PRIORITY AND GOAL ASSESSMENT OF DEMINING OBJECTIVES FOR MEETING INTERNATIONAL TREATY OBLIGATIONS

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March, 2013

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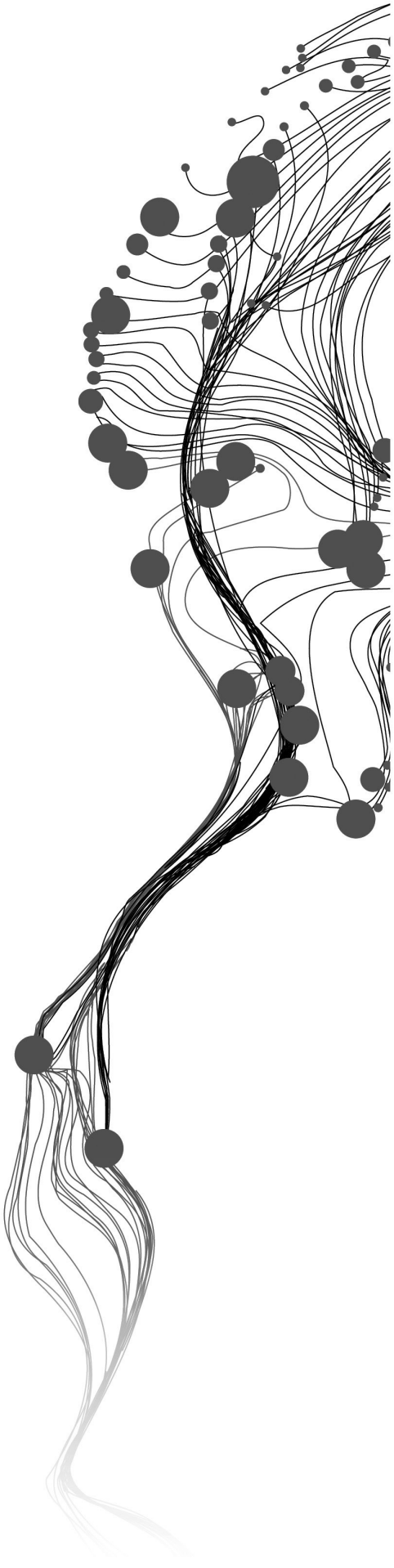

PRIORITY AND GOAL ASSESSMENT OF DEMINING OBJECTIVES FOR MEETING INTERNATIONAL TREATY OBLIGATIONS

RORY P. NEALON
Enschede, The Netherlands, March, 2013

Individual Assignment (IFA) submitted to the Faculty of Geo-information Science and Earth Observation of the University of Twente in partial fulfilment of the requirements for the degree of Master in Geo-information Science and Earth Observation.
Specialization: Governance & Spatial Information Management M.Sc.

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ABSTRACT

Humanitarian demining addresses one of the world's most evil and indiscriminate killers, landmines and other Explosive Retirements of War. The Ottawa Convention to Ban Anti-personnel landmines, is an almost universally adopted treaty prohibiting their use, production, stockpiling, as well as committing its signatories to remove all landmines in its territory within 10 years. However, the states partied to this treaty have a high rate of noncompliance with a majority requesting extensions on their clearance deadline.

Iraq's clearance deadline in 2018 is fast approaching. With a complex security and political environment as well as a large contamination problem, Iraq faces steep challenges in trying to meet its deadline.

By establishing the beliefs and views of Iraqi humanitarian mine action stakeholders on what is good and what is not good for compliance, this study will propose Spatial Decision Support Systems (SDSS) to assist stakeholders, and the program at large, in meeting its treaty deadline. Q methodology, a quantitative method to elicit beliefs, was used to establish different belief groups within the program's stakeholders. Using factor analysis and then rotating these factors, four distinct groups of thought were found. With grid-group theory, these belief groups further analyzed to allow for the proposal of appropriate SDSSs and contexts in which to use them in.

Keywords

Q Methodology, Mine Action, Humanitarian Demining, Ottawa Convention, Compliance

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For all my family members, friends, colleagues and strangers who helped to remind me to push on with the work. I would not have been able to accomplish this with my will alone.

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INTRODUCTION

1.1 MINE ACTION

Mines are a particularly evil weapon as they kill indiscriminately and are constantly left behind long after the wars that laid them have ceased. This leaves the civilian population vulnerable to being injured or killed by these explosive remnants of war. While the number of deaths and injuries from landmines has dropped to a yearly average of 4,191 in 2010-2011 down from around 20,000 in 1992, this still accounts for a significant number of deaths that could have otherwise have been prevented [7]. Military conflicts and violence is an innate part of society but its effects and the impact can be mitigated, especially in regards to civilian populations through effective international treaties. International disarmament and non-proliferation treaties have reduced or eliminated production and stockpiles of: nuclear, chemical, and biological weapons, but these weapons of mass destruction have only been sparsely used by state actors since the end of the 1940s [28]. However conventional weapons, such as landmines, have not shared the same amount of attention until the 1980s and not until the 1990s did this subject begin to receive serious attention on the international stage (see figure 5 in the Annex).

One of the most mine affected countries in the world is Iraq. The country's recent history has been marred by violent conflicts: the Iran-Iraq war in the the 1980s, the first Gulf War in in the 1990s, the second Gulf War in the 2000s, to the ongoing violence and civil strife, has left the country heavily contaminated with landmines, Unexploded Ordnances (UXOs), stockpiles of munitions, and countless other Explosive Remnants of War (ERW). The landmines and other ERW that have been left behind, leave a daunting task for those charge with their removal as well as those who need to manage the demining process as a whole.

The Local Impact Survey (LIS) was the first to measure the complete extent of this contamination but went further to measure its impact on the Iraqi population. The survey estimated that 1,622 communities were affected by the 3,673 different areas that were suspected as containing ERW and marked as hazardous. This meant that the livelihoods and safety of an estimated 1.6 million citizens was directly affected by the 1,730 square kilometers of hazardous area [12].

The LIS, while its methodology and usefulness questioned by some, shows the evolution that has occurred in mine action from being purely a numbers game concerned about the amount of hazardous areas cleared, to looking at the relation clearance has on the local population; its effect on their daily lives [10]. Minefields, in this frame are no longer equal; as those that are more dangerous, threaten a greater segment of the population, block more infrastructure and economic activities have greater value in their removal then the ones with less of an impact.

The same conceptual evolution that occurred here needs to be mirrored in national programs' strategic level planning. In clearing these hazards and for incorporating obligations from the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction (Ottawa Treaty) the inequality of the hazards; that they were not all created equal, needs to be incorporated. By only focusing landmine clearance efforts on reducing the total area of minefields to meet Article 5[1] the Ottawa Treaty, the work is not prioritized in a manner that helps the population of a country nor its economy reconstruct and redevelop.

1.2 OTTAWA TREATY

This more humanitarian approach can be attributed to the concept of "human security" and the Ottawa Convention is often cited as a shining example of human security in practice. While some argue that this concept has existed and practised since the Geneva Convention in the 19th century, its current conceptualization emerged with the collapse of the Soviet Union and the aftermath of the Cold War. The United Nations Development Programme's (UNDP)Human Development Report 1994 is considered the seminal work introducing this idea. It wanted to move away from the traditional view of security being the nation state focused on "...external aggression, or as protection of national interests in foreign policy or as global security from the threat of a nuclear holocaust"[27].

Instead they wanted to define security "..beyond the classical conception of security as military security..." and instead include "...issues such as human rights, development or environment"[31]. This meant that security should protect people in their daily lives "...from the threat of disease, hunger, unemployment, crime, social conflict, political repression and environmental hazards"[27]. Furthermore, the report goes on to categorize these threats to the world's population into seven categories:

- Economic Security
- Food Security
- Health Security
- Environmental Security
- Personal Security
- Community Security
- Political Security

Mine Action neatly fits into the concept of human security. With this focus away from the warring superpowers of the cold war, more conventional weapons came into the focus of the international community, landmines being one of them. Their toll on the civilian populations around the world was considerable, the cost to lay them cheap, and the process to remove them expensive. At the time around the Ottawa Convention's drafting, 26,000 people were being killed by landmines, a majority of whom were civilians[22]. Not only were

[1] Each State Party undertakes to destroy or ensure the destruction of all anti-personnel mines in mined areas under its jurisdiction or control, as soon as possible but not later than ten years after the entry into force of this Convention for that State Party.

the people's personal security being violated but the other six categories covered by human security as well.

While there is ample evidence to connote human security with the raison du jour for the process that lead to the treaty's creation and widespread adoption, its goals may not have perfectly translated into the treaty itself. Article 5 section 1 states that the measure for compliance is merely the elimination of all minefields in 10 years–an important accomplishment and would certainly benefit a country's population, yet it is not constructed in a way to motivate states to demine in a way that puts its population first. As is the case in Iraq, oilfields and oil infrastructure have been prioritized in the National Mine Action Strategy over that of of civil infrastructure, agricultural lands, etc...[19].

1.3 Q METHEDOLOGY

Establishing what should be done for compliance requires a systematic study of relevant stakeholders' opinions. Q Methodology is one way to establish quantitative results on such an abstract concept as people's opinions on compliance. It "...provides a foundation for the systematic study of subjectivity, a person's viewpoint, opinion, beliefs, attitude and the like..."[30]. This of course necessitates the assumption that an individual's subjectivity is able to be studied.

Through defining a concourse around the subject in question and from this deriving statements for respondents to assess and rank on their personal opinions, coalitions of similar or different thoughts and beliefs can emerge. One of the tangible benefits of this methodology is that it lends itself well to a small set of specialized respondents. As mentioned, people's responses are correlated with one another to see if cluster of similarities appear, meaning that it can "...reveal a characteristic independently of the distribution of that characteristic relative to other characteristics"[30]. This information will allow Iraq's decision makers to better utilize its very own experts opinions to insure it meets its demining obligations.

Humanitarian Mine Action programs are often operating in complex post conflict and transitional states. Being able to manage such a program is often hampered by a confluence of complex external factors. This makes managing the program, controlling what can be controlled, a critical component of insuring success. Understanding what needs to be done to insure success can be difficult to ascertain, but would help the people managing mine action in Iraq to meet their compliance obligations as efficiently as possible.

1.4 RESEARCH OBJECTIVES

Based on the current concourse in subject matter literature and media, and with the gaps that exist in academic knowledge, the objectives of this research are to identify what beliefs and perceptions exist in Iraqi mine action stakeholders on best practices and ideal strategy to insure compliance with international treaty obligations in this post conflict state that will allow for relevant spatial decision support tools to be identified and proposed.

1. Identify and extract applicable concourse surrounding different policies and themes within mine action that can be used to assist with Iraq's Article 5 obligations.

This will be done via:

2. Constructing and conducting a study based on Q methodology of relevant Iraqi mine action stakeholders including members from:
   - National and regional mine action authorities
   - National demining NGO
   - International demining company (commercial)
   - United Nations
   - International Information Management consulting company
3. Identify the different relevant group of belief that exist within the study group.
4. Use grid-group cultural theory to further analyze and categorize the resulting belief groups
5. Leverage the results of the analysis to propose a criteria for a plausible spatial decision support tool which will utilize various data bodes; both generated by the mine action program itself and from external sources.

1.5 RESEARCH QUESTIONS

1. What is being discussed in the current concourse on Iraqi mine action, especially that related to compliance with Article 5
2. What different coalitions exist for stakeholder's perceptions on Article 5 compliance in Iraq's humanitarian mine action program?
3. Do relevant stakeholders involved in Iraq's humanitarian mine action program have agreed upon conceptions on what needs to be done to insure Iraq is able to comply with its Article 5 obligations?
4. Can the results from this be used to propose and construct a spatial decision support system (SDSS) for decision makers?

1.6 RESEARCH DESIGN

To answer these questions, work was executed in seven stages, with the thesis being written along each of the different phases outlined in Figure 3. The research was designed to establish the different groups of beliefs of the relevant stakeholders in order to extract meaningful information on what should be done within the program to meet Iraq's Article 5 obligations. From this information, the criteria of an SDSS is proposed along with which stakeholders it should target.
The Research Matrix shown in Table 1.1, highlights the connections between the Research Objectives and Questions. Additionally it indicates what methods will be used to complete the objective and answer the question along with the source of the data that will be used.

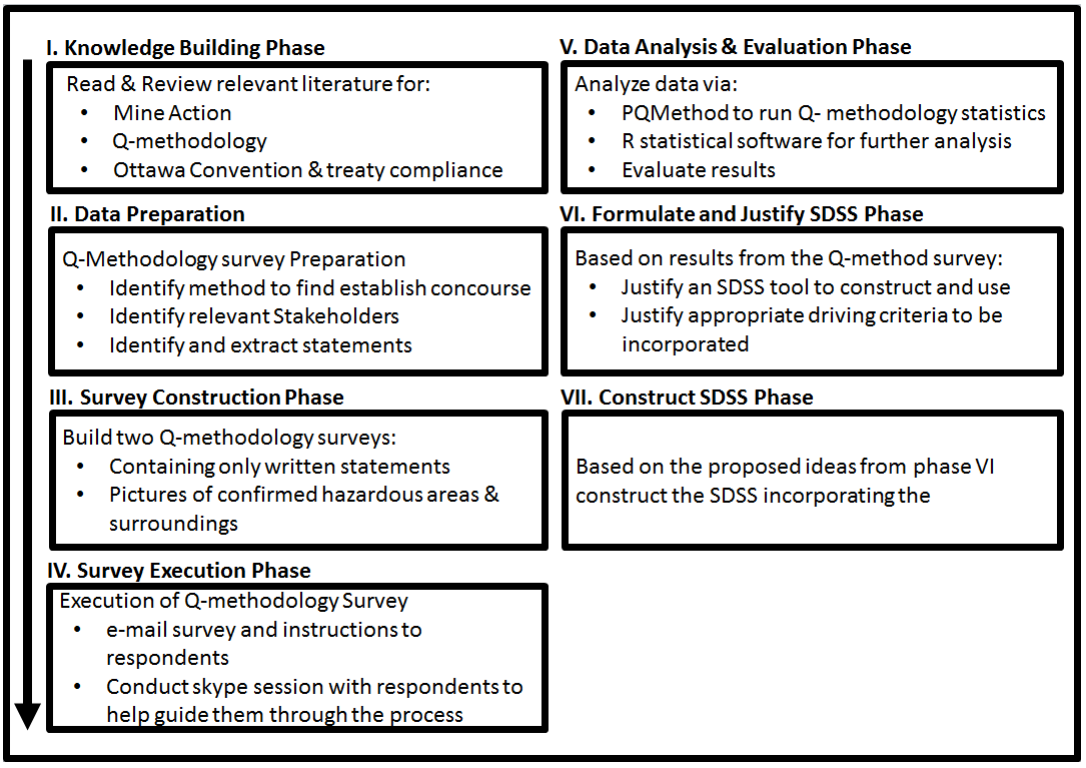

Figure 1.1: Research Steps

Table 1.1 Research Matrix

Objectives	Research Questions	Methods	Data Source
Identify and extract applicable concourse surrounding different policies and themes within mine action that can be used to assist with Iraq's Article 5	What is being discussed in the current concourse on Iraqi mine action, especially that related to compliance with Article 5	Literature Review	Academic Journals, News outlets, Government documents, Third party organizations, social media
Construct and conduct a study based on Q methodology of relevant Iraqi mine action stakeholders:	What different coalitions exist for stakeholder's perceptions on Article 5 compliance in Iraq's humanitarian mine action program?	Remote online Q methodology study in Q-Assessor	Q statements derived from concourse
Identify the different relevant group of belief that exist within the study group	Do relevant stakeholders involved in Iraq's humanitarian mine action program have agreed upon conceptions on what needs to be done to insure Iraq is able to comply with its Article 5 obligations?	Factor Analysis	Results of the Q sorts
Use grid-group cultural theory to further analyze and categorize the resulting belief groups	Do relevant stakeholders involved in Iraq's humanitarian mine action program have agreed upon conceptions on what needs to be done to insure Iraq is able to comply with its Article 5 obligations?	grid-group cultural theory	Results of factor analysis for the Q sorts
Leverage the results of the analysis to propose criterion for a plausible spatial decision support tool which will utilize various data bodes; both generated by the mine action program itself and from external sources.	Can the results from this be used to propose and construct a SDSS for decision makers?	Expert Opinion	Collective output of Q methodology study and grid-group cultural theory

Chapter 2
LITERATURE REVIEW

Academic research related to mine action is limited, fragmented, with a large amount of it coming during the initial push to frame it as an issue of universal human security concern (Figure 2.1, Table 2.1). The more recent work related to mine action is on adopting new methods in robotics or remote sensing. However, some research does exist on the decision making process and the utilization of support systems, however this is limited as well. This study will examine and fuse concepts from Q-methodology, grid-group cultural theory, and the (spatial) decision support sciences, all in context of compliance with Article 5 of the Ottawa Convention.

