Identification of Critical Factors in Large Crisis Decision Making Processes Using Computational Tools: The Case of ATHENA

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ABSTRACT

This article aims to present a social media-based system that coordinates the responses of the authorities in a large crisis. The article performs extensive review of literature in order to identify decision making approaches in crisis situations and the different factors that affect these approaches. It also presents the ATHENA Crisis Management system which is based on a platform that makes combined use of data mining algorithms for the purpose of analysing large amounts of data received through the Social Media during and after a large crisis. A number of conclusions are drawn on the identification of different types of factors that impact large crisis decision making.

KEYWORDS

ATHENA, Categorisation, Concept, Crawling, Credibility, Crisis, Decision, Factors, Sentiment

INTRODUCTION

The severity of the consequences of a large crisis (e.g. earthquake, flooding, terrorist actions) requires a thorough and well-designed crisis management and decision-making process. In many occasions in the past, bad handling of a crisis resulted to additional problems. Crises tend to be characterized by stresses and demands. Specifically, crises are characterized by high impact events and choices both in political and ethical level. Crises involve situations where national, organizational, and personal values are in doubt. Furthermore, possible bad handling of a crisis situation can profoundly impact political perceptions and choices for years or decades to come. A crisis is characterised by the following factors: a threat to basic values, urgency and uncertainty (Stern, 2003). Risk, uncertainty and collective stress need to be integrated to a broader understanding of how governments and decision makers respond to crisis situations. Pearson and Clair (1998) suggest ambiguity and urgency are the two main characteristics of a crisis and they affect the way leaders take decisions. Also, response uncertainty and time pressure characterise a crisis (Billings, Milburn & Schaalman, 1980).

During a large crisis, such as the 11th of September, the pressure on crisis decision makers was extremely high and the intensity on taking decisions during such times was unimaginable. The decisions made during such a crisis had to be instant and as much as accurate as possible. Planes in the air were advised to land to the closest airport while subway trains stopped and as a result a number

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between 3000 and 5000 lives were saved (Associated Press, 2001). Tens of thousands of people were evacuated from the targeted buildings and from those in close vicinity. The WTC tragedy resulted in the death of nearly 3000 people, the relocation of 1000 firms and put over 100,000 out of work (Bram et al., 2002; New York Metropolitan Transportation Council, 2002). In these circumstances, leaders with crisis management and leadership talents are very highly valued (Hymowitz, 2001) as a large amount of information associated with the crisis may be inaccurate or simply unavailable. Decisions also need to be made considering the different factors, constraints and consequences.

Crisis decision making must be a very carefully designed process and its significance is shown by the amount of research realised to improve it. Janis and Mann (1977) have presented a number of criteria that need to be followed in order for decision making during a crisis to be efficient. The first of these criteria is the identification of the objectives that need to be achieved by the decision(s) taken and the specification of the major requirements of a successful choice. The second criterion is the generation of a comprehensive list of alternatives while the third criterion is the wide search of the relevant information with which the quality of the alternatives can be determined. The fourth criterion is the accurate elaboration of information relevant to the assessment of the alternatives and the fifth criterion is the re-evaluation of the advantages and disadvantages of the alternatives. During a large crisis, such as 09/11, a crisis decision maker has to face a number of factors, both cognitive and emotional (Kleinmutz, 1990) but also a number of external parameters, both in organisational and environmental level.

There are different types of crises and different decision-making processes. Also, different factors affect these processes. Snowden and Boone (2007) suggest that a new form of leadership and management should be formed and be based on complexity science. The reason for this is that circumstances change and as they become more complex, any simplifications can fail. As a result, good leadership is a not a one-size-fits-all proposition. Complexity is more a way of thinking rather than a new way for working with mathematical models. For this purpose, the Cynefin framework has been developed and this framework allows crisis leaders to see things from different perspectives, analyse complex information and address real-world problems. The framework uses different domains and each of them requires different actions. Simple and complicated contexts assume that there is order and right decisions can be based on facts. Complex and chaotic contexts are unordered, and any decision making is based on emerging patterns. The fifth context (disorder) is characterised by cacophony. In this case, the situation must be broken down into different segments and assign each of them to one of the four other contexts (Snowden & Boone, 2007).

Overall, crisis management is a very important function of leadership in public, private, and non-profit organizations. It is very challenging even to organizations used to fast-paced operations, such as first responders (Stern, 2014). Successful crisis management does not consider only the different factors that directly affect the crisis decision makers but also the audience of the crisis decision makers, in the case of a crisis, this audience are the citizens. Especially nowadays with the continuous use of the Social Media, crisis communication has taken another form. Specifically, more factors have direct impact on this communication. This can be shown in Figure 1.

This paper focuses on the identification of the factors that affect large crisis decision making and the impact these factors have on the way crisis decision makers make decisions. The paper provides a review of the main crisis decision making models and of the factors that affect crisis decision making and that the literature has so far identified. Conclusions are drawn about the significance of identifying of such factors and

LITERATURE REVIEW

In emergency situations, decision making requires non-traditional approaches and tools that are characterised by non-hierarchical structure and flexibility. The dynamic nature of crises imposes the examination of inter-sector and inter-agency collaboration. An example of such collaboration is the
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