CRANFIELD UNIVERSITY

GURKAN YESILYURT

ASSESSMENT OF THE EFFECTS OF THE STRATEGY, LEADERSHIP AND MORALE ON THE OUTCOME OF THE BATTLE

CRANFIELD DEFENCE AND SECURITY

LEADERSHIP AND MANAGEMENT

PhD

Academic Year: 2021 - 2024

Supervisor: Dr. Iftikhar Zaidi

Associate Supervisor: Dr.Irfan Ansari

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This thesis is submitted in partial fulfilment of the requirements for the degree of Enter degree

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ABSTRACT

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LIST OF ABBREVIATIONS

|  |  |
| --- | --- |
| IT | Information Technology |
| QJM | Quantified Judgement Model |
| OLI | Operational Lethality Indexes |
|  |  |
|  |  |

# INTRODUCTION

## Introduction

Understanding human role in causing social conflicts and resolving them has been studied by many social scientists. Rummel argues that human being’s nature and needs as the basic reasons of the social conflicts (1977, Chapter 2). Marx believes that the *surplus value,* which is created by the labourers, by no means only should be owned by the capitalist and defines conflict as a social struggle between the working class and the capitalists for the control of the means of production and the sharing of wealth (2008, pp. 315, 384), while Huntington points to the conflicts between groups from differing civilizations (1996, p. 13). Clausewitz, before analysing the war and battle, gives the definition of conflict in terms of fighting and he says it is a trial of moral and physical forces through the medium of physical force(1989, p. 127).

Rummel’s analysis of the conflict is comprehensive, and he frames the dynamics of conflict and war with his five-volume series of *Understanding Conflict and War*. He starts with the analysis of the inner person, psychology of human being to detect the roots of the conflict and defines it as a *process of balancing of powers*. He conceptualizes the conflict in four levels as described below.

* *Conflict-space:* sources of conflict, like existence of slaves and the master in a certain society.
* *Conflict-structure:* Dispositions of the elements in the conflict-space, like slaves wish to be free.
* *Conflict-situation:*  If slavery is illegal then there is a conflict-situation.
* *Manifestation:* Real conflict, like struggle of slaves will to be free, which yields a new balance.

He then applies these four level to socio-cultural field and defines social conflict as *confrontation of social powers and opposition and balancing of interests*. This confrontation is in recursive nature and after balance has been reached, disrupted expectations initiate previous phases, that’s why he names this as “the conflict helix” (1976, Chapters 26–29).

Balancing of opposing interests, capabilities, and wills in the international level is being expressed as conflict behaviour, violence, and war. So, war is seen as one form of conflict(Dubois et al., 1997, p. 17; Rummel, 1979, p. 23,26). Below perspectives on war summarizes importance of it.

* War is a matter of vital importance to the state and the area of life or death (Tzu, 1971, p. 63),
* War is the prince’s most important matter to keep the state live (Machiavelli, 2008, p. 50),
* War is a is murder unless the life of the nation is in danger (Ataturk, 2006, p. 305) .

This vital feature of the war makes it an important topic of analysis in all ages (Frankel, 2021, sec. War). While much have been said on the physical elements of the factors like force ratios, most of these studies excludes the qualitative characteristics or take them constant because of their qualitative nature (Clausewitz, 1989, p. 134). Although the importance of non-material factors is generally emphasized by authors (Clausewitz, 1832, pp. 127, 184, 194; N. T. Dupuy, 1979, p. 47; Lanchester, 1916, p. 37; Machiavelli, 2008, p. 39), it has not been treated within a rigorous, and systematic academic study.

Since social conflicts is caused by the human factors, it is reasonable to argue that successful resolution of them also necessitates subtle human intervention. In this research, the factors affecting the outcome of the battle will be examined from the perspective of strategy, leadership, and morale.

## Background

Determinants of outcome of war is a special interest of topic which encourages the stateman, commanders and researchers to explain it (Biddle, 2006, p. 1; Machiavelli, 2008, p. 52). Sun Tzu names five fundamental factors to evaluate the war. These factors, which he associates with the winning of the battle are moral influence, weather, terrain, command, and doctrine. With these estimation factors laid down as principles, he prescribes some force ratio rules as when ten to the enemy’s one, surround him, when five times his strength, attack him, if double his strength, divide him (1971, pp. 63–80).

