

# **MODELING HOMELAND SECURITY: STRUCTURING KEY OBJECTIVES THROUGH AFFINITY DIAGRAMMING**

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## **ABSTRACT**

This study implements affinity diagramming to provide structure in understanding homeland security objectives at the federal level. The defined hierarchy is based on a thorough analysis and compilation of existing homeland security doctrine. With the key objectives identified and structured, the hierarchy can be utilized to assess the value of alternative homeland security strategies at the federal level. Additional research in metric development leverages this structure to quantify the impact of competing strategies that aim to improve the nation's homeland security posture.

## **INTRODUCTION**

Since the attacks of September 11, 2001 the United States government's response to the threat of terrorism has been profound. Less than one month after the attacks on 9/11 President Bush released Executive Order 13228, establishing the Office of Homeland Security and the Homeland Security Council. The President's intention was for the Office to develop and coordinate implementation of a national strategy for "detecting, preparing for, preventing, protecting against, responding to, and recovering from terrorist threats or attacks within the United States" [8, p. 1]. Even before the strategy was completed and released, in July 2002, it became apparent that the challenges brought on by protecting the homeland would require bold Federal government reorganization. With this in mind, in June 2002 the President called for the creation of the Department of Homeland Security [3, p. 1]. Legislation to implement the President's plan received Congressional approval in November 2002 and the Department was established. The objectives for homeland security delineated in the National Strategy, of which the Department of Homeland Security is a part, are the following:

- Prevent terrorist attacks within the United States;
- Reduce America's vulnerability to terrorism; and
- Minimize the damage and recover from attacks that do occur. [7, p. 2]

The nation as a whole must make every effort to execute these objectives in order to secure the United States homeland from terrorist threats and attacks.

This work presents the methodology, affinity diagramming, that was used to support the development of a decision framework for Federal level homeland security decision-makers to leverage in the recognition and specification of key homeland security objectives. Drawing from quality management and data mining concepts, affinity diagramming, combined with a content analysis, was used to investigate and organize the vast collection of concepts for homeland security presented in the literature. The resulting hierarchical structure, in combination with the appropriate evaluation measures, can then be utilized to

assess the value attained by various homeland security alternatives. The focus of this paper being on the hierarchy itself, a discussion of evaluation measures can be found in the thesis work by Pruitt [9].

## RESEARCH METHODOLOGY

Efforts to secure the American homeland from terrorism require a variety of difficult decisions. To ensure that these decisions are made in the most beneficial manner, an effective decision-making methodology is required. Value Focused Thinking (VFT) provides such a methodology.

### Value Focused Thinking

One of the most vital steps in the VFT process is the accurate identification of the decision-maker's fundamental objectives (i.e. what is valued). The structuring of objectives into a hierarchical model affords a variety of advantages to the decision process. In general, this structure "improves our understanding of the values that matter, leads to a better value model, and enhances the quality of the value-focused thinking" [5, p. 86]. Thus it is not enough to merely recognize the objectives associated with a particular decision problem; these objectives must be organized into a hierarchical structure (e.g. a value hierarchy) if the alternatives related to the decision context are to be accurately measured.

There are two *primary* ways in which a value hierarchy can be constructed. The decision of which method to employ is largely based on how well alternative solutions are defined [6, p. 20]. With clearly defined alternatives, the hierarchy can be developed by first identifying evaluation measures and then grouping these measures into higher-level objectives [6, p. 20]. This method is known as a *bottom-up* approach. However, because it is not clear what strategies for homeland security will entail, effective evaluation measures are difficult to identify up front. Thus, it would appear more appropriate to use a *top-down* approach.

By using the *top-down* approach, this study began with the overall objective of securing the homeland and attempted to specify lower level objectives for accomplishing this goal. However, the homeland security decision environment is evolving and spans a vast and complex space. Because of this, lower tier objectives are difficult to define. This suggests that some form of bottom up analysis, in conjunction with the top down specification, may benefit the pursuit of a collectively exhaustive hierarchy. Using the "Gold Standard" method, this work identified key objectives from doctrinal literature to assist the top down creation of the value hierarchy. The organization and specification of these objectives is accomplished through a process known as *affinity diagramming*.