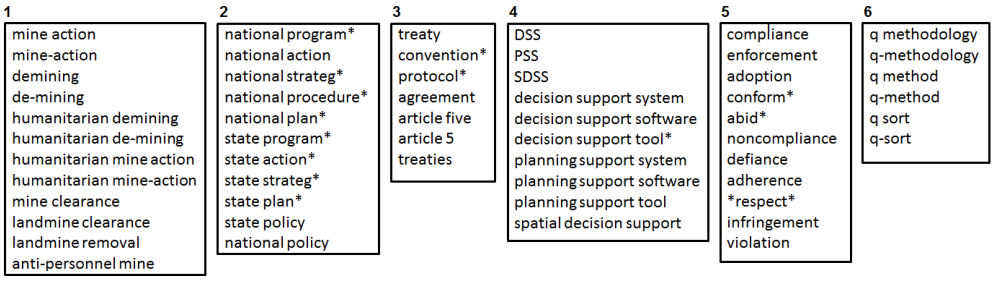

Figure 2.1: Search Terms

Table 2.1 Search Combinations

Search Combination	Number of Results	Refined Results
5 AND 3	197,131	-
(5 AND 3) AND 2	5	-
1 AND 2	1	-
(5 AND 3) AND 2	135*	93
(5 AND 3) AND 4	446*	191
4 AND 2	21	-
6 AND 1	0	-
6 AND 3	4,695	-

2.1 Q METHODOLOGY

2.1.1 Introduction

Establishing what relevant stakeholders in Iraqi mine action believes should be done for compliance requires a systematic study of their beliefs. Q Methodology is one way to establish

quantitative results on such an abstract concept as people's opinions on compliance. It is a statistical adaption of Charles Spearman's factor analysis [32]. It "...provides a foundation for the systematic study of subjectivity, a person's viewpoint, opinion, beliefs, attitude and the like..."[30]. This of course necessitates the assumption that an individual's subjectivity is able to be studied.

2.1.2 Concourse

A concourse in Q methodology refers to the "...flow of communicability surrounding any topic..." [4]. Where communicability is the "...observable domain of self-referent statements and opinions" [32]. The concourse can be seen as "the whole" surrounding a topic, ranging from people's discussions on the subject, written material, and even artistic and musical expression, is encompassed by this term. Steven Brown believes that it "...incorporates virtually all manifestations of human life, as expressed in the lingua franca of shared culture" [4]. Establishing a concourse can be done in different ways [4]. A common way to establish a concourse is to interview and record subjects in a workshop setting [4]. However, alternative means are possible. Literature, and other forms of media can be as well. The purpose is to form "...the overall population of statements from which a final Q set is sampled" [32].

2.1.3 Q set

The Q set is the sample of statements derived from this concourse that the P set will eventually sort. This is considered by many as the most difficult part of the development process as it is "...more an art than a science..." [3]. The selected Q set needs to be representative of the concourse from which it was derived. Different parts of the concourse should not be over emphasized or igonored because of an excess or lack of statements focused on that particular subject. A structure is needed for this to happen and it can either "...emerge from further examination of the statements..." or it "...may be imposed on the concourse based on some theory" [30]. It is important to note that this may lead to different Q sets being selected from the same concourse by imposing different structures or a different researcher performs this task [30].

2.1.4 P set Selection

The P set or, the people who would be partaking in the study, has to be defined. It should be a robust sample of the population to insure that a range of viewpoints are captured. Importantly, the P set members should have not just have any viewpoint but one which "...matters in relation to the subject at hand" [32]. This means that members should be substantially diverse from one another, be it: sex, occupation, hair color, smoker vs nonsmoker, or a number of other demographic and social characteristics.

2.1.5 Q sorting

Since Q methodology was originally developed in the 1930s, the Q sort was performed with paper or cards [30]. With the advent of personal computing and the ever increasing penetration of the internet, it is now possible to perform Q sorts both on a computer and remotely. Q sorting is the "...technical means whereby data are obtained for factoring"[3]. The Q sorter is asked to rank Q set's statements according to his or her personal point of view on the subject. This is done in a specific form. This specific form is known as the response grid. It is "...a continuum from most agree at one end to most disagree at

the other"[4]. It "...usually takes the form of a quasi-normal distribution", with a scale corresponding with the weight of each of the positions [30]. The response gird should have slots where the statements from the Q set can be placed, it there for has to have enough slots for all of the statements in the Q set. These slots form columns which all have the same value on the set scale. An example Response grid can be seen in Figure 2.2 below.

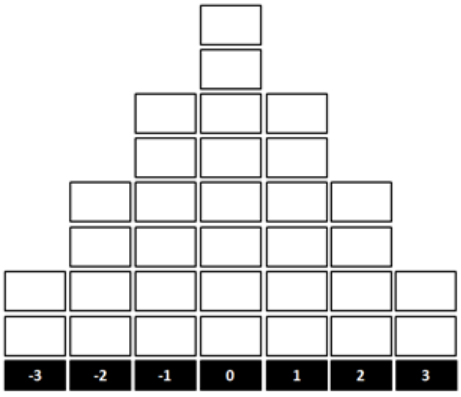

Figure 2.2: Example response grid, with −3 being most disagree and 3 being most agree

2.1.6 Variance

Variance is an essential concept that needs to be understood before understanding the conceptions used in Q methodology's analysis. There are a few different types of variance involved. The "...full range of meaning and variability present in the study - is known as the study variance" [32]. This can be divided into: common variance, which is how much is in common with both the Q sort and the group, specific variance which is the variance related to a particular P set member specific Q sorts", and finally, error variance, which is the random error from "...imperfections that all methods and systems of data gathering introduce" [32].

2.1.7 Factor Analysis

Factor analysis, a data reduction method, is performed to analyze the completed Q sorts. It tries to "...account[s] for as much of this study variance as possible...through the identification of, and by reference to, any sizeable portions of common or shared meaning that are present in the data [32]. The study's factors are formed by these different groups of shared (correlated) meaning. The factors are the "...natural groupings of Q sorts by virtue of being similar or dissimilar to one another..." [30].

The factors are built through a series of key intermediary steps. The first step in analyzing the results from Q methodology is building a correlation matrix [30]. The correlation matrix shows the "the relationship of each Q sort with every other sort", thus showing how similar, or different, the two variables being compared are [32]. Although it is often considered an "intermediate structure used simply for the subsequent calculations", it is still useful to see the strength of the relationship different sorts have with one another [13].

Another step is needed before the data can be subject to factor analysis, calculating the

residual correlation matrix. It is formed from the original correlation matrix and the original factor loadings. The reason residual correlations are calculated is to remove a "...sizeable portion of shared ground", in other words, to remove the common variance [32]. The formula for calculating two variables' residual correlation is:

```
Residual Correlation = Original Correlation - (Factor Loading
        First Q sort * Factor Loading Second Q sort).
```

The result of this process is a new set of factors being calculated and these are the factors used in factor analysis.

The end result of extracting the factors from the residual correlations, are the unrotated factors. Factor analysis involves grouping Q sorts with similar views into the same factor. Each of the Q sorts has a factor loading associated with it which shows how similar each Q sort is with each of the factors. Van Excel states that the "...number of factors in the final set depends on the variability in the elicited Q sorts" but recommends to "take along more than the number of factors that is anticipated in the next step of analysis...to preserve as much of the variance as possible" [30]. He continues to state that in accordance with Brown, the "magical number" of factors is seven [3]. Q-Assessor, performs this step automatically and by default, provides seven factors.

The next step in Q methodology factor analysis is rotating the said factors. Steven R. Brown believes that "...rotation is akin to increasing the resolving power of a microscope..."[3]. Hence, by looking at the factors from a different angle, new meaning can be extracted. The factor loadings are treated as having a "...spatial or geometric function" where the two factors being examined are used as coordinates to map "...the relative positions or viewpoint of all the Q sorts in a study"; an X and Y value [32]. This is used to plot the points on a Cartesian plane (known as a factor space) as seen in the unrotated example of factors A and B in Figure 2.3. However, there is a third dimension in this plot. The third factor is, he viewpoint in which the other factors are being examined, and like the other dimensions in the factor space, has a role in how the plotted points are viewed. Since factor extraction captured the majority of the commonality between the Q sorts, the current position of the variables "...reflects a compromise....of what these otherwise disparate viewpoints hold in common" [32]. Factor rotation will allow for the re-positioning of the axes to give us the most meaningful viewpoint possible in relation to the other Q sorts, helping us understand our data.
Factor rotation takes the plotted, unrotated factors, and swivels the axes into a new location in the space. It does not move the plotted points, but in essence, changes the perspective in which they are viewed. The type of rotation used is an orthogonal rotation, meaning that the 90°angles of the axes are maintained. This insures that "...each factor is statistically independent and that all are zero-correlated" [32]. As can be seen in Figure 2.4, the location of the points in the rotated plots of factors A and B, appeared to have, relative to the unrotated factor, changed. Yet the "...sum of reality remains the same.." and the distance between the points "...remain invariant..." no matter how the axes are rotated [3].

2.2 GRID-GROUP CULTURAL THEORY

While known by many names, grid-group cultural theory, attempts to classify all cultures on two basic and mostly independent societal dimensions [18] [23]. These two dimensions,

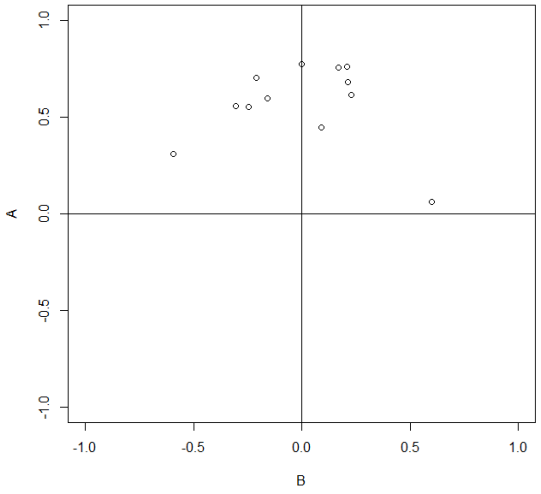

Figure 2.3: Scatter plot of unrotated factors A, B

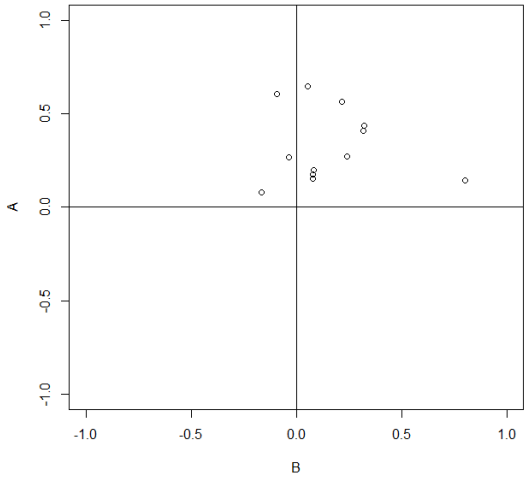

Figure 2.4: Scatter plot of Rotated factors A, B

group and grid form the basis of all the theory's classifications and the axes of the matrix used to plot them. From this, the theory has three major claims. The first and underlying assumption, is that "...culture matters", secondly that it is possible to distinguish a finite set of cultural types, and the final claim is that this can be applied universally [18].

Group, which forms the basis of the X axis of the matrix, "...measures how much of people's lives [are] controlled by the group they live in" [6]. This makes sense, as a person "...needs to accept constraint on his/her behavior by the mere fact of belonging to a group..." also their needs to be "...some collective pressure to signal loyalty" for a group to have members [6].

As one is placed increasingly to the right of the X axis, the more someone is "...increasingly under the bond of other people", and to the left, increasingly "independent of other people's pressure" exerting pressure on others[5]. Once the Grid dimension is added, classification based on the resulting "types" will be possible.

Grid, which will be the basis of the Y axis of our matrix, is the amount of regulation or control of who (or what) is being plotted is willing to accept [6]. Basically this includes any other part of society that would in some way limit how they are able to behave besides what is included in the group. In contrast to the group, it is made up of "...individually-oriented aspects of social structure", specifically what is referred to as networks [23]. These networks are the "connection between particular individuals that do not carry with them group-centered consequences" [23]. This makes networks a very basic level of interaction. With the grid and group defined, the matrix they form can be examined.

The matrix created by the two axes, creates for distinct quadrants with four distinct cultural types. While there has been debate on how to display the matrix, it is of minor concern as long as its principles are known. Two essential questions about the matrix must be answered to understand it in this regards. First, are the dimensions continuous or dichotomous [18]? The dimensions will represent a continuous scale, "...distinguishing between weak and strong, low and high..." because the study was conducted at a high resolution on a narrow subject, thus necessitating finer detail to represent the variation in beliefs [18]. Secondly, how many cultural types exists? Some studies add a fifth culture type, known as an Isolationist, someone who has removed themselves from much of the confines that cannot be defined within grid-group theory; a hermit for example [18]. This was deemed unnecessary for this study, as all could be categorized with the four displayed. The four quadrants are classified, for the purpose of this study as:

- Hierarchy
- Enclave /Egalitarian
- Individualist
- Fatalists

While different terms are used by different authors, they represent the same ideals. Since these labels do produce "...a lot of confusion because the stimulate our imagination so readers tend to forget about grid and group and fill up the quadrants with the connotations of the labels...", it is less important to focus on the names as to what they represent for the quadrant [18].