Clausewitz ’s approach to subject is comprehensive and covers qualitative nature of the subject as well. He conditions overcoming enemy with matching the efforts against opponent’s power of resistance which he says product of two inseparable factors, namely total means at his disposal and strength of his will (1989, p. 77). He specifies that, with deciding; time, place, and the force of the engagement, strategy, not force ratio, has *considerable influence* on an engagement’s outcome. However, if the superiority of numbers reaches to the point where it is overwhelming then it becomes the most important factor and counterbalances all other factors (like quality of troops, leadership, or circumstances (1989, pp. 194–195).

Lancaster, on the other hand, developed a combat model that includes mathematical formulas to predict the winner of the battle. His first formula is named as Linear Law which basically explains the casualties in differential equations (the number of men knocked out per unit time will be directly proportional to the numerical strength of the opposing force, efficiency of weapons and unit value). His second contribution is N-square law which defines fighting strength of a force as the proportional to the square of its numerical strength multiplied by the fighting value of individual units (1916, pp. 39–66).

The width of mathematical formulas is so enlarged by the Dupuy, who tried to quantify almost every factor in the battle to predict outcome. His efforts started with calculating the lethality of weapons, namely Operational Lethality Indices (OLI) in 1963. He then integrated these OLI values to all combat variables to get and compare the combat power potentials of the sides to predict the theoretical winner and named this model as Quantified Judgement Model (QJM). He evaluates these theoretical results with the actual results of battle which is quantified with three criteria (mission accomplishment, holding ground, and casualties) in Result Model. Aware of his model’s inability to quantify all non-material variables he approximates the effects of leadership, training, experience, morale, and logistics in a Combat Effectiveness Value (CEV) (1979, pp. 19–105).

Biddle used multiple methods (formal theory, case study, statistical analysis, and simulation experimentation) to better explain the outcome of the battle and argued that material factors alone cannot explain capability. He added force employment (doctrine and tactics) by which armies use their materiel in the field. He argues that armies will be successful if they execute offensive and defensive operations conforming with the modern system of force employment (tactics of cover and conceal, dispersion, combined arms, and independent small unit operations). His key finding was the effects of preponderance in the numbers and technology is *mediated by* modern system of force employment. He concludes that technology and preponderance’s effects are radically different and can be decisive or almost immaterial as a function of force employment. The one who implements force employment better, will exploit advantageous of numerical superiority in numbers and technology (2006, pp. 29–77).

Aware of the importance of the non-material factors in warfare, *British Defence Doctrine (BDD)* categorized fighting power into three sections (conceptual, physical, and moral) in 2001 and this approach has been used by UK since then. It asserts that combat power is the product of these three components. *Conceptual component* provides the thought processes to develop the ability to fight and contains principles of the war and the doctrine supported by strategy. *Physical component* is the means to fight and consists of five elements (manpower, equipment collective performance, readiness, and sustainability). And the *moral component* is about persuading the people to fight which requires motivation, leadership, and management (UK Ministry of Defence, 2001, pp. 4-1: 4-5). This doctrine constitutes the linkage between the subject and a military that follows a theoretical foundation from a practitioner perspective.

It is worth to mention the report of RAND which argues that morale, cohesion, and discipline is associated with the will to fight and provides an explanation of how to assess this important feature of forces by military planners (Connable et al., 2018, p. 10).

## Problem Analysis

### Considerations

The literature so far presents models for predicting the outcome of the battle composed of based on quantifiable determinants. Lancaster’s models only take number of troops and the weapon effectiveness as input and excludes training, morale, leadership, and other qualitative factors of fighting strength since, he says, these cannot be put into the equations, and he assumes these factors are equal on both sides. (Lanchester, 1916, p. 47). Kirkpatrick, detected that while Lancester’s models were valid in some historical contexts such as in Americal Civil War, in other scenarious where warfare dominated by technology they are potentially misleading (2021, p. 43).

Dupuy’s models are evaluating material factors much more detail than Lancaster (OLI values for all weapons and platforms, operational and environmental variables as well). His combat effectiveness value (CEV) which combines non-material factors in a group is the most controversial and erroneous part of his models since this value is either determined generally (ex. German CEV value is 1.2 of Allied Powers in WWI in western front) or if there is inconsistent result, related factor (such as surprise) is added afterwards to CEV to calibrate the model to give correct value (Ciano, 1988, p. 31). Another weak point of Dupuy’s model is the subjective selectness of the non-material factors which is included to the model in the beginning of the analysis only if evaluators of the models detect any discrepancy (Dupuy, 1979, p. 39).