### Affinity Diagramming

Affinity diagramming is a technique that can be used when a large number of concepts have been collected, but have no real structure. The method provides a means to identify common themes and relationships among a vast array of issues [1, p. 33]. For this study, affinity diagramming supports the structuring of the various objectives of homeland security into a defensible, doctrine-based value hierarchy.

A number of institutions have developed steps for creating an affinity diagram. The majority of the discrepancies between alternative processes stem from the level of detail used. By combining the broad concepts shared by many of these previously developed processes, a general method for constructing an affinity diagram was established. The following steps were used.

- Clearly define the problem or issue under consideration
- Research and record issues and ideas pertaining to the problem
- Collect all ideas together and randomize them
- Organize the collection of ideas into related groups
- Label related groups according to the specific theme
- Discuss and confirm the groupings

These steps are a general method for accomplishing this technique; more detailed instructions are left to the individual facilitating the creation of the affinity diagram.

In this study, the base approach of affinity grouping is extended to allow for cross validation of grouping results. The goal is to allow subject matter experts (SMEs) an opportunity to collaborate more effectively to ensure accuracy during hierarchy construction. Therefore, the basic steps provided above were modified to include a more quantitative validation during the grouping process. The following steps expound upon the last three steps in the process above:

- Start at the most broad grouping of the hierarchy and have each SME and team member divide individual ideas based on their own perception of the groupings
- Label related groups according to the specific theme, while validating these themes against existing doctrine
- Cross check this effort between team members by identifying, discussing, and resolving discrepancies until consensus is reached on the proper grouping for individual ideas

When consensus is reached at the current tier of the hierarchy, the SMEs and team members move to the next level of grouping and repeat this process. The process is repeated until the collection of ideas have been grouped at a level that can be accurately measured.

The use of affinity diagramming for organizing and defining complex issues can be truly beneficial in a vast array of applications. Homeland security is no exception. By clearly and completely delineating and grouping all of the issues concerning the security of America, as outlined in various resources, affinity diagramming provides an exceptional method for performing a bottom up completion and validation of a top down value hierarchy.

## **HOMELAND SECURITY VALUE MODEL**

The specific problem addressed in this research is the identification and organization of key homeland security objectives into a structure that will allow for the measurement of the nation's capability to achieve these objectives. The issues and initiatives pertaining to homeland security were obtained from the literature. In particular, a content analysis was performed on the following five prominent homeland security documents to obtain a vast collection of ideas and concepts.

- *Executive Order 13228: Establishing the Office of Homeland Security and the Homeland Security Council* [8]
- *The Department of Homeland Security*, released by President Bush [3]
- *National Strategy for Homeland Security*, released by the Office of Homeland Security [7]
- *Securing the Homeland Strengthening the Nation*, budget released by President Bush [4]
- *Homeland Security: The Strategic Cycle*, released by the ANSER Institute [2]

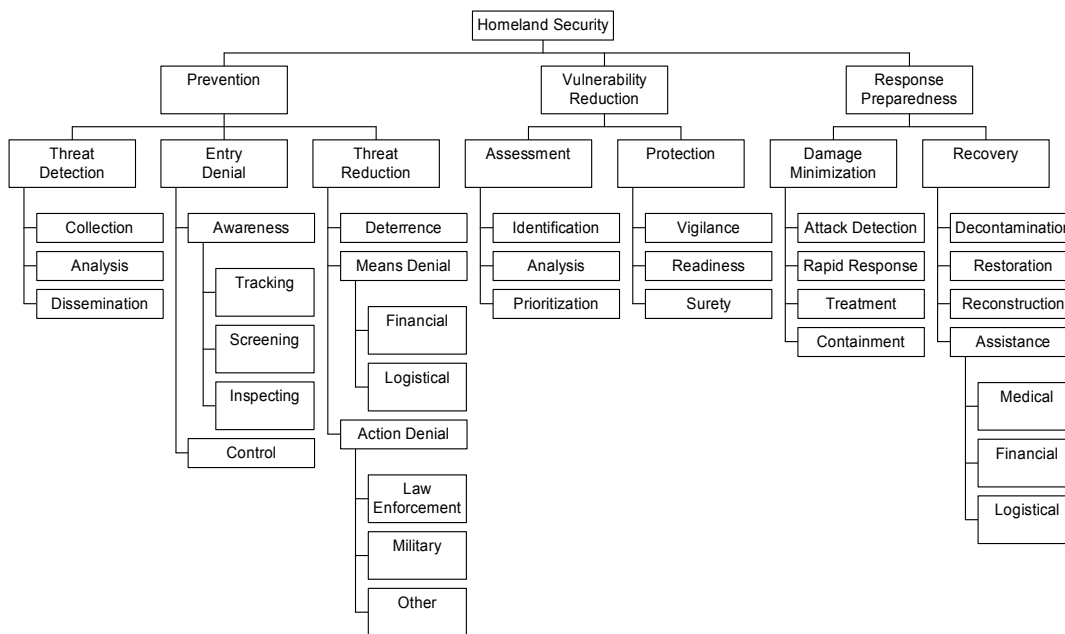
Each document was thoroughly examined to obtain not only the clearly defined objectives, but any "hidden" objectives as well. This analysis led to the extraction of **363 objectives** related to securing the homeland from terrorist threats and attacks. These objectives were randomized, however a tag to their source document remained throughout the process for documentation purposes. This effort accomplished the first three steps of affinity diagramming presented in the previous section.