The four grids of the matrix can be seen below in figure 2.3. The upper right gird, Hierarchy, has both strong grid and strong group influences. It is marked by behavior that is "...governed by positional rules..." [6]. The bottom right quadrant is marked by the enclavist or egalitarian culture, while strong on group, they are week on grid controls. Generally those that fall within this quadrant would not have "...ranking or grading rule for the relations between its members", preferring instead, equality [6]. In the bottom left quadrant lies the individualists. They are defined by having both weak grid and weak group influence. Douglas believes the main form of control at work in this quadrant is competition [6]. The name itself makes it clear that the individual is focused and commitment to a group, quite weak. Finally, in the upper left hand corner is the Fatalist culture type. It has "...has strong

grid controls, without any group membership to sustain individuals" [6]. People here are generally ignored by the larger groups. These four form the basis of the grid-group cultural theory culture cultural types. In this study, as is generally seen in most of society, there are very few examples of these types in their pure form. Instead, hybrid versions that have commonalities with more than one group are more likely to be seen.

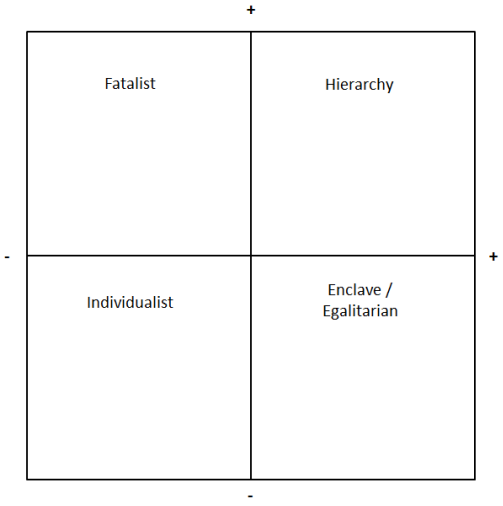

Figure 2.5: Grid-Group Matrix

The Q methodology analysis flows quite nicely into grid-group cultural theory. With grid-group cultural theory stating that people's beliefs and perceptions come from their "...adherence to a certain way of organising social relations..." and that these are "...revealed by their preferences..", Q methodology makes an excellent partner [18]. Q statements, created and selected to match the two basic dimensions of life (grid and group) are sorted by the respondent's based on their personal beliefs and perceptions, in an attempt to reveal what they exactly are.

2.3 DECISION SUPPORT SYSTEMS IN MINE ACTION

2.3.1 Introduction

DSSs are defined on how and why they are used in supporting decision making. They "...interact with the people who are entering and evaluating the data prior to producing output"[11]. Importantly, they are complementary or ancillary systems which are "...not intended to replace skilled decision-makers" [21].

A wide range of knowledge and theory is used by DSSs including: database research, decision theory, and economics just to name a few [16]. Further, they have been applied and implemented in a variety of ways, in a variety of fields, targeting a variety of individuals, groups, and institutions. A Survey of Decision Support Systems Applications (1995 - 2001), highlights this diversity. DSSs have been seen application in corporate functional areas such as finance, strategic management, and in non-corporate areas such as, education, government, and the military [8]. A taxonomy for DSSs was also built on the type of support

they provide: suggestion model, optimization model, data analysis system etc...[8]. The diversity of their application shows how useful they have become, ingrained in helping to resolve different decision situations.

2.3.2 Spatial Decisions Support

A Spatial Decision Support System (SDSS) is a Decision Support System with provides "...computerized support for decision making where there is a geographic or spatial component to the decision" [14]. This usually means it contains a Geographic Information System (GIS) in its structure and incorporates aspects in it for decision making. The GIS "...facilitates interaction..." with a database which stores spatial information [14]. With the democratization of geographic information on the internet, people are becoming more and more conftable with using spatial information in their daily lives. Numerous applications such as google maps, Ushahidi, Mapbox now let you add, mashup, and layer geographic information and incorporate it you decision making process.

2.3.3 (Spatial) Decision Support Systems in Mine Action

Decision Support Systems (DSS) have played a role in humanitarian mine action even before it became universally famous with the Ottawa Treaty and Jordy Williams receiving the 1997 Nobel Peace Prize. The Mine Action Information Centre, founded at James Madison University in Harrisonburg, Virigina in 1996 was supported by the Centre for Geographic Information Science, in many facets including Decision Support [17]. This included the evaluation of "GIS software for a Humanitarian Demining Support System" [17].

SDSSs have been employed in mine action because demining is "...an extremely complex, slow and expensive job", with limited funding [15]. Further, with the costs of ineffective, poorly made decisions being being human lives, efficiency is desired [15]. Decision support systems have been utilized in this field usual for minefield demining prioritization although "...the social science used in humanitarian landmine action is still weak" [2]. This puts a damper on them, preventing them from being universally accepted, adopted, and integrated into humanitarian mine action programs decision making and work-flows.

Chapter 3
METHODOLOGY

3.1 OVERALL APPROACH

To make new discoveries about what is needed to be done for Iraq to comply with Article 5, Q methodology was chosen as the appropriate approach. For this project, Van Exel and De Graff's basic framework as seen in Q methodology - a sneak preview was followed for conducting the Q methodology survey [30]. They state that first a concourse must be defined, from this a Q sample developed, then a P set chosen to administer the Q sample to, which will ultimately allow for the analysis and interpretation to be conducted [30].

Because of security concerns, funding, and time limitations, the necessary concourse was derived solely from different types of literature on the subject. These different documents, representing the large swath of opinions that exist in this concourse, was effective in deriving the necessary statements. the reset of this chapter will be dedicated to explaining how these statements were derived, how the Q sort was conducted and how finally how the results were analyzed and interrupted.

3.2 STUDY EXTENT

The study will cover the entire Republic of Iraq. The study's statements were designed for the country as a whole, and the respondents asked to consider humanitarian mine action on a national scale. This spatial scale was chosen because it was the national government who signed and ratified the treaty and they are ultimately responsible for the country's adherence. However, responsibility for humanitarian mine action in Iraq is controlled by three main offices, the Iraq Kurdish Mine Action Agency (IKMAA) headquartered in Erbil, The Directorate of Mine Action (DMA) in Baghdad, and the Regional Mine Action Center - South (RMAC-S) located in Basra. It would be possible to do the same study on a smaller regional scale, however, it would have proven much harder in obtaining the requisite amount remotely.

3.3 CONCOURSE

In this instance a wide range of literature was consulted, including: news articles, academic papers, official government documents, and from third party monitoring agencies. These were consulted to establish the concourse on Iraq's Ottawa Convention compliance.

3.4 Q SET DEVELOPMENT

From The US State Department's Inspector General's Report on Humanitarian Mine Action in Iraq, to articles in specialized Oil Industry outlets and even a demining organization's

Facebook page, a wide breadth was used in establishing the concourse. From here the Q set was derived by selecting a diverse set of the most penitent, interesting, and relevant quotes. These would form the basis of the initial Q set. The quotes chosen looked at different aspects of a humanitarian mine action program. These quotes were used to write a series of initial statements for the Q set in a google drive spreadsheet (see Annex A). From here the statements were categorized based on their theme. The original themes were: Bureaucratic, Corruption, Commitment, Location, Security, and Prioritization.

While these labels did proved a certain amount of insight into each individual statement, a different lens was needed that would better help in the analysis of statements. Instead of picking categories out of thin air, a structure was imposed with categories from grid-group culture theory. These included Hierarchy, Egalitarian (enclavist), Individualist, and Fatalist (isolates) [18]. Additionally The questions were also categorized on the essence of the type of problem it dealt with. These were Authority, Commitment, Information Tools, Prioritization, and Strategic Planning. With a corresponding statement at the core view, secondary view (on how to achieve the core view) and a Policy View (a practical implementation of this or tool). However, it soon became apparent that by looking at each question on these three levels, in some instances, change or manipulated them in a way that they lost their original meaning, clarity and impact. Instead it was decided that only two levels of statements would be used, representing a "Fundamental" and "Operational" perspective to each of the problem categories and each of the cultural grid group theory classes (see Annex B).

3.5 P SET SELECTION AND CLASSIFICATION

A representative group for the P set was desired that would include the different sectors involved in humanitarian mine action and of people who would also be familiar with the Ottawa Convention. Participants came from: the United Nations, donor governments, The Iraq government, international and national NGOs, as well as commercial demining companies. To insure a representative sample, a stakeholder analysis was conducted.

A "Stakeholder Classification Matrix", is essential in proving the "...validity of the assumptions made about its various stakeholders..."[9]. Additionally it helps establish that a representative sample of organizations were selected from various levels of influence and importance. The Matrix displays the different organizations from which the respondents P set belong to. It is displayed on a 2 x 2 matrix with from high to low on the X axis and Importance from high to low on the Y. The Importance and Influence was considered continuous and the organizations were placed accordingly, as can be seen in Figure 3.1 below.

The Organization with the least amount of importance and influence resided in Box D. Here the two demining companies, the Iraq Mine Clearance Company (IMCO) and Ronald's Company (RONCO)are placed. While both these organizations play an important role on the ground as both deal with the physical detection, removal, and disposal of mines, they exert very little influence strategically on Iraq's Article 5 compliance. Furthermore they are competing in a crowded and fluid market, where companies can easily ramp up or down operations based on the contracts they have received from the government. This sector is highly regulated, managed, and controlled by the government offices responsible and thus these two organizations can only act within the regulations and guidelines set for them.

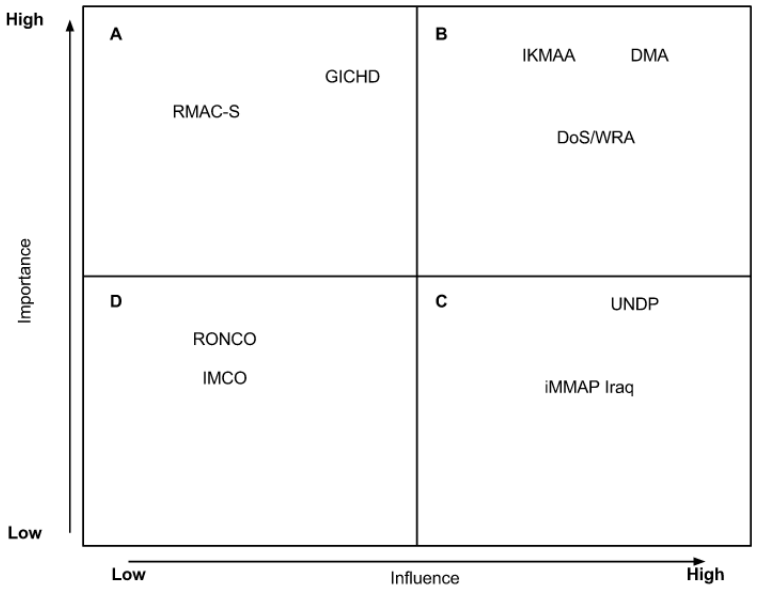

Figure 3.1: Stakeholder Classification Matrix, based on Organization/Office

While the two companies do have to work efficiently to meet the completion dates that the government sets, it is in their interest to do so, in order to receive future projects. Thus they are not very influential on the compliance process because of the nature of how the program is managed, and their importance is minimized due to the fact that there are many other companies which could fill the role they play.

Box C, has two organizations that are more influential, but their importance is still minimal. Information Management and Mine Action Programs (iMMAP) and UNDP, both acting in different capacities as consultancies for the Iraqi humanitarian mine action program, are able to influence the respondents who's organizations are located in Box A (highly important and influential), but on their own are not necessary important to the program. iMMAP has been funded by the U.S. Department of State office of Weapons Removal and Abatement (WRA) to support the three Iraqi mine action offices with mapping and information management. UNDP, also in part funded by WRA, provides strategic and planning advice to the mine action offices in Iraq. iMMAP has a long history of operating in the country and is able to exert a considerable amount of influence on Iraq's Article 5 compliance. The database they help the Iraqi government maintain is the one responsible for storing the information used to report clearance work to the convention. iMMAP was able to get approval for Mine Fields being removed from the database because they overlapped other minefields, this meant the same hazardous area was counted twice, and by removing the overlap the amount of land being reported as hazardous decreased with no demining work needed. However, both organizations are competing for the ear of the people they are being paid to support and additionally, for dollars from donor governments. These additional burdens might conflict slightly at points with the objectives that the Iraqi government has as far as Article 5.

The organizations that exhibit the highest degree of importance and influence reside in box B. In this case the Iraqi Kurdish Mine Action Agency (IKMAA), the Directorate of Mine

Action (DMA), and WRA are located here. All three are essential if the goal set forth by Article 5 is to be met. First the DMA is, in relation to the other organizations, is the most important and influential because it is the government agency responsible for reporting Article 5 compliance to the treaty holders and for setting policy and managing the Iraqi humanitarian mine action program. It is up to the DMA to decide how to actually address the strategic plan to meet the article 5 deadline, and how to implement it operationally. Another way to look at this is the fact that they are the only group involved in the P set that could single-handedly prevent compliance.

IKMAA is next in importance. They are de jure subordinate to the DMA and must submit all information regarding mine clearance work to them. However, like other institutions in the region, it is run very independently and with little oversight from the central government. With Mine Action however, this might not necessarily be bad. The "no-fly zone" established in Northern Iraq, allowed international demining companies to in the North since the early 1990s, giving them a head start not only in clearance but in receiving training and advice from intentional experts. This "head-start" and because of other political rivalries, makes compliance and reporting on compliance within the Kurdish government, and thus IKMAA's interest. It is one of the most heavily mined regions within the country making it very important for Article 5 and with the expertise of its staff, very influential as well.

Finally, WRA, the organization which is the least important and influential of these three, but still relatively more so then the others, has a unique position among the participating organizations. It does seem a bit out of place, being that the government of the United States has not signed the Ottawa Convention. Yet it is both important and influential to Iraq's success in Article 5 compliance. The United States government has spent $1.5 billion since 1993 on landmine removal around the world, making it one of the largest donors in mine action and a large part of it has gone to Iraq [29]. Naturally, it would be interested in insuring that the funding it provides is well spent and efficiently used.

For this study it was extremely difficult to get the desired P set to participate in a Q sort. However, for all "...good intentions and carefully laid plans, the recruitment of participants still has a tendency to develop on the hoof – through snowball sampling techniques and via word of mouth - as the fieldwork is conducted" [32]. This of course is not perfered, but with the limitations that come with an M.Sc. and especially one on a foreign country with security issues, "...often a practical necessity" [32]. The P set that ultimately obtained and performed Q sorts, was the ones who through sheer pressure and pestering, took the survey. Table 3.1 below identifies the P set members with an ID and their self described position.

Table 3.1 Final P set

ID	Field	Job Title
5338	Commercial Company	GIS/DATA TECHNICIAN
5374	NGO	IMSMA Team Leader
5433	Government	Information Management Officer (IMSMA & GIS)
5451	NGO	Snr TA (Senior Technical Advisor)
5555	Government	IT/ Information manager
5594	Commercial Company	Country Manager
5647	Other: International organisation	Advisor information management
5777	Government	Engineer Assistant
5780	NGO	Information Management Officer
5781	Other: UNDP	Mine Action & Victim Assistance Project Manager
5795	NGO	Information Management Officer
5807	Other: UNDP	TA/Liaison Officer

3.6 STUDY CONSTRUCTION

With the Q set defined and stakeholders who would form the P set identified, the survey itself had to be created. Funding, time, and security related constraints meant that the study would be conducted remotely and that a virtual means of doing so had to be identified. Asking the P set to print out the Q statements, cut them out as cards, and then sort them in the pyramid was a lot to ask for. Instead an online was desirable as this would be the easiest and most efficient means of conducting the sorts and collecting its information. A simple search on the internet found two online tools: Q-Assessor and FlashQ. After exploring both of the tools' functionality and customization options, Q-Assessor as easily determined to be the best tool for not only designing the Q sort but distributing it as well.