Biddle’s model includes only one non-material factor (force employment) of major qualitative features which is laid down in the literature. Sun Tzu’s three out of five fundamental factors to be victorious (includes moral, command, and doctrine elements) relates with non-material factors (1971, p. 63). Clausewitz names skill of the commander, experience, courage, patriotic spirit as principle moral elements and moral components are among the most important in the war (1989, p. 186), while Dupuy lists leadership, training, morale, logistics as non-material factors of the battle (1979, pp. 37–38). Biddle’s model is needs to be incremented to better reflect reality.

These major models in this field fails to explain significant events like USA withdrawal from Afghanistan, Battle of France in WW2, or major battles in Vietnam War.

For the USA withdrawal from Afghanistan, world’s biggest military spender, $778 billion in 2020 (Sipri, 2021, para. 5), USA, has had to withdraw from Afghanistan after nearly two decades of campaign and Taliban regained control over the country although Afghan Government Forces and its main supporter USA has numerical and technological superiority. Malkasian argues that the thing that make Taliban powerful was their fight for Islam and the cultural values enshrined in Afghan identity like resistance to occupation (2021, pp. 4–5). Current models including Biddle’s one (because his main argument was force employment, the one Americans is excellent at), cannot explain this withdrawal without taking into consideration of non-material factors.

For the Battle of France in WW II, the whole front is broken by General Guderian corps with only three Panzer Divisions and Motorized Infantry elements, against France forces of 10 Divisions at Ardennes and dislocated BEF forces to Dunkirk and French forces to south of the country where they were ineffective throughout the war. Inferior by all predictions or force ratios in this decisive point, superior tactic of strategic penetration by independent armoured force combined with effective leadership enabled these victory (Aitken et al., 1994, pt. 1; Hart, 1974, p. 71).

### Theoretical Approach to the Problem

Clausewitz’s conceptualization of the war and the manner he presents the importance of the numbers seems to be basic to understanding the roots of the problem in the current models. In order to understand real war, Clausewitz analyses the absolute war, like Isaac Newton, who conceptualized the relative motion theories to understand the true motions of the individual bodies in the space (Harper, 2005, p. 592). Clausewitz’s perfect world of the war is absolute war, in which human factors, politics, and elite interests are taken away and each side pushes toward the extremes (extreme use of force, disarming the opponent, maximum exertion of strength) to win the war. Then he describes the modifications to this absolutism and says extreme use of force and maximum exertion of the strength is restricted by the limits of the human nature which in turn reduces the power of resistance. Realities, prospects of future events, political considerations, and possibility of the peace also prevents sides from employing all available forces. In reality opponents use their physical and moral forces in this limited sense (Clausewitz, 1989, pp. 75–80).

Clausewitz’s approach of success on the battlefield is then attributed to the superior numbers only in this absolute mean of the war, when human factors, leadership, morale, will, determination is taken away from analysis. This constitutes his mechanical way of predicting the outcome of the battle. Then he qualifies this by saying that if superior numbers reach to the point of overwhelming, it will counterbalance all other contributing circumstances (strategy, morale and etc.). That’s why he suggests that bringing as many troops as possible into the engagement at the decisive point as the first principle of strategy (Clausewitz, 1989, 194-195).

This conceptualization is adopted by USA military, and they postulated six times strength over enemy to attack (USA Department of the Army, 1976, pp. 3–4). Since USA military planners attributed the victory in the WWII to overwhelming numbers (Herbert, 1988, p. 99), they continue to think overwhelming combat force would yield the success (USA Joint Chief of Staff, 2020, pp. IV–33). Vietnam, Korea, Afghanistan, Libya, and Iraq cases have demonstrated flaws in this way of thinking. These predictive models that suggested these campaigns will reach their strategic objectives. In each of these cases they have been successful in achieving the initial war aims. But hey could not attain total victory in the end.

### Problem Definition

This theoretical approach and way of thinking is expressed also within the current models of the war. Up to now, only material factors found their places in the models of the war. Non-material factors either assumed to be equal or not represented within the models due to their unquantifiable nature.

Since models are representation of the reality (Pidd, 2009, p. 10), current models of identifying the determinants of the outcome of the battle does not reflect major part of the reality on the battlefield with the exclusion of non-material factors from assessment.