Using this collection of homeland security objectives, common themes and issues were grouped together to form a hierarchical structure. This is where the newly developed affinity diagramming process (the last three steps presented in the previous section) began. The sub-objectives were first grouped according to the three fundamental objectives included in the National Strategy’s definition of homeland security (Prevention, Vulnerability Reduction, Response Preparedness). This grouping allowed for the validation of current doctrine by ensuring that all the stated objectives fit in these three categories. Each of these groups was further sub-grouped in order to validate and in some cases supplement the doctrine-based definition. This method not only assists in the completion of the value hierarchy, but also provides quantifiable support for the values that are included.

The grouping process was performed by the authors, leveraging the knowledge attained through the literature, current affairs, and military/federal government experience. The groupings were performed independently to capture variations in perspective. Mechanically, this was achieved by color-coding each of the 363 objectives into the various groupings. By completing the groupings in this manner, discrepancies between team members became very easy to identify. Discrepancies were then resolved through a series of group discussions until a consensus was reached. In most cases throughout this process, the discrepancies between team members stemmed from dissimilar understandings of the definitions of objectives being used in the hierarchy. The resolution of these discrepancies resulted in major improvements to the definitions used throughout each tier of the hierarchy. Thus, the hierarchy was created one level at a time, reaching agreement on the groupings and definitions in one tier before moving on to the next.

This showcases one of the greatest benefits of a doctrine-based grouping technique; it can be performed in the absence of the ultimate decision-maker. For strategic level problems, such as homeland security, the researcher may have limited access to the values and preferences of the decision-maker. This technique, therefore, acts as an independent validation and further clarification of homeland security doctrine. Figure 1 displays the value hierarchy that resulted from the affinity diagramming process.

**FIGURE 1: HOMELAND SECURITY VALUE HIERARCHY**



The definitions developed during the grouping process helped ensure the completeness and nonredundance of the value hierarchy. In many cases these definitions were modified from what is included in the literature as a consequence of the affinity diagramming. The grouping process revealed that many of the previous definitions did not adequately account for all the underlying objectives. Thus, it was necessary to develop more representative definitions. A complete delineation of these definitions can be found in the thesis work by Pruitt [9].

## CONCLUSION

This research has only begun to scratch the surface of the complex and pervasive problem of securing the American homeland from terrorist threats and attacks. As long as the critical infrastructures and key assets of the United States remain vulnerable, and terrorists are capable of executing their deadly intentions, homeland security will be of eminent concern. The value hierarchy presented in this study addresses this concern by demonstrating the capability to identify and structure key mission objectives in the absence of the ultimate decision-maker. Additionally, because it is developed directly from homeland security doctrine, the hierarchy can be utilized to measure the nation's capability to accomplish declared objectives. This insight supplies a foundation for the Federal government to leverage in the continuing effort to accomplish one of the most vital missions facing the United States of America, homeland security.

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