After an account was created the q study was created. The first step was to edit the study's "General Configurations". This meant writing a general description of the survey, that would be displayed to respondents at the start of their sort. Also, to make the survey less burdensome, anonymous responses where allowed, negating the need to register with Q-Assessor in order to participate. The interface which users would use for the sort had to be chosen as well, the "Drag and Drop Grid Interface" was chosen over "Vertical group button interface" because of it was more interactive, intuitive, and mimicked best a traditional Q sort done on paper. Another configuration was to display "Randomized Statements During Initial Sort" as to have no one statement be biased because of its order int the sort. Additionally, the two poles of the sort had to be created (Is good for Compliance, Neutral, Is Bad for Compliance). After the study was configured, the last step was to write instructions for the study, to insure that the participants understood how to complete it.

Next, the study's concourse itself had to be created. The thirty-two Q statements that were developed earlier had to be entered into the study's concourse and marked as "Active". From here, the Q sort's bins were created. To do this, three sets of information was needed: a Bin "Score", representing the value of the bins, the "Number of Statements in Bin", setting how many statements would belong to each score, and finally a "Label" for each of the the bins. This can be seen in Figure 3.2 below:
To accommodate the thirty-two statements, and to keep the requisite symmetrical structure of the response grid, seven columns were used, to store the bins. This distribution, as noted in van Exel's paper, was designed to roughly follow normal distribution [30]. Furthermore,

Iraq Article 5 Survey Bins

Current Bins

You have configured the correct number of bins to match the concourse size.

Label	Number of Statements in Bin	Bin "Score"	Actions
+3	2	+ 3	Edit | Move Down
+2	4	+ 2	Edit | Move Down
+1	6	+ 1	Edit | Move Down
0	8	0	Edit | Move Down
-1	6	-1	Edit | Move Down
-2	4	-2	Edit | Move Down
-3	2	-3	Edit

Figure 3.2: Bin Configuration

since the statements covered a range of topics, not all which the respondents were expected to be have strong opinion on made it necessary to insure that the statements were organized into a relatively steep sloping pyramid [30]. The bins were organized and scored" -3, -2, -1, 0, 1, 2, 3 to resemble the structure seen in Figure 3.3.

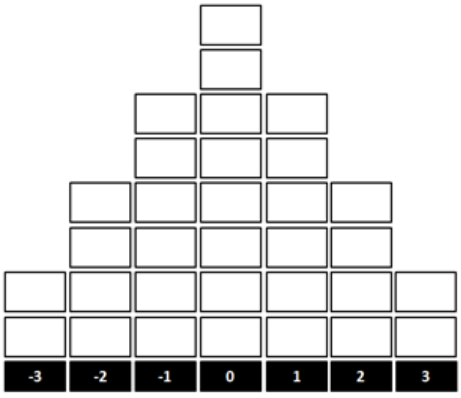

Figure 3.3: Visualization of Response Grid

With the response grid established and formatted, four ancillary questions were added to tract the respondents and to provide further information in the analysis phase. The first question 1. What field do you work in? Government, Military, Commercial Company, Oil Company, Oil Industry, NGO, was single section. Question 2. asked for the respondents Name and had a textbox for them to input it. The third question asked for the respondent's job title with a a textbox for the answer. Finally in a a single selection question the respondents were asked: "How important would you describe your office is in influencing Iraq's article 5 compliance?" from 0 - 10. All of the questions were marked as mandatory to insure

that it was impossible to submit the sort with out answering all of them.

3.7 DATA COLLECTION

To reach the P set, a two pronged approach was used. First, the desired participants were e-mailed directly, and when possible, followed up with conversations over skype or through additional e-mails. If an individual's e-mail address was known, then they were sent an email directly, if it was desired that an organization participate but unknown who from that organization should participate then the organization's generic contact address was used. Additionally, some participants within the P set who had a greater familiarity with technology and English were pushed to help and encourage those who posed more of a liability at responding. With the response rate being slow initially, it was deemed necessary to travel to Geneva, Switzerland to attend the "The Twelfth Meeting of the States Parties of the Anti-Personnel Mine Ban Convention" (12 MSP).

The annual review conference for the convention was held from December 3rd to December 12th, 2012 at the United Nation's Palais des Nations. Official delegations from each of the states' party as well as, observer nations, academic institutions, and international organizations attend the conference. The states' party report on the status of the treaty, if they will meet their obligations, and if they will need any assistance. Furthermore extension requests and other modifications to a state's obligations are requested, debated and modified. Thus, the event provided an opportunity to meet Iraqi mine action stakeholders and explain the study as well as to have them participate in the study and to encourage them to pass it along to others.

Unfortunately 2/4 members of the Iraqi delegation were unable to attend the meeting having been unsuccessful in securing a visa. These two, (one was former Assistant Head of Information Management at the Directorate of Mine Action in Baghdad and current head of Victim Assistance) were targets for the survey and key for providing introductions to other members of the delegation. The two members who did attend were the newly appointed Director General of the DMA and the Director of the Iraqi Kurdish Mine Action Agency.

However, even after the 12 MSP, a lack of responses still hurt the integrity of the analysis. Thus it was decided to reach out to respondents who had already completed the survey to ask their colleges and pass the survey along to them. With this new push, five sorts were completed in three days. With a total of 12 respondents and time running short the next step was to analyze the collected data.

3.8 SOFTWARE

To analyze the Q sorts, the International Society for the Scientific Study of Subjectivity (ISSSS) list two tools on their webpage, PQMehthod and PCQ [25]. However, PCQ method is a propriety software costing, at the time of this document when to publication, $400.00[24]. This was too expensive for trying a piece of software that may or may not be better than free alternatives. Thus PQMethod, a free DOS based software was deemed the most suitable option.

PQMethod, provides a simple command line based interface for entering and analyzing Q sorts (as seen in figure 3.4 below). However, running the program proved difficult as it was

not properly storing the sorts entered and was erratic in what it required to be entered for the different sorts. For example some sorts could not be found after being entered and others only allowed for half of the sorts to be entered.

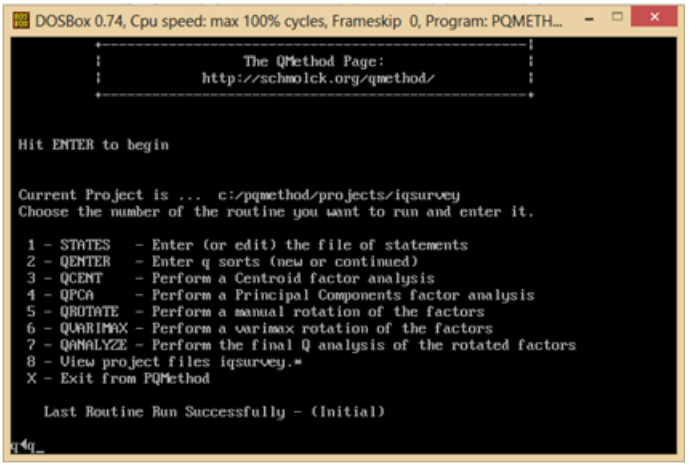

Figure 3.4: PQMethod Interface

Thus, these issues had to be resolved or another means of analysis found. Luckily, in reviewing the collected data, it was found that Q-Assessor had its own built in reporting and analysis tool. At the Home » Rory Nealon » Studies » Iraq Article 5 Survey, in the "Data" section there is the option to "Review Analysis". This brings the page titled "Iraq Article 5 Survey Analysis" which displays a table with all of the P set's sorts with seven factors (unrotated). Additionally there was the option to perform a Varimax rotation, manually rotate the factors, and to "Generate and Review Report". The convenience of having a built in analysis tool made it the practical option for conducting the Q methodology analysis.

To process the appropriate data for analyzing the Q sort some additional work had to be conducted. Luckily with Q-Assessor's analysis tool, the data did not have to be migrated or reentered into a new program. This insures data quality and integrity as there is less room for errors in this process. To get the output data that would be used in the analysis first the sorts had to undergo factor rotation. Additional information was attained by using the "Generate and Review Report" button. This provided the following information:

- Rank Statement Totals For Each Factor
- Normalized Factor Scores (for each of the factors)
- Descending Array of Differences Between Factors (which provided all of the possible combinations).
- Factor Q-Sort Values for Each Statement
- Factor Q-Sort Values for Statements Sorted From Most Disagreement to Most Agreement
- Factor Characteristics
- Standard Errors for Differences in Normalized Factor Scores

- Distinguishing Statements For Factors
- Consensus Statements That Do Not Distinguish Between ANY Pair of Factors

3.9 FACTOR ANALYSIS

The above list of data all hinges on factors being built for the Q sort. A few steps, many behind the scenes in Q-Assessor, have to be taken to prepare the data for its analysis. A correlation matrix of the variables (all of the P set's Q sorts) is created first. From this the residual correlations are calculated, however this is not presented in Q-Assessor. The resulting residual correlations matrix is searched for "...portions of common variance present in the data", which will form the first factor, and continued until there is no common variance left [32]. This forms the unroated factors, which will be subsequently rotated.

3.9.1 Correlation Matrix

Since the correlation matrix is only an intermediary step, for factor analysis, it is not displayed in Q-Assessor's front end. The Correleation Matrix was built manually: to insure the study's integrity, to better understand the evolution the data took, and to help with the ultimate analysis. To create the study's correlation matrix data from all of the sorts was downloaded, formatted, and saved as a comma separated value (csv) file. This made it readable in R, a statistical computing software. A simple script was run to calculate the correlation statistic for all of the variables. The script (as seen below) reads the Q sort data and then performs the necessary calculations to produce the correlation matrix.

```
>Qsort = read.csv("Qsort.csv")
>cor(Qsort,method = 'pearson')
```

The output was pasted into an excel file and conditional formatting used to highlight which of the variables were "significant". The correlation matrix for this study can be seen below in Figure 3.5

Q Sort	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	-																															
2	0.07	-																														
3	-0.22	-0.07	-																													
4	-0.03	-0.38	-0.37	-																												
5	-0.19	-0.14	0.62	-0.20	-																											
6	0.36	-0.05	-0.52	0.17	-0.62	-																										
7	0.03	0.59	-0.01	-0.46	-0.36	0.03	-																									
8	0.46	0.30	-0.26	-0.03	-0.20	0.38	0.05	-																								
9	-0.75	-0.35	0.17	0.15	0.24	-0.08	-0.46	-0.25	-																							
10	-0.64	0.06	0.08	-0.36	0.11	-0.29	0.37	-0.57	0.44	-																						
11	-0.02	-0.03	0.07	0.02	0.36	-0.42	-0.31	0.19	-0.03	-0.30	-																					
12	0.45	0.20	-0.64	0.17	-0.35	0.31	0.18	0.61	-0.23	-0.21	-0.01	-																				
13	-0.05	-0.30	0.26	-0.19	0.62	-0.49	-0.14	-0.08	-0.09	0.13	0.54	-0.29	-																			
14	0.18	0.30	-0.61	0.05	-0.24	0.40	0.29	0.42	-0.11	0.21	-0.18	0.54	0.08	-																		
15	0.06	0.14	0.46	0.08	0.53	-0.36	-0.52	-0.08	0.10	-0.30	0.28	-0.43	0.10	-0.31	-																	
16	-0.06	0.05	0.15	-0.14	0.02	0.21	0.13	-0.24	0.37	0.34	-0.40	0.16	-0.50	-0.02	-0.07	-																
17	0.01	-0.24	-0.27	0.00	-0.30	0.33	-0.11	-0.20	-0.07	-0.13	-0.31	-0.03	-0.39	-0.37	-0.38	0.01	-															
18	0.38	0.74	-0.36	-0.23	-0.46	0.12	0.27	0.37	-0.45	-0.28	0.07	0.35	-0.49	0.08	0.14	-0.08	0.09	-														
19	0.05	-0.32	0.14	-0.17	0.51	0.15	-0.45	-0.27	0.24	0.17	-0.10	-0.37	0.36	0.12	0.32	0.17	0.03	-0.42	-													
20	-0.25	0.00	0.07	0.00	-0.40	0.37	0.10	0.12	0.21	-0.09	0.21	-0.30	-0.14	-0.10	-0.11	0.00	-0.10	0.00	-0.19	-												
21	0.09	0.16	-0.41	-0.11	-0.44	0.43	0.15	0.32	-0.03	-0.17	0.36	0.40	-0.30	0.06	-0.40	0.22	0.23	0.37	-0.28	0.54	-											
22	-0.43	0.18	0.39	-0.09	0.20	-0.48	0.09	-0.50	0.40	0.58	-0.42	-0.28	-0.22	-0.14	0.34	0.37	-0.27	-0.03	-0.01	-0.30	-0.58	-										
23	-0.42	-0.54	0.20	0.20	0.00	-0.21	-0.29	-0.68	0.17	0.14	0.00	-0.76	0.23	-0.53	0.06	-0.37	0.34	-0.40	0.14	0.21	-0.30	0.08	-									
24	-0.08	-0.05	-0.19	0.42	0.21	-0.42	-0.29	-0.02	0.13	0.12	0.07	0.14	0.29	0.35	0.32	-0.35	-0.49	-0.07	0.01	-0.51	-0.61	0.41	0.00	-								
25	-0.32	-0.03	0.33	-0.16	0.39	-0.35	0.09	0.16	0.18	0.26	-0.21	-0.13	0.38	0.16	-0.05	-0.33	-0.22	-0.40	0.03	-0.32	-0.65	0.29	0.00	0.39	-							
26	-0.33	-0.24	0.21	-0.11	0.05	-0.25	0.11	0.02	-0.04	0.02	-0.01	-0.26	0.28	-0.30	-0.36	-0.57	0.36	-0.29	-0.28	0.00	-0.23	-0.14	0.44	-0.09	0.64	-						
27	0.10	-0.32	-0.43	0.71	-0.47	0.44	-0.10	-0.08	-0.10	-0.18	-0.13	-0.04	-0.01	0.31	-0.13	-0.26	-0.10	-0.23	-0.01	0.32	-0.06	-0.24	0.36	0.24	-0.23	-0.13	-					
28	0.26	0.08	-0.40	0.27	-0.62	0.18	0.36	-0.27	-0.25	0.17	-0.41	0.34	-0.46	0.19	-0.26	0.33	-0.02	0.27	-0.33	-0.09	0.05	0.28	-0.05	0.15	-0.47	-0.45	0.42	-				
29	-0.05	0.68	-0.11	-0.20	-0.50	0.10	0.82	-0.07	-0.32	0.23	-0.32	0.19	-0.57	0.06	-0.35	0.34	0.10	0.49	-0.58	0.18	0.34	0.18	-0.25	-0.39	-0.27	-0.11	-0.08	0.50	-			
30	0.11	-0.57	0.12	0.37	0.24	-0.19	-0.81	-0.09	0.19	-0.37	0.09	-0.26	0.17	-0.37	0.51	-0.37	0.10	-0.17	0.26	-0.28	-0.51	0.12	0.43	0.47	0.15	0.14	0.13	-0.17	-0.77	-		
31	-0.12	0.02	0.24	-0.10	0.12	-0.30	0.22	-0.10	-0.11	-0.09	0.16	0.13	-0.16	-0.56	-0.28	0.20	0.42	0.00	-0.46	-0.10	0.32	-0.12	-0.06	-0.48	-0.08	0.35	-0.48	-0.10	0.39	-0.30	-	
32	-0.05	-0.43	-0.11	0.28	-0.45	0.24	0.08	0.19	0.00	-0.26	0.21	0.15	-0.05	-0.22	-0.57	-0.14	0.19	-0.22	-0.53	0.57	0.49	-0.51	0.21	-0.38	-0.16	0.40	0.32	0.07	0.07	-0.11	0.38	-

Figure 3.5: Correlation Matrix of Q sort with significant correlations (±) highlighted in grey

The significant correlations were determined using the following formula:$2.58 * (\frac{1}{\sqrt{32}}) = 0.456$. Thus if the correlation statistic between any of the two variables was ± 0.456 then it was considered to be significantly correlated. A number > 0.456 shows that the variables are statistically significant in a positive correlation (sort 7,29 for example). This means that "...persons who scored highly in relation to Variable 1 have tended to do similarly in relation to Variable 2 (and vice versa)" [32]. A number > -0.456 indicates a statistically significant negative correlation (21,25 for example). This "...suggests that high scores related to Variable 1 are typically associated with low scores on Variable 2 (and vice versa)" [32].

3.9.2 Unroatated Factors

Producing the unroated facotors is an automated process in Q-Assessor with only the resulting unrotated factor matrix, as seen below in figure 3.6, being displayed.

Original Unrotated Factors

Sorts	A	B	C	D	E	F	G	h^2
0 (ID: 5338)	0.68148	0.21096	0.03951	-0.37616	0.17051	0.0186	0.00037	0.6814
1 (ID: 5374)	0.06097	0.59908	0.48431	0.27947	0.13803	-0.4441	0.31988	0.9939
2 (ID: 5433)	0.55624	-0.30447	0.07583	0.03968	0.00508	0.03951	0.00036	0.4111
3 (ID: 5451)	0.44887	0.09055	0.00761	-0.33696	0.12565	-0.09875	0.01327	0.3491
4 (ID: 5555)	0.55405	-0.24795	0.04857	0.14316	0.03739	-0.15728	0.03125	0.4185
5 (ID: 5594)	0.61593	0.22695	0.04568	0.14795	0.03963	0.18254	0.02924	0.4907
6 (ID: 5647)	0.75801	0.16771	0.02527	0.06791	0.01105	0.44052	0.24798	0.8636
7 (ID: 5777)	0.59811	-0.1593	0.01887	0.16451	0.04795	0.40016	0.18754	0.6082
8 (ID: 5780)	0.31081	-0.59478	0.42237	-0.2416	0.05237	0.13985	0.01585	0.7098
9 (ID: 5781)	0.77453	-0.00184	0.00025	0.06403	0.01011	-0.26131	0.08567	0.6797
10 (ID: 5795)	0.70445	-0.2094	0.03396	-0.28867	0.08354	-0.04697	0.00367	0.6337
11 (ID: 5807)	0.76272	0.20852	0.03882	0.2686	0.12538	-0.18209	0.04143	0.7494
Eigenvalues	4.3721	1.1119	0.4287	0.6267	0.0949	0.7444	0.2104	7.5891
% Total Variance	36.4342	9.2658	3.5725	5.2225	0.7908	6.2033	1.7533	63.2425

Figure 3.6: Unrotated Factors from Q-Assessor, note the number of factors = 7

The table pits the unrotated factors on the X axis and the P set's Q sorts on the Y. The factor loadings for each of the individual Q sorts, "...are basically correlations" [32]. The last column, h^2, contains the communality measure, which describes the amount an individual's Q sort has in common with other participants [30]. For example in Figure 3.6, Sort 1 has the highest h^2 value of 0.9939 or 99.39% of that sort's variance has been accounted for by the different factors. Similar to the h^2 value, the Eigenvalues in the next to last row, express how much the different factors have in common with one another [32].

3.9.3 Rotated Factors

Next, the factors need to be rotated. Q-Assessor offeres the options of roating the factors manually or by the varimax rotation method. With rotation being "...purely objective and technical, and are usually processed by computer", it was decided to use varimax, as it is an objective statistical means [3] [30]. The resulting Rotated Factors can be seen below in Figure 3.7.

Rotated Factors

Sorts	A	B	C	D	E	F	G	h^2
0 (ID: 5338)	0.17552	0.07986	0.0626	0.73322	-0.01028	0.3144	0.06112	0.6813
1 (ID: 5374)	0.08057	-0.16366	0.97911	0.04166	0.00236	0.013	0.0059	0.9939
2 (ID: 5433)	0.43636	0.32341	-0.11261	0.16613	0.00839	0.27444	0.01857	0.411
3 (ID: 5451)	0.15342	0.07655	0.03313	0.5561	-0.00011	0.09478	-0.01656	0.349
4 (ID: 5555)	0.56381	0.21573	0.0159	0.14011	-0.02191	0.18288	-0.01374	0.4184
5 (ID: 5594)	0.2692	-0.03684	0.12692	0.25421	0.00319	0.56137	0.14454	0.4906
6 (ID: 5647)	0.19899	0.08122	0.03713	0.31531	0.05214	0.84416	-0.03631	0.8636
7 (ID: 5777)	0.27253	0.23997	-0.11165	0.0838	-0.05235	0.67032	-0.06861	0.6081
8 (ID: 5780)	0.14531	0.80255	-0.14013	0.13834	-4.0e-05	0.07516	-0.00729	0.7096
9 (ID: 5781)	0.64752	0.05398	0.14872	0.39488	0.07066	0.27203	-0.02205	0.6797
10 (ID: 5795)	0.4068	0.31974	-0.12179	0.55038	0.01968	0.21711	-0.02814	0.6337
11 (ID: 5807)	0.60618	-0.09062	0.30055	0.30918	-0.06391	0.41377	0.11224	0.7495
Eigenvalues	1.7289	1.0132	1.1535	1.6402	0.0156	1.9916	0.0454	7.5884
% Total Variance	14.4075	8.4433	9.6125	13.6683	0.13	16.5967	0.3783	63.2367

Figure 3.7: Rotated Factors from Q-Assessor

3.9.4 Eliminating Factors

The rotated factors were examined next to insure that they were relevant to the study. A factor had to meet certain criteria to be considered relevant, insuring it represented enough of the study's variance. The criteria used are the so called Kaiser-Guttman criterion, based on the factor's eigenvalues, and "Humphrey's" rule, After examining the rotated factors, it became clear that some were not as relevant as others.

First, the rotated factor's eigenvalues were considered to see if they met the Kaiser-Guttman criterion. Watts considers this to be the "...most commonly used criterion...for deciding how many factors to retain..." [32]. Furthermore, Watts points out that this often results in a large amount of factors being used, but with only an initial seven factors (already at Brown's "magic number"), this would not appear to be an issue. However, Brown does state that this can leave out some significant factors below the "...arbitrary limit of unity" [3]. As seen previously in Figure 3.7, Q-Assessor automatically calculates the eigenvalues for each of the seven initial factors.
Looking at the eigenvalues of the rotated factor loadings in Figure 3.9, we can see that Factors E and G only capture: 0.0156 (1.56%), and 0.0454 (4.54%) of the study's total variance respectively. These are the only two factor's who's eigenvalues are below 1.00. Watts states that eigenvalues which are less than 1.00 are often removed because "...they account for less study variance than a single Q sort" [32]. These two eigenvalues are indeed quite low, in Brown's example where he highlights the danger of leaving valuables out below 1.00 the value he uses is 0.88, on the border, while these values are far from it.

However this was not the only reason fro their removal. Another contributing factor is the fact that none of them contain any factor loadings considered significant by the "Fuerntratt criterion" (the highlighted factor loadings in Figure 3.9). Furthermore, it is stated that the factor is significant "...if the cross-product of its two highest loadings...exceed twice the standard error" [32]. The standard error can be calculated: $1/(\sqrt{\texttt{\# of items in the Q set}})$, meaning for this study it is $1/(\sqrt{32}) = 0.17677$ [32]. Doubling the standard error will results

in a value of 0.35355.

To test the factors, the table with their loadings was brought from Q-Assessor into excel. After the data was formatted, each factor had all of its factor loadings removed with the exception of the two largest values (regardless of ±). Next "conditional formatting" was used to highlight the factor loadings which were greater than the double standard error value (0.35355). The results can be seen below in Table 3.1.

Table 3.2 Highest two factor loadings with those greater than twice the study's standard error highlighted

Q sorter	A	B	C	D	E	F	G
0				60.73322			
1			0.97911				
2		0.32341					
3				0.55610			
4							
5							0.14454
6						0.84416	
7						0.67032	
8		0.80255					
9	0.64752				0.07066		
10							
11	0.60618		0.30055		−0.06391		0.11224

Again, factors E and G fail to even have one of their highest loadings meet the 0.35355 threshold. Factors A, D, and F meet the requirement of having both factor loadings above the threshold. Factors B and C both have one of their two highest loadings meeting the threshold. However, factor C's highest loading is also the highest loading contained in any of the factors. Factor B as well only had a single loading but it was the third highest in the study.

In sum, following the Kaiser-Guttman criterion, 5 factors would remain, A, B, C, D, F. Strictly following Humphry's rule, would result in 3 factors considered: A, D and F. Considering that both methods of factor elimination removed E and G they can be disregarded immediately. Left with B and C, which was included in Kaiser-Guttman but not in Humphry's rule, a closer examination was needed. Considering that factor C had the highest of any loading, it would hurt the study's validity if it was removed. Factor B's highest loading is 0.80255, which is still quite high, but considering that this factor only accounts for 8.4433% of the study's variance, it will be disregarded. The final four factors that were determined significant for analysis, A, C, D, and F, account for approximately 54.29% of the study's variance.

3.10 FINAL PRODUCTS

3.10.1 Factor Array

Now that the appropriate factors established an overall factor array was created. Built automatically in Q-Assessor, the table takes the factors and in essence produces a Q sort

for each one. It ranks the statements as Q sorter in the initial P set would, but in this case being representative of the P set that would load into each particular factor. It does this by taking the z score that had been calcuated for each statement in relation to a particular factor and ranks them from highest to lowest. Since the factor array "...always conforms to the same distribution used in the original data collection..." it places the statements likewise [32]. For example in this study, the statements with the two highest z scores will be given $+3$, the next four highest $+2$ etc... (see annex with Factor Exemplifying Q sorts to see the questions arranged in the response grid).

3.10.2 Crib Sheets

To systematically characterize the factors, Watts' "crib sheet" will be used. The crib sheet is based on the factor arrays and one is made for each of the factors involved in our analysis. They let us identify "...important issues" about how the different factors' "...viewpoint is polarized..." and "..."how that viewpoint is polarized realative to the other study factors" [32]. It does this by taking the factor arrays and identifying statements that fit one of four categories:

- Items Ranked at $+3$
- Items Ranked Higher in Factor A Array than in Other Factors
- Items Ranked Lower in Factor A Array than in Other Factors
- Items Ranked at -3

The crib sheets were created for the study by importing the data of the factor arrays from Q-Assessor to Excel. The data was scanned and the appropriate statements were placed in the matching category.

3.10.3 Distinguishing Statements for Factors

The final product produced for analysis is finding the distinguishing statements for the factors. Produced automatically in Q assessor, Watts cautions that while they are "potentially useful" they are not the "be-all and end be-all of factor interpretation"[32]. Due to the limited size of the study's P set, only eight distinguishing factors were found a the $p < 0.05$ level.

Chapter 4

RESULTS

4.1 THE FACTORS

Q methodology in this study has produced four distinct factors which represent four viewpoints of what Iraqi humanitarian mine action stakeholders believe is needed to insure Article 5 compliance. This addresses research Objective 3., in identifying the different, relevant groups of belief that exist within our P set. Watts believes that the holism of this methodology, which Stephenson, its creator stressed, was to insure that "...the final product really must explain, or otherwise account for, the entire item configuration captured in the relevant factor array" [32]. The factor arrays along with the distinguishing statements for each of the factors will allow for a narrative to be built for each of the factors explaining their essential characteristics. Different aspects of the factor arrays will be highlighted, areas found significant, or different from the others that were included in analysis.

4.2 INDIVIDUAL FACTOR LOADINGS

An essential result of Q methodology is how each member of the Q set loads into an individual factor. Here you can see how significantly each of the Q sorters load into each of the factors.

Table 4.1 Factor loadings for individual P set members

	Factors			
Q sorter	A	B	D	F
1	0.17552	0.0626	0.73322	0.3144
2	0.08057	0.97911	0.04166	0.0130
3	0.43636	-0.11261	0.16613	0.27444
4	0.15342	0.03313	0.55610	0.09478
5	0.56381	0.01590	0.14011	0.18288
6	0.26920	0.12692	0.25421	0.56137
7	0.19899	0.03713	0.31531	0.84416
8	0.27253	-0.11165	0.08380	0.67032
9	0.14531	-0.14013	0.13834	0.07516
10	0.64752	0.14872	0.39488	0.27203
11	0.40680	-0.12179	0.55038	0.21711
12	0.60618	0.30055	0.30918	0.41377

4.3 FACTOR ARRAY

Table 4.2 (seen below) contains the factor arrays for each of the analyzed Q sorts. Furthermore the table also contains the z score, which was used to calculate the statements' Rank (displayed as well) for the factor. To dig down to the essence of what beliefs each factor represents, what it holds in common and its difference from the other factors, Watt's crib sheet was used to examine each of the factors arrays, and they will be relied on heavily in our narratives of the factor arrays.

Table 4.2 Factor array for the rotated factors, including z score and Rank

	A			C			D			F		
#	Q sort	z score	Rank	Q sort	z score	Rank	Q sort	z score	Rank	Q sort	z score	Rank
1	-2	-0.81	27	1	0.622	12	2	1.418	4	3	1.599	1
2	2	1.11	6	2	1.245	6	0	-0.007	17	2	1.239	4
3	0	-0.209	18	-2	-1.245	30	-2	-1.179	28	0	-0.233	18
4	-2	-1.41	30	-1	-0.622	26	-1	-0.709	25	-2	-1.539	29
5	0	0.3	14	-3	-1.867	32	1	0.47	11	1	0.518	12
6	1	0.405	12	1	0.622	12	2	1.186	5	-1	-0.345	21
7	1	0.705	9	2	1.245	6	-1	-0.47	23	1	0.649	10
8	-2	-1.41	30	-1	-0.622	26	0	-0.239	20	0	-0.289	19
9	2	1.41	3	0	0	20	1	0.709	8	0	0.229	16
10	3	1.814	2	0	0	20	-1	-0.47	23	0	0.289	15
11	-2	-0.9	28	0	0	20	0	0	16	2	1.235	5
12	0	0	16	2	1.245	6	2	1.179	6	1	0.995	7
13	0	0.105	15	-2	-1.245	30	1	0.477	10	3	1.411	2
14	1	0.81	8	0	0	20	1	0.709	8	1	0.938	8
15	0	0.3	14	-1	-0.622	26	0	0.231	14	1	0.589	11
16	2	1.305	4	1	0.622	12	0	0.239	13	0	0.345	14
17	1	0.405	12	3	1.867	2	3	1.888	1	-3	-1.584	31
18	1	0.405	12	3	1.867	2	1	0.463	12	2	1.366	3
19	3	1.814	2	-3	-1.867	32	3	1.657	2	1	0.706	9
20	2	1.11	6	2	1.245	6	1	0.477	10	2	1.006	6
21	-1	-0.6	23	1	0.622	12	-1	-0.47	23	0	-0.233	18
22	1	0.9	7	-1	-0.622	26	-2	-1.186	29	-1	-0.417	22
23	0	-0.3	20	-1	-0.622	26	-1	-0.94	26	-2	-1.584	31
24	-1	-0.705	26	-2	-1.245	30	-1	-0.477	24	0	-0.3	20
25	-1	-0.405	22	-2	-1.245	30	0	-0.239	20	-1	-0.589	25
26	-1	-0.705	26	0	0	20	0	0	16	-1	-0.878	26
27	0	-0.3	20	0	0	20	0	-0.231	18	-1	-0.473	24
28	-1	-0.405	22	1	0.622	12	-2	-1.179	28	-1	-0.473	24
29	-1	-0.705	26	1	0.622	12	-3	-2.127	32	-2	-1.295	27
30	0	-0.105	17	-1	-0.622	26	2	1.649	3	0	0.417	13
31	-3	-1.814	31	0	0	20	-3	-1.418	31	-3	-1.772	32
32	-3	-2.115	32	0	0	20	-2	-1.411	30	-2	-1.528	28

4.4 FACTOR A: DECENTRALIZED, STRATEGIC FOCUSED GOVERNMENT

Factor A has an eigenvalue of 1.73 (rounded) and accounts for 14.40% of the study's variance. This represents the second highest eigenvalue and variance of the factors included for analysis. Two participants load significantly with this factor, and one additional participant, while not loading significantly here, scores higher in this factor than any of the others. All three of these people are Iraqi nationals with two from the UN and one from IKMAA.

This factor represents a strong operational viewpoint. As can be seen in Annex XX, section D.1, ten out of the sixteen questions categorized as operational are present on the crib sheet. While it is split evenly with five statements ranked higher in this factor array than any other or ranked "+3" and five in statements ranked lower in this factor array than any other or "−3", the statements in the higher part were on average ranked higher than the ones in the lower part of the crib sheet were ranked low (1.8 vs −1.2). Furthermore, three out of the five statements in the Higher part, were +2 or greater while only two statements in the Lower part were ranked −2 or higher.

Additionally, this particular factor views positively the role of government to insure national commitment to mine action. Five of the questions that made it to factor A's crib sheet are related to commitment. Four out of the five of these are ones ranked higher in this array than any other. A majority of these are focused on the government's role (10. +3, 9. +2, 14. +1,) While the last two are focused on demining organizations lobbying the national government (21., −1, 22., +1). These two statements, with their ratings of +1 and −1 are opposite of each other, which makes sense as 21. believes that organizations involved in mine action outside of the government should not focus on the nation's commitment to mine action, while question 22. states each organization should instead lobby the government for its own particular interests.

After, commitment, questions related to authority scored well for this factor. Four authority categorized questions appeared on factor A's crib sheet, three of them, ranked lower in this factor than any other and the one authority statement ranked higher than the others, was ranked zero. The statements included in this factor related to authority reinforce the notion that that the government should take the lead for demining but share responsibility with its various components. No single governmental office should be responsible for all demining related activities (1., −2), but at the same time government has a role in managing demining as this factor disagrees that a government office is not needed (4., −2). Likewise, independent work done in an ad-hoc fashion by the demining organizations, without supervision by a governmental authority, is not favored (8., −2).

4.5 FACTOR C: INFORMATION TOOLS RELAXED PLANNER

Factor C has an eigenvalue of 1.15 (rounded) and its variance accounts for 9.61%. These are the lowest values for a factor that were included in the study. The participant who loads significantly into this factor is an Iraqi national from a national humanitarian demining organization. This means the organization is a non-profit, which should not focus its activities on or with commercial interests. The particular candidate rates their office's ability to influence compliance at six out of ten.

As with factor A, factor C represents a strong operational viewpoint. As seen in Appendix

D section D.2, more functional statements are on factor C's crib sheet than operational (ten vs eight). However, more are positively rated, ranked +3 or higher in this factor than any other, then compared to: −3 or ranked lower in this factor than any other.

With the highest member of the P set loading into this factor being the head of the information management department at a humanitarian demining NGO, it is no surprise that statements related to "information management tools" are well represented in the crib sheet (Annex B, section C.2). Five out of the seven statements related to information management tools, were ranked either +3 or higher in this factor than any other, and only two ranked lower than any other factor array. Both of he statements that were ranked +3 are information management related (17., 18.). The two statements show commitment to a decentralized, and wide spread adoption of IMSMA where different organizations and government offices have access. Rules are believed to be needed, on who can access, approve, and work in the Iraqi version of IMSMA (12., +2). This is because, this factor believes more so than the others that while IMSMA should be widely distributed, it should not be maintained independently(23., −1, 24., −2). Finally it is a bit ambiguous whether information should be collected only as needed, since there seems to be agreement that information should be gathered in an ad-hoc fashion (29., +1) but disagreement with information being gathered and sent when requested(30. (−2).

With the factor's strong associate with information management, it does seem to be odd that this factor is also negatively associated with strategic planning. Four out of the five questions that are related to strategic planning are ranked −3 or are ranked lower in this factor than any other. A strategic plan for mine action, as seen in the Iraq Mine Action Strategy 2010 to 2012 is not desired (19., −3) and nore should it be the responsibility of the national government (13., −2) On an operational level policy being the product of negotiated workshops with stakeholders (20. +2) is seen positively while its fundamental counterpart is, as mentioned not (19., −3) [19].

4.6 FACTOR D: GOVERNMENT LEAD PARTICIPATORY STRATEGIC, STRONG ORGANIZATION OPERATIONAL LEVEL

Factor D has an eigenvalue of 1.64 (rounded) and it accounts for 13.66% of the study's variance. Two participants load significantly into this factor, one from an information management NGO and one from a commercial demining company. They differ greatly on answering the ancillary question as to what is the importance of their office is in influencing Iraq's article 5 compliance. The participant working at the NGO, while in a more senior position, ranks his office at four while the participant from a commercial company, eight.

Continuing the trend of being operationally focused, factor D, is only slightly more operationally than functionally focused. With twelve operational related statements compared to ten functional ones, the statements, on average, are scored 0.33 for operational and −0.3 for functional. Functional statements on information management and strategic topics have both been ranked at +3 (29., 30.) and −3(17., 19.). Rather than showing indecisiveness for this factor, the positive and negative statements complement one another. The information management statements show the belief that demining works best if IMSMA is distributed between different government offices and demining organizations (17.,+3) and that information should not be collected in an ad-hoc fashion (29. −3). The same complimentary scores were given to the strategic planning statements. The statements were ranked to show the

belief that strategic planning should be done based on goals and principles agreed upon by different stakeholders (19., +3), while not having a strategic plan is highly undesirable (31., −3).

Four out of five statements related to commitment to mine action, are consistently ranked lower in this factor than any of the other factors(Annex B, section B.3). The remaining commitment statement, while ranked higher in this factor than any other, agrees with the fact that constantly working to keep demining on the national policy agenda is indeed a waste of time (27. 0).

4.7 FACTOR F: INTER-GOVERNMENTAL COOPERATION AND DOMINATION

Finally, factor F has an eigenvalue of 1.99 (rounded) and it accounts for 16.60 of the study's variance. This is both the highest eigenvalue of any factor in the study as well as the most variance. Three participants load significantly into this factor, one from an International Agency responsible for both IMSMA and IMAS (International Mine Action Standards), A member of RMAC-S staff and a project manager for a commercial demining company. In the ancillary question where they are asked to rate the importance of their office, the participant form the international agency rated his office a 5, the RMAC-S member, a 8, and the project manager form a commercial demining company a 6.

Factor F would appear to distinguish the least between fundamental and operational statements. Of the sixteen statements included in the factor's crib sheet, ten are fundamental and six are operational (Annex B, section B.4). However, the average ranking for these statements are 0.2 for fundamental and 0 for operational.

This factor is characterized by authority related statements. Four out of the five statements on authority issues are ranked higher in this factor than any other or +3. They show the belief that while a single, national governmental office should take the lead for all demining related activities (1. +3), it should be shared between different ministries as well (2. +2). This factor array believes, more so than any other factor, that each government ministry, involved in mine action should run demining activities as they see like (3. 0) and that individual demmining organizations do not need work orders since they work as they see fit (8. 0). Maintaining the view of the government's authority, these demining work orders do not need to be issued after consultations with members from industry and civil society (24. −1).

Furthermore, in regards to strategic planning, the central government should be responsible for it as well as mine action policy (13. +3). However, while it is believed that that the government should be responsible for strategic planning, it should only emerge as a product of negotiated workshops and stakeholder meetings (20. +2). With this said, it makes sense that they would view a strategic plan as necessary (31., −3) and would be against demining being conducted according to individual plans of demining organizations (26. -1).

Chapter 5
INTERPRETATIONS

5.1 INTRODUCTION

To guide and interpret out results, grid-group cultural theory will be used to further unpack meaning of these distinct beliefs. The factors arrays will be treated as distinct viewpoints and plotted in the grid group cultural theory matrix. While grounded in the results of the Q methodology, a lot of plotting will be based on This will address research objective 4. and help us answer research question 3.. The results constructed culture types will form the basis of analysis for the proposed SDSS.

5.2 BELIEF GROUP A: DECENTRALIZED, STRATEGIC FOCUSED GOVERNMENT

The first belief group (factor A) was characterized by its preference for the government's responsibility to be decentralized, and that it was strategically focused. The crib sheet (Appendix D, section D.2) for the factor array which characterized it, shows a large propensity for egalitarian related statement (16. +2, 18. +1, 19. +3, 20. +2) with only 18., ranked lower here than any of the other factors. Wanting the strategic plan to be based on principles agreed upon by many of Iraqi mine action stakeholders and other official policy documents as well firmly entrenches the egalitarian cultural type in this factor's classification. Added with the belief that delegation of responsibility for committing the country and authorities to demining belongs with the media and humanitarian demining NGOs only further proves this.

One culture type that can easily be eliminated or treated as a repelling element, is the fatalist quadrant of the matrix. Teo of the four fatalist related statements account for both of the "Items Ranked −3" (31., 32.). The other two fatalist statements that made this factor's crib sheet are ranked lower in this factor than any other (4. −2, 8. −2.). The fatalist statement ranks contrast well with the egalitarian statements. While the egalitarian statements called for inclusions and sharing of responsibility, the fatalist statements which were rank at −3, state that a demining plan is unnecessary and that it should be conducted in this manner.

Of the three individualists statements, only one was ranked higher in factor D than in any of the others (3. 0). The other two were ranked lower in this factor than any of the others (21. −1, 26, −1). The statements rankings again reinforce the strength of hierarchy's association with this belief group. As the statements are ranked low because they talk about demining organizations carrying out demining according to their own individual plans (26.) and about agencies only focusing on their narrow line of work, not broader issues that would be mutually beneficial to humanitarian demining as a whole in Iraq (21.). However they do have a propensity, more so than other belief groups, to believe that government ministries or offices should run demining activities as they see fit (3.) This shows a bit of an individualist

streak, that can be interpreted to show the belief in different offices independence from one another.

The cultural type hierarchy, has six statements in this belief group's factor crib sheet. These statements are however distributed with three either ranked at +3 or higher in this factor than any other and three ranked lower in this factor than any other. The belief group believes that leadership is needed in the government, internally, to lobby within itself for funding and other resources for mine action (10., +3). Other statements that were included make it obvious that the national government should lead in commitment to mine action and its strategic planning (9. +2, 14. +1). However, this should not come at the expense of one part of the government from retaining absolute responsibility (1. −2, 11. −2). Also reinforcing egalitarian principles the disapproval of having rules and standards for who can use, access, and work in IMSMA, leads to the assumption that a more egalitarian solution is needed (12. 0). These statements hint at the boundaries of the group for this belief, in showing the extent to which the egalitarian principles apply, between the different government offices.

The belief system in question is well grounded in the egalitarian quadrant with some pull from the individual and hierarchy quadrants. Figure 5.1 below, depicts where on the gird-group cultural theory matrix the belief group would occupy. It would only barely cross into the individualist grid, mainly occupying the egalitarian quadrant, with also some pull from hierarchy. This cultural group can be used to add to the title of this belif group calling it instead the: "Decentralized Egalitarian Strategic focused Government".

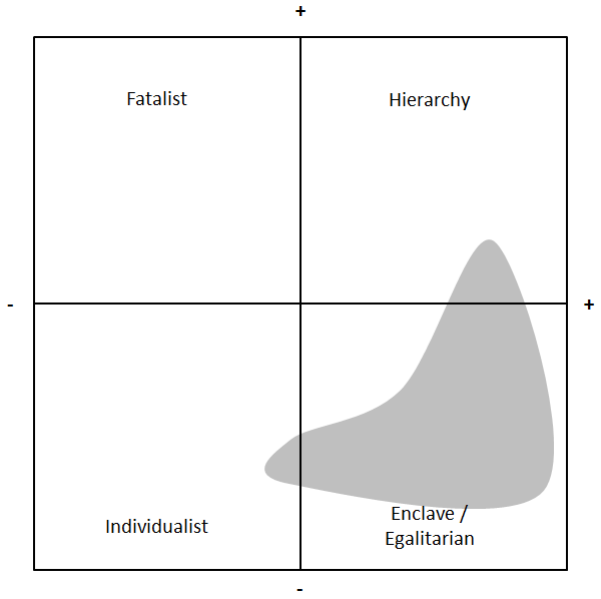

Figure 5.1: Belief A Grid-Group Matrix

5.3 BELIEF GROUP C: INFORMATION TOOLS RELAXED PLANNER

This belief system (based on factor C) exhibits strong egalitarian tendencies as well. With three of the statements in the belief's factor ranked at +3 or higher here than any other, there is obviously a positive view on egalitarian principles. However, two egalitarian statements were ranked lower here than any other of the belief's factors or were ranked at −3. The egalitarianism of this factor is focused on information tools, pushing the responsibility of IMSMA to be distributed between different government offices and as well as allowing different organizations to use the official version (17. +3, 18. +3). However, this egalitarianism is not shared in its views on strategic planning/policy. In fact, the strategic mine action plan should not be based on goals and principles agreed upon by stake holders nor should responsibility for for keeping the country committed to mine action on the national policy agenda (15. −1, 19 −3). Although at the same time, it is believed on an operational level, that mine action strategy and policy should be a product of The egalitarianism in this belief group is more confined to a single subject instead of being a universally applied mantra.

The hierarchical cultural type has a large influence on this belief group as well. Four of the five hierarchy statements are ranked lower in this belief's factor crib sheet than any other or ranked at −3. They show a belief that the government should not provide top down direction in humanitarian demining (5. −3, 14. 0, 13. −2, 9. 0) While there is some belief in hierarchy having a limited role in information management with the rules and standards need for IMSMA (12. +2).

Four individualist statements make this belief's factor crib sheet. Three are ranked lower and one higher here than any of the belief's factors. Matching this belief's egalitarian ideals for information management, and specifically the IMSMA, an individualist approach, were different groups maintain their own different versions of IMSMA is thoroughly rejected (24. −2). However, while this belief is not fully supportive of this the belief ranks higher than any other factor the idea that each agency maintains its own independent IMSMA database (23. −1). There is little support in this belief for the various government ministries to run demining activities as they see fit or from each of these groups and other stakeholders to solely formulate their own individual demining plans (3. −2, 25. −2) Finally, different offices and organizations do not need to bother themselves with commitment to mine action and should focus on their individual roles (21. +2).

Fatalist related statements appear three times in this belief's factor crib sheets. Twice they are ranked higher in this crib sheet then any other factors' and once lower then any of the other factors. Continuing the information management focus, this belief rejects reactionary mine action information collection on an operational level, but accepts it on a fundamental level (29. +1, 30. −2). While the fundamental statement is not ranked as strongly as the operational statement regardless of it being positive or negative, it shows that what is operationally unacceptable might be accepted on a fundamental level. This would be a useful piece of information for a policy maker in dealing with this topic and marketing to people who share this belief. Fatalist ideology also appears in commitment questions for this belief, believing that the means for securing commitment for the humanitarian mine action program, as long as it works (28. +1).

As with belief A, belief C is well grounded in egalitarian principles and thus in the egalitar-

ian quadrant. While there is some pull and push from the cultural types in other quadrants, they do not have as strong as an effect as in belief A. Hierarchy does have some push on this belief, as would be expected for an egalitarian associated belief group. The individualist quadrant as well has some push on the belief group. In information management their is a disdain for individualist beliefs and in strategy. Surprisingly, fatalism has a minor attractive effect in this situation, although it is weak. As can be seen below in Figure 5.2, the resulting plot of this group makes it narrow and concave as it is squeezed by hierarchy and individualist quadrants. Further it covers less area than in the previous belief because fewer members of the P set load in it's factor array significantly.

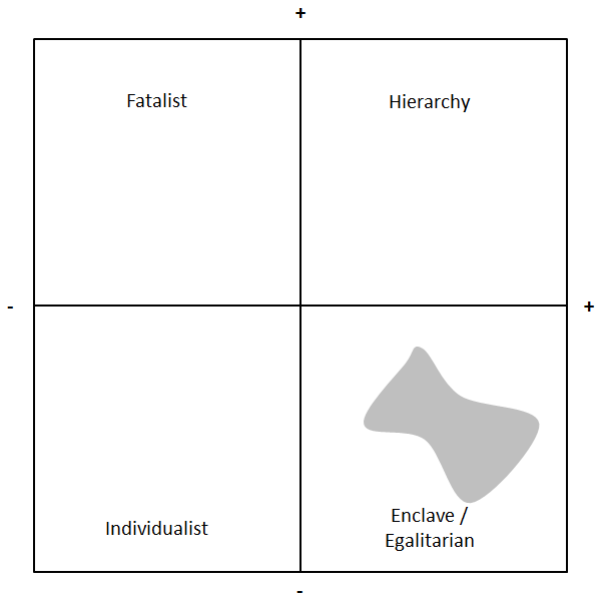

Figure 5.2: Belief B Grid-Group Matrix

In sum, this belief's factor had an information management professional from a humanitarian demining NGO load significantly. This is probably why the government's role is diminished, believing that they get in the way of demining and thus Article 5 compliance. In January 2009, this NGO was ordered to stop all of its work by the Ministry of Defense in a different but related field of small arms/light weapons destruction [20]. Also a nationwide ban on humanitarian demining related operations was imposed from December 2008 to August 2009 [26]. Finally rules constantly changed on responsibility for the destruction of removed ordinances could have lead to these views being established, and this belief formed.

5.4 BELIEF GROUP D: GOVERNMENT LEAD PARTICIPATORY STRATEGIC, STRONG ORGANIZATION OPERATIONAL LEVEL

The third belief group in the study, as the groups before it, shows a considerable amount of egalitarian values (Annex B, section B.3). Although some of these statements are positively ranked in the belief's factor array, they are ranked lower here than in any other factor. This suggests that while the link to egalitarian values exist, it is not as strong as belief groups A and C (18. +1, 20. +1). However it is still relatively strong with two egalitarian statements make up its +3 category both focused, as in belief group C, on information management

and strategic issues (17., 19.).

Hierarchy also exerts a strong influence for this belief group. Three hierarchy related statements are ranked higher in this belief's factor array than in any other. These three statements address a range of topics specifically: authority, information management, and strategic planning. Work orders, in this belief, should come exclusively from the Directorate of Mine Action but at the same time the belief believes that work orders should be issued only after discussions with industry and civil society, an egalitarian statement (5. +1, 6. +2) This exemplifies the hybrid nature of this belief group showing that hierarchy and egalitarian values are not mutually exclusive. While work orders should be a top down assignment from the government to organizations, it should still only be done after consultations with the relevant stakeholders. Further, it is believed, that IMSMA should not be run as a free for all, which is understandable since both members of the P set which load significantly in this belief's factor array are information management professionals. They would believe in standards and a professional class to use and manage the information management system (12. +2). Strategic planning is seen as a governmental role although not strongly (14. +1). Perhaps, this is because the group believes that the government, who currently controls and maintains IMSMA, would be able to utilize the information produced from IMSMA and incorporate it in their strategic planning and policy. While they do not believe that that the government should lead lobbying for funds and other resource, this can be attributed not to an anti-hierarchical view, but to a lack of concern since one of the information management professionals comes from a commercial company, not dependent solely on government funding and the other person's organization receives their funding from a foreign government (10. −1).

Interestingly enough for this factor all three of the individualist related statements that are ranked higher here than any other of the belief's factor crib sheets are ranked either −1 or 0. It sees independent versions of IMSMA being maintained by different agencies as undesirable, yet would be more open to the fact then other factors (23. −1). As information management professionals they may be against this in terms of best practices and efficiency but as being members of projects that need funding, cold see the wider adoption of IMSMA as an opportunity to further expand and entrench their work (receive more funding and responsibility). Individualistic planning ideals, as mentioned above, are ranked low but still higher in this belief than in any of the other belief's factor crib sheets (25. 0 , 26. 0). This reinforces the notation that while against individualistic ideals, it would present the opportunity to expand and grow the respective P set's organizations and work. Three individualist statements were ranked lower in this belief's factor crib sheet than in any other. Lobby for the broader issue of commitment, and all that comes with it, should not be the focus of individual organizations (21. −1 , 22. −2). Further, work orders should not be issued from individual regional mine action centers (7. −1).

Fatalistic views tend to be rejected by this belief as well. Both of its items ranked −3, are fatalist and another is ranked lower here than in any other crib sheet. Three fatalist views are ranked higher here than in any other of the crib sheets factors. The belief group rejects the idea that a strategic plan for demining is unnecessary (31. −3). Also the means would appear to matter in how commitment is secured for demining (28. -2). Fatalistic views for information management is rejected outright on a fundamental level, but accepted on an operational level (29. −3, 30. +2). This may show a commitment to responding for requests for information than accepting the ad-hoc collection of data. Work to keep demining on the

national policy agenda, while not highly ranked, is ranked higher here than on other factor's crib sheets (27. 0). Similarly, another fatalistic question was ranked low in this belief's factor array, but higher here than any where else, this time in regards to authority. It disagrees that demining does not need a government office to manage it, since the demining organizations do as they see fit anyways (4. −1). However with it ranked higher than factor, it would possibly indicate that they agree that demining organizations do what they want anyways.

Like the two beliefs discussed before it, factor C is firmly grounded in egalitarian principles (6., 17., 19.). Even the statements that appear on this belief's factor crib sheet ranked below others, still ranked positively or at 0 (2., 18, 20.). Yet we see a strong influence from the hierarchical culture group as well. Individualist principles are not seen generally agreed with, even the ones ranked higher in this belief's factor crib sheet are not ranked that highly and in fact two are ranked at −1 (23., 25). Fatalism is positively ranked for an information management related statement, but the rest of the items that appear on the related factor's crib sheet are negatively ranked or at 0 (4., 28., 27., 29., 30.).

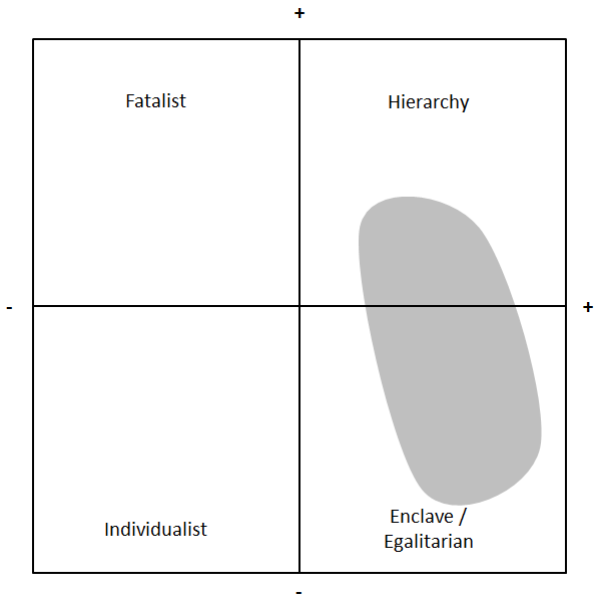

Figure 5.3: Belief D Grid-Group Matrix

This factor firmly straddles the egalitarian and hierarchy cultural group quadrants. With ever so slightly of a tilt to the Fatalist quadrant due to the high ranking of a fatalist information management question. Both P set members who loaded significantly in this belief are from the information management profession and both have work experience in humanitarian programs outside of Iraq. This may have informed them that some level of hierarchy is needed in information management, operational work orders, and strategic planning. But at the same time consultations with other stakeholders is essential in assuring compliance to Article 5.

5.5 BELIEF GROUP F:INTER-GOVERNMENTAL COOPERATION AND DOMINATION

The final belief group that has been examined is one of the most different. The hierarchy cultural group appears to be the most dominate in this belief, but egalitarian values are viewed positively as well. Both of this belief factor array's statements which were ranked +3 are hierarchical (1., 13.). It believes that authority ultimately rests in the national government for all demining related activities, including strategic planning. Further only one office in the government should be responsible for the IMSMA database with no other office allowed access (11. +2). Hierarchy related statements are noticeably absent from statements ranked lower in this factor than in any other.

Egalitarianism also has a strong voice in this belief group and shows how and egalitarianism can form a hybrid belief group on some issues. As seen earlier, authority should ultimately rest with the government, but its responsibly should be shared between different ministries within the government (2. +2) Other egalitarian beliefs show that keeping commitment to demining can be shared with stakeholders other than the government, and that there is room for stakeholders to have input in strategy and policy documents through workshops and other meetings (15. +1 20. +2). There is also push back in this belief against egalitarian views. Reinforcing the hierarchical view that IMSMA should be the solely owned and managed by a single governmental office, the notion that it should be distributed between different government offices and demining organizations is rejected (17. −3) Work orders for demining operations should not be subject to discussion with industry and civil society (6. −1). Actual lobbying and campaigning by NGOs and media outlets to commit the country to demining is opposed by this belief group (16. 0). This operational statement is in contrast to the fundamental question in the same vein, meaning that while its agreed that these stakeholders have a role in commitment, it should be done by other means.

As noted, the hierarchy cultural type has a strong presence in this belief group. It would stand to reason that this would come at the expense of egalitarian and even individualistic principles. Individual organizations conducting demining according to their own plan would stand in opposition to the government being ultimately responsible for all demining related activities, including strategic planning (26. −1). IMSMA, being solely controlled by a single government, would make it impossible for other agencies to have their own independent version (23. −3). The two individual statements are ranked higher in this belief's factor crib sheet than in any other, were only given a 0 by the related factor array. Having each government ministry run demining as it sees fit may contrast slightly with the egalitarian principle this belief groups exhibits for within the government, but still shows a commitment to government's dominate role in the hierarchy (3.). Their also appears to be a slight, relative affinity with not having an official version of IMSMA and for allowing different government offices and/or organizations use their own version (24.). While dominated by the thought that only a single government agency should use and control IMSMA, this may hint at the possibly of some sharing of responsibility; probably within the government.

Fatalist statements only appear three times in this belief's factor crib sheet. Two of the statements are ranked lower in this factor than in any of the others, and one higher. The fatalist statement which is ranked higher than any other is only given a 0, so while not a strong belief, it is agreed with more than in others. It hints at the lack of reach and control that the government agencies involved in demining have, saying that work orders for demining are unecessary as organizations work as they see fit (8. 0). This is more

likely exhibiting the frustration with how demining organizations are conducting work then agreement in how they should work. Strategic demining being conducted without an overall strategic plan being ranked −3 (31.) makes sense, as this belief group views strategic planning as the role of the government (13. +3). Finally this group believes that work should be done to insure commitment by authorities and donors to demining, as they disagree that this work is a waste of time (27. −1).

Belief group F is anchored in the hierarchy cultural group quadrant. The shaded area which covers the area of beliefs for this group, straddles the hierarchy and egalitarian quadrants. It has a more ridged shape then the other three beliefs because the fatalist and individualist statements do not exert as large an influence except for a small ting of fatalism, hence the tilt. The egalitarianism espoused tends to be focused for only government offices.

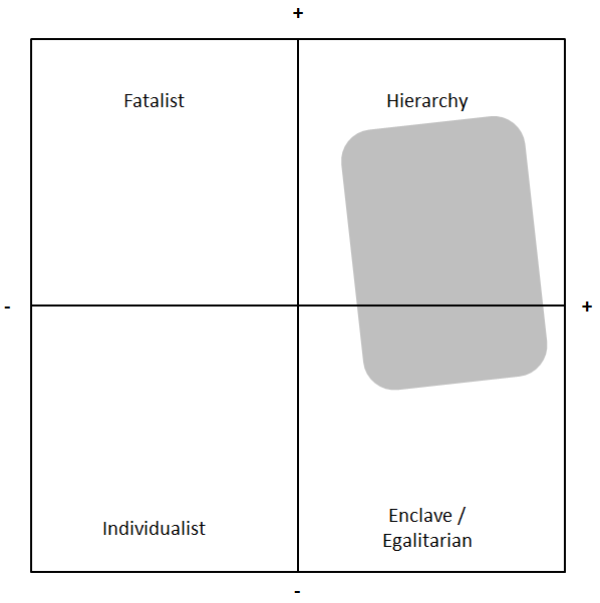

Figure 5.4: Belief F Grid-Group Matrix

This belif group comes as no surprise as the members of the P set who load significantly into this group's factor array are from the Iraqi government, commercial company, and an international monitoring and support organization. These groups tend to think solutions can come from the top down, the government employee would naturally believe that the government should hold a majority of the responsibility as well as the monitoring/support agency employee as it is his responsibility to advise and assist the government.

Chapter 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 FROM PROBLEM TO SOLUTION

While the goals of the problem have always been defined, compliance with Article 5 in the time allotted, finding agreement on what are the appropriate means to accomplish this have always very weak. By performing the Q methodology survey, and refining its results in the frame of grid-group cultural theory, a clearer picture of what different belief groups considered are the appropriate means have been established. This helps in defining the problem and helps move, even slightly it to one that is more structured.

To address Research Objective 5. and to answer Research Question 4., the newly found belief groups will not be able to address the question alone. The spatial component and problem of mine action has to be considered as well. As mentioned, the decision support component of demining has been relatively well studied. (see: [15], [17], [2], [1]). However, as mentioned, Benini concludes that because "...the social science used in humanitarian landmine action is still weak...decision-support systems will not likely be welcomed when they expand their scope beyond consensus domains" in humanitarian mine action [2]. Using Q methodology in conduction with grid-group cultural theory, the belief groups that were found can be used to help strengthen the social sciences used in humanitarian mine action, and propose SDSSs tailored to the different approaches that are believed to be needed for compliance.

6.2 SPATIAL DECISION SUPPORT TOOLS

6.2.1 Belief Group A

Belief group A was highly associated with the egalitarian cultural type and the proposed SDSS should of course reflect that belief. However, the small hierarchy (government focused) streak within this belief group shows that the national government would have control, but used with egalitarian principles (9., 10, 14).

The system should also be able to incorporate a multitude of data, both spatial and non-spatial as it will be used at a strategic planning level. Further when used at a strategic level it could involve different government ministries, members of civil society, and demining NGOs, and thus would need to accommodate, in some means the participation people's thoughts and preferences from a multitude of sources (19. 20.). This means that a Spatial Multi-critria Analysis/Evaluation tool would work best.

The decisions from the proposed system to should be transparent and accessible, meaning not only are methods, data sources, and documentation avaliable but also easy to understand with decisive results. With media outlets, and humanitarian demining organizations charged

with focusing on keeping demining on the national policy agenda they will need to access to different aspects of the system and the processes used it used to create decisions. This could come in the form of a "read access only" version of the system, or from initiatives from those responsible for it to regularly publish its results. Also, the methods and criteria used in the decision making process should be transparent and accessible for stakeholders to review as well.

6.2.2 Belief Group C

As with belief group A, the second belief group, C exhibits strong egalitarian cultural principles, especially for information management tools (17., 18). This would probably call for the adoption of a similar system as with A, but with a few notice differences. The proposed SDSS would not be in the sole ownership of the government (17., 18, 23.). But instead a distributed system, online with data being able to be imputed and information extracted as needed. However, this belief group acknowledges that a totally open system could prove harmful, necessitating user accounts to limit access on who can manipulate data and settings, and perform analysis (12.). This also means that responsibility for the system will be distributed with multiple administrators from different stakeholder agencies.

As with the SDSS for factor A, it should have a transparent component to it. It will be used to help formulate strategy and policy through workshops so it should be able to produce its results in a method that would have a wide appeal, be easily understandable and be able to pick between different alternatives.

6.2.3 Belief Group D

As mentioned in the interpretations, D shares the egalitarian cultural type with A and C. However with Hierarchy exerting a larger influence on this belief than As with belief group C, the SDSS for C, will be distributed as well but with a stricter, hierarchical control over the system (17., 12). This results not in less people having access to the system, but being able to effect it directly.

6.2.4 Belief Group F

Belief group F as may be remembered reverses the trend of having the egalitarian cultural type dominate. This group is most closely associated with hierarchy but does have some egalitarian principles that are mainly focused at an intra-governmental level. A SDSS would be exclusively in the control of the government (1., 11., 13.) However other government agencies would be able to contribute data and take information (2.).

Issues such as transparency would be at the whim of the government. However a certain level of information sharing will be needed since official strategy is believed to best for compliance when its the result of negotiated workshops and meetings (20.). Further in this vain, grassroots campaigns should take the lead in assuring national commitment to demining (15.). Fostering these campaigns by providing them the necessary data on what and where resources are needed will help insure their success. This means that spatial data should be provided, from the SDSS tool that would be used and controlled by the government.

6.3 GOING FURTHER

It would have been nice, with the appropriate time and funding to expand upon this study. For Q methodology it would have been interesting to include a category of statements based on maps or photos. Also it would have been nice to be able to sit with the Q sorter as he performed his or her sort. This way, questions they may have had on the statements could be clarified and further insight into their reasoning for ranking statements as they did in an exit interview.

Access to "SIMP" the Sustainable Information Management Package created by consultants in partnership with the GICHD would have been interesting to explore and evaluate. In essence it is an online, ditributed version of IMSMA, with increased reporting capabilities. It might have factored in nicely with Factor C and could have even, with enough time and funding for training been piloted with the participant who loaded into factor C.

6.4 LIMITATIONS

Although the study is sound in its methodology and execution, there are some limitations that should be mentioned. First of all, with the desired P set not being able to participate, the limitations on what can be extracted - how far it can go must be noted. The difficulty in getting getting stakeholders to take the survey was enormous causing the size to be much diminished from what was originally planned.

With more time, the statements from the concourse, used to build the Q set could have been improved. Some of the statements could have been made stronger, in that they would have caused more of a guttural reaction from the P set.

With the grid-group, more quantifiable measures could have made its way into the analysis. For example, the eigenvalues could have been used to standardize the size of the belief areas when they were plotted on the grid-group matrix.

Appendix A

Q set with Categories

	Hierarchy	Egalitarian	Individualist	Fatalist
Authority (Fundamental)	1. A single national governmental office should be responsible for all demining related activities.	2. Demining is a responsibility that should be shared between different minisitries.	3. Each government ministry and/or office should run demining activities as they like (to suit their own needs).	4. Demining does not need a government office to manage it, the demining organizations do what they want anyways.
Authority (Operational)	5. Work orders should only be issued by the Ministry of Environment, Directorate of Mine Action directly to the demining organizations.	6. Work orders should only be issued only after discussions with industry and civil society.	7. Work orders should be issued by each of the Regional Mine Action Centers to the organizations operating in their region.	8. Individual demining organizations do not need work orders, they should work as they see fit without governmental supervision.
Commitment (Fundamental)	9. Ensuring the necessary commitment and keeping demining on the policy agenda is fundamentally a task for the national government.	15. Grassroots groups and demining NGOs should take the lead in keeping demining on the national policy agenda.	21. Individual agencies have their own tasks and responsibilities and should not focus on broader issues of commitment.	27. Working to constantly keep demining on the national policy agenda is a waste of time and other resources.
Commitment (Operational)	10. Strong leadership is needed with in the government ministries to lobby internally for funds and other resources.	16. Media outlets and campaigns lead by Humanitarian Demining Organizations should be the focus of keeping demining on the national agenda.	22. Each demining organization should lobby the national government for its own interest.	28. It does not matter how commitment to demining is secured as long as it works
Information tools (Fundamental)	11. Only the Ministry of Environment's Directorate of Mine Action should maintain the IMSMA database, no other Government office or demining organization should have access	17. Demining works best if responsibility of the IMSMA database is distributed between different government offices and demining organizations.	23. Each agency maintains its own independent IMSMA database.	29. Information only needs to be collected in an ad-hoc (random) fashion
Information tools (Operational)	12. Rules and standards on who can access, approve and work with the IMSMA database.	18. Allowing different organizations and offices to use the official version of IMSMA in Iraq.	24. There is no one official IMSMA database as each organization and/or office would create and maintain their own.	30. Information is gathered and sent when requested.
Strategic Planning (Fundatmental)	13. The Central Government is responsible for strategic planning and policy for Iraqi mine action.	19. The Strategic Plan should be based on goals and principles agreed by different Government Ministries, Civil Society, Industry, and demining NGOs.	25. Each group involved in demining should formulate their own individual plan for demining	31. An overall strategic plan for demining is unnecessary
Strategic Planning (Operational)	14. Strategic planning and policy drafted by the Government should be the basis of all demining operations.	20. All official strategy and policy documents should be the product of negotiated workshops and meetings with stakeholders.	26. Demining organizations should carryout demining according to their own plans.	32. Demining should be conducted without any strategic plan,

Appendix B
Crib Sheets

B.1 A

Items Rank +3

19. The Strategic Plan should be based on goals and principles agreed by different Government Ministries, Civil Society, Industry, and demining NGOs.
10. Strong leadership is needed within the government ministries to lobby internally for funds and other resources.

Items Ranked Higher in Factor A Array than in Other Factor Arrays

3. Each government ministry and/or office should run demining activities as they like (to suit their own needs).
9. Ensuring the necessary commitment and keeping demining on the policy agenda is fundamentally a task for the national government.
14. Strategic planning and policy drafted by the Government should be the basis of all demining operations.
16. Media outlets and campaigns lead by Humanitarian Demining organizations should be the focus of keeping demining on the national agenda.
20. All official strategy and policy documents should be the product of negotiated workshops and meetings with stakeholders.
22. Each demining organization should lobby the national government for its own interest.

Items Rank Lower in Factor 1 Array than in Other Factor Arrays

1. A single national governmental office should be responsible for all demining related activities.
4. Demining does not need a government office to manage it, the demining organizations do what they want anyways.
8. Individual demining organizations do not need work orders, they should work as they see fit without governmental supervision.
11. Only the Ministry of Environment's, Directorate of Mine Action should maintain the IMSMA database, no other Government office or demining organization should have access.
12. Rules and standards on who can access, approve and work with the IMSMA database.
18. Allowing different organizations and offices to use the official version of IMSMA in Iraq.
21. Individual agencies have their own tasks and responsibilities and should not focus on broader issues of commitment.
26. Demining organizations should carryout demining according to their own plans.

Items Ranked −3

31. An overall strategic plan for demining is unnecessary.
32. Demining should be conducted without any strategic plan.

B.2 C

Items Rank +3

17. Demining works best if responsibility of the IMSMA database is distributed between different government offices and demining organizations.

18. Allowing different organizations and offices to use the official version of IMSMA in Iraq.

Items Rank Higher in Factor C Array than in Other Factor Arrays

12. Rules and standards on who can access, approve and work with the IMSMA database.

20. All official strategy and policy documents should be the product of negotiated workshops and meetings with stakeholders.

21. Individual agencies have their own tasks and responsibilities and should not focus on broader issues of commitment.

23. Each agency maintains its own independent IMSMA database.

28. It does not matter how commitment to demining is secured as long as it works.

29. Information only needs to be collected in an ad-hoc (random) fashion

Items Rank Lower in Factor C Array than in Other Factor Arrays

3. Each government ministry and/or office should run demining activities as they like (to suit their own needs).

9. Ensuring the necessary commitment and keeping demining on the policy agenda is fundamentally a task for the national government.

13. The Central Government is responsible for strategic planning and policy for Iraqi mine action.

14. Strategic planning and policy drafted by the Government should be the basis of all demining operations.

15. Grassroots groups and demining NGOs should take the lead in keeping demining on the national policy agenda.

24. There is no one official IMSMA database as each organization and/or office would create and maintain their own

25. Each group involved in demining should formulate their own individual plan for demining.

30. Information is gathered and sent when requested.

Items Ranked −3

5. Work orders should only be issued by the Ministry of Environment, Directorate of Mine Action directly to the demining organizations.

19. The Strategic Plan should be based on goals and principles agreed by different Government Ministries, Civil Society, Industry, and demining NGOs.

B.3 D

Items Rank +3

17. Demining works best if responsibility of the IMSMA database is distributed between different government offices and demining organizations.

19. The Strategic Plan should be based on goals and principles agreed by different Government Ministries, Civil Society, Industry, and demining NGOs

Items Rank Higher in Factor D Array than in Other Factor Arrays

4. Demining does not need a government office to manage it, the demining organizations do what they want anyways.

5. Work orders should only be issued by the Ministry of Environment, Directorate of Mine Action directly to the demining organizations.

6. Work orders should only be issued only after discussions with industry and civil society.

12. Rules and standards on who can access, approve and work with the IMSMA database.

14. Strategic planning and policy drafted by the Government should be the basis of all demining operations.

23. Each agency maintains its own independent IMSMA database.

25. Each group involved in demining should formulate their own individual plan for demining.

26. Demining organizations should carryout demining according to their own plans.

27. Working to constantly keep demining on the national policy agenda is a waste of time and other resources.

30. Information is gathered and sent when requested.

Items Rank Lower in Factor D Array than in Other Factor Arrays

2. Demining is a responsibility that should be shared between different ministries.

7. Work orders should be issued by each of the Regional Mine Action Centers to the organizations operating in their region.

10. Strong leadership is needed with in the government ministries to lobby internally for funds and other resources.

18. Allowing different organizations and offices to use the official version of IMSMA in Iraq.

20. All official strategy and policy documents should be the product of negotiated workshops and meetings with stakeholders.

21. Individual agencies have their own tasks and responsibilities and should not focus on broader issues of commitment.

22. Each demining organization should lobby the national government for its own interest.

28. It does not matter how commitment to demining is secured as long as it works

Items Rank −3

29. Information only needs to be collected in an ad-hoc (random) fashion.

31. An overall strategic plan for demining is unnecessary.

B.4 F

Items Rank +3

1. A single national governmental office should be responsible for all demining related activities.

13. The Central Government is responsible for strategic planning and policy for Iraqi mine action.

Items Rank Higher in Factor F Array than in Other Factor Arrays

2. Demining is a responsibility that should be shared between different ministries.

3. Each government ministry and/or office should run demining activities as they like (to suit their own needs).

8. Individual demining organizations do not need work orders, they should work as they see fit without governmental supervision.

11. Only the Ministry of Environment's Directorate of Mine Action should maintain the IMSMA database, no other Government office or demining organization should have access.

15. Grassroots groups and demining NGOs should take the lead in keeping demining on the national policy agenda.

20. All official strategy and policy documents should be the product of negotiated workshops and meetings with stakeholders.

24. There is no one official IMSMA database as each organization and/or office would create and maintain their own.

Items Rank Lower in Factor F Array than in Other Factor Arrays

6. Work orders should only be issued only after discussions with industry and civil society.

16. Media outlets and campaigns lead by Humanitarian Demining organizations should be the focus of keeping demining on the national agenda.

23. Each agency maintains its own independent IMSMA database.

26. Demining organizations should carryout demining according to their own plans.

27. Working to constantly keep demining on the national policy agenda is a waste of time and other resources.

Items Rank −3

17. Demining works best if responsibility of the IMSMA database is distributed between different government offices and demining organizations.

31. An overall strategic plan for demining is unnecessary.

Appendix C

Factor Array Response Grids

			3			
			5			
		21	12	6		
		24	13	7		
	1	25	15	14	2	
	4	26	23	17	9	
31	8	28	27	18	16	10
32	11	29	30	22	20	19
-3	-2	-1	0	1	2	3

(a) Factor A

			9			
			10			
		4	11	1		
		8	14	6		
	3	15	26	16	2	
	13	22	27	21	7	
17	24	23	31	28	12	5
18	25	30	32	29	20	19
-3	-2	-1	0	1	2	3

(b) Factor C

			2			
			8			
		4	11	5		
		7	15	9		
	3	10	16	13	1	
	22	21	25	14	6	
29	28	23	26	18	12	17
31	32	24	27	20	30	19
-3	-2	-1	0	1	2	3

(c) Factor D

			3			
			8			
		6	9	5		
		22	10	7		
	4	25	16	12	2	
	23	26	21	14	11	
17	29	27	24	15	18	1
31	32	28	30	19	20	13
-3	-2	-1	0	1	2	3

(d) Factor F

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