That’s why current models cannot explain outcomes of numerically and technologically inferior forces defeats their opponents. Germans would never attack to France in WW2 if they were to use Lancaster’s and Dupuy’s models. Current models including Biddle (because his main argument was force employment, the one Americans is excellent at) would have said Taliban can never triumph in Afghanistan. These considerations and examples prove that there is a clear problem in those tools way of representing reality.

### Problem Statement

Against this background, problem definition for this research is defined as *current predictor models of battle outcome are basically using material factors as determinants, and this is not reflecting reality and insufficient to explain major events on the battlefield.*

## Aim and Objectives

Against this problem statement this research will add the effects of the strategy, leadership, and morale to better represent the reality in terms of the determinants of the battle outcome. This approach is not challenging current models but will complement them to *explore* other qualitative factors to add new information to the literature.

### Aim:

This research will aim to *explore* effects of non-material factors on the outcome of the battle alongside other material factors.

### Objectives:

In order to achieve this aim, this research identifies two objectives.

* To *explain* how far material factors varies the outcome of the battle.
* To *explore* the nature and the degree of the effects of strategy, leadership, and morale on the outcome of the battle.

## Scope

Of non-material factors that affect the outcome of the battle, only strategy, leadership, and morale effects will be analysed. Material factors that influence the outcome of the battle will be explained in general to put the research into context. It is not intended to identify all elements affecting the course of the events in the battle.

## Research Value

This research is expected to provide contribution to literature *new knowledge* by analysing the effects of strategy, leadership, and morale on the outcome of the battle in inductive approach.

This research is expected to add value to *leadership studies* in the battlefield environment. Off intangible factors stated by Dupuy, time and space, intelligence, surprise, and initiative factors are also referred to be related with leadership (1979, pp. 38–39). And most importantly the strategy, which has *considerable influence* on the outcome of the battle (Clausewitz, 1989, p. 194) is devised by the leaders, in turn will be treated as the by-product of the leaders. All these factors will be analysed to appraise to what degree leadership matters on the outcome of the battle.

## Positioning

Current research positioning is to look at war from strategy, leadership, and morale perspectives and their effects on the combat outcome.

The research will use the literature that includes the evaluations of war theories on combat factors (Sun Tzu’s *Art of War*, Clausewitz’s *On War*, Machiavelli’s *The Prince,* *Art of War*, and etc.), models and doctrines developed in the light of these evaluations (Dupuy’s QJM, Lancaster’s Linear and N-square law, UK British Defence Doctrine, USA Joint Publications), and previous academic research in this field.

Types of the data to be used in the research will be *secondary data.* To uncover how far material factors varies the outcome of the battle (first objective), USA Army’s CDB Dataset (USA Historical Evaluation and Research Organization, 1990) will be used. In order to explore the nature and the degree of the effects of strategy, leadership, and morale on the outcome of the battle (second objective); military history books, official reports and memoirs of the soldiers will be used.

## Research Questions

### Research Question 1:

What are the *co-efficient values* of material factors on the outcome of the battle?

### Research Question 2:

How much strategy, leadership, and morale *affect the variation* of the outcome of the battle?

### Research Question 3:

To what extent do strategy, leadership, and morale *mediate* the effects of material factors?

## Thesis

Initial thesis of this research is strategy, leadership, and morale affect considerably the outcome of the battle.

## Concepts and Variable

Concepts as ingredients of the theory (Bryman, 2016, p. 6) will be;

* Combat variables (material and non-material factors).
* Military strategy as defined by among others Sun Tzu (1971, Chapter 3), Clausewitz (1989, pt. 3), Jomini (2008, Chapter 3).
* Leadership effectiveness as defined by Yukl (2020, pp. 28–30)
* Morale as defined by Clausewitz (1989, p. 186).
* Outcome of the battle (victory vs. battle) as analysed by Zaidi (2009).

## Methodology, Research Methods

### Methodology Considerations

As it is shown in the background part, outcome of the battle depends on both material and non-material factors. Reality of the material part can be conceptualized by the objectivist approach, while non-material factors which is the enablers of material factors, as explained by the Biddle (2006, pp. 73–77), can be expressed in constructivist thinking. The reason for that is in the non-material factors (strategy, leadership, morale, experience), it is the social actors that influence the process (Rummel, 1977, Chapter 1). Since the research questions will be mainly expressed by the non-material factors, this research will mainly take the position of *constructivist* approach as expressed by Bryman (2016, p. 29) .

Epistemological position, the way to frame the knowledge within this reality, will be both *positivist* in material sense and *interpretivist* in non-material sense as defined by Bryman (2016, pp. 24–26). To analyse the material factors as determinants of the outcome, battle database, which lists all the material factors will be utilized. On the other hand, in order to extract the meanings and perceptions about the strategy, leadership, and morale, the contents of the texts (military history books, memoirs, official reports) will be analysed.

This research will use *sequential mixed method* research strategy, with quantitative methodology preceding the qualitative one in supporting role (quan-->QUAL). Design of this mix method strategy will be *explanatory sequential design*, the results of quan methodology will be elaborated by the QUAL methodology to reach the findings of the research as outlined by Bryman (2016, pp. 638–639).

### Research Methods

In the initial *quan* part of the research *statistical method* of multiple regression analysis will be used to identify the co-efficient values of material factors on the outcome of the battle with the use of in-place battle databases.

In the *QUAL* part of the research, *content analysis* method will be utilised to define relationship between strategy, leadership, and morale and the battle result. These two methods will allow to *explore* the nature and the degree of the effects of strategy, leadership, and morale on the outcome of the battle which is the second objective of this research.

## Research Ethics

This research’s focus will be on strategy, leadership, and morale on the outcome of the battle. Role of strategy, leadership qualities and morale effects will be solicited from universally accepted literature. It is expected that maximum objectivity will be attained in this term.

In order to provide maximum objectivity for the selection of the battles however there are some limitations when the effects of the material factors analysed. Main limitation is the availability of the datasets. There are two widely used dataset for the battles, which are Correlates of War (Sarkees & Frank Wayman, 2010) and USA Army’s CDB Dataset(USA Historical Evaluation and Research Organization, 1990). COW Dataset includes wars rather than battles. Since this research’s unit of analysis is battle, usability of this dataset will be limited to only analysing the effects of the material features. CDB90 dataset is centred on the battles. However, it has also drawbacks. The battles analysed in this dataset is mainly from USA, German, and Israeli experiences. The second main limit of this dataset is reliability. Biddle argues that real errors remain in the CDB90 data, in frequency that is difficult to assess but could well be significant (2006, p. 153).

## Layout of the Research

In this chapter (Chapter one) the general context has been set up. Questions has been so far responded with regard to what will be studied, why this research is being conducted, and how it will be conducted. Aim, objectives, questions, value, and limitations of the research has been articulated.

In Chapter two current literature will be summarized to explain what kind of approaches and models are being used so far.

In Chapter three theoretical framework will be presented to explain the factors effecting the outcome of the battle (variables) and their relationships, data collection and analysis methods.

In Chapter four how the research was carried out will be explained.

In Chapter five findings of research will be presented.

# LITERATURE REVIEW

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APPENDICES

Whilst Heading 1 to Heading 6 can be used to number headings in the main body of the thesis, Heading styles 7–9 have been modified specifically for lettered appendix headings with Heading 7 having the ‘Appendix’ prefix as shown below.

Appendix Title (Use Heading 7)

Appendix Section (Use Heading 8)

Appendix Subsection (Use Heading 9)

Creating captions in Appendices

If you have chosen to include chapter numbers in your captions then follow the instructions given here to apply the same format to the captions in your appendices. This section explains how to caption the figures and tables in your Appendices, assuming that Heading 7 is numbered “Appendix A” and that the Figures and Tables are going to be labelled ‘Figure A-1’, ‘Figure A-2’, ‘Table B-1’ etc.

You will have to create new, separate labels that look like the ‘Figure’ and ‘Table’ labels you used in the main body of your thesis.

1. Select the **References** tab on the Ribbon then click on **Insert Caption**
2. Click **New Label**. Type **Figure\_Apx** then click **OK**
3. You now have two labels for figures, called **Figure** and **Figure\_Apx**  
   Repeat for table captions.
4. In the **Caption** box, type your caption text
5. Click **Numbering**. Tick **Include chapter numbering** and choose **Heading 7** from the drop-down list of styles and click **OK** twice
6. Your caption should look something like this:

**Figure\_Apx A‑1 This is the caption text for a Figure in the Appendix**

1. Delete the extraneous ