (items):

1. The first common factor has a significant relationship (negative correlation) to item 11 and 16 and we named this factor "Citizens awareness".
2. The second common factor, which we called "Ensuring the hygiene & anti-epidemic measures" strongly positively correlated with question 8 and also has a positive relationship with items 1 and 7.
3. The third common factor strongly positively correlates with item 5, therefore we call it "Ensuring the distribution system for the population".
4. The fourth factor, called "Readiness of the population to a crisis/emergency" is positively correlated with question 15 and strongly negatively correlated with question 12.
5. The fifth common factor has a positive correlation with question 3 and a negative correlation with question 10. Its name is "Population awareness of the recovery processes".
6. The sixth factor model is positively correlated with issue 2 and 14 and therefore we call it "Ensuring the protection of the citizens' property".
7. The seventh factor "Ensuring the public order" of the factor model strongly positively correlated with question 9.
8. The last common factor of the model has a strong negative correlation with question 4 and that is why we named it "Ensuring the transport in the municipality territory".

**Table-2 The load of factors**

Var.	The load of factors (Varimaxnormaliz. ) Extraction: Main components (Labeled load are >,500000)							
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	0,078349	0,493722	0,018244	0,228352	0,142205	0,337096	0,256384	0,213108
2	0,106376	-0,016200	-0,124437	-0,093040	-0,010532	0,531113	0,078239	0,026014
3	0,084689	0,008929	0,130140	0,036285	0,764665	-0,115777	0,045114	0,044052
4	-0,039097	0,006448	-0,042916	0,025987	0,062088	-0,097213	-0,073366	-0,728133
5	-0,000920	0,069475	0,643918	-0,032535	0,020078	-0,103261	0,042631	0,190150

6	-0,169223	-0,092438	0,217820	0,213688	0,339067	0,067507	-0,344421	0,288737
7	-0,076079	0,436529	-0,195703	-0,303046	0,119315	0,360587	0,097063	0,095303
8	0,035917	0,719192	0,068354	-0,034937	-0,091006	-0,017533	-0,216571	-0,114180
9	-0,066158	-0,100008	0,086470	-0,043078	-0,045064	0,002226	0,752689	0,109188
10	0,050301	-0,005268	0,261107	0,147103	-0,524642	-0,069005	0,111424	0,219476
11	-0,650001	0,130101	0,033134	0,122055	-0,161567	-0,157491	-0,006035	-0,230274
12	0,050185	-0,047813	-0,012678	-0,545767	0,076795	0,027578	0,222182	-0,081645
13	-0,215325	0,174709	-0,481162	0,205317	0,049332	0,049259	0,064988	0,277640
14	0,021411	-0,061969	0,082191	0,272201	-0,088833	0,571908	-0,201034	0,154889
15	0,137891	-0,097645	-0,194705	0,640272	0,088447	0,075942	0,279034	-0,162690
16	-0,698653	-0,162758	-0,089258	-0,160347	0,097140	0,014366	0,044314	0,141076
17	-0,204708	0,151344	0,467150	0,147765	0,100177	0,405246	0,268781	-0,318265
Interpretation of variance								
	1,089656	1,087847	1,118936	1,112569	1,093690	1,094153	1,081103	1,088378
Total percentage								
	0,064097	0,063991	0,065820	0,065445	0,064335	0,064362	0,063594	0,064022

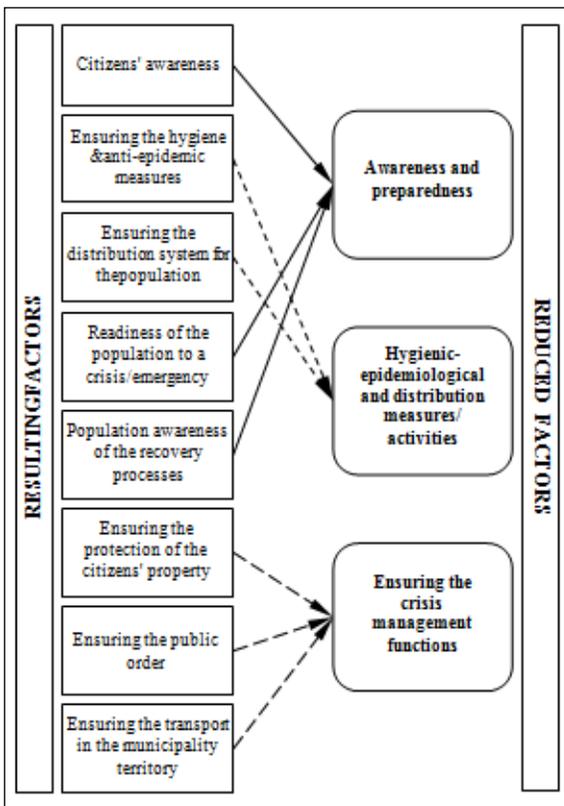


Figure-1 Model of Reduced citizens' factors

The result of factor analysis was a reduction of observed variables to three factors:

1. Awareness and preparedness;
2. Hygienic-epidemiological and distribution measures/activities;
3. Ensuring the crisis management functions.

**CONCLUSIONS**

Factor analysis extracted a group of factors that are important to residents of flood areas and relevant to the management of crisis situations caused by water. Using the critical analysis the extracted factors (a total of eight) were reduced - on the basis of relatedness (similarity) of the processes - to three factors. These three factors represent areas of interest of the population within the crisis/emergency situations caused by water (floods), to which crisis managers of the municipalities must adequately respond i.e. create a plan (concept) of communication policy that enables quick, timely, and competent warning and notification of residents that fully inform and satisfy them. An analysis of the factors shows that citizens require and expect enough information both during and outside the hazards.

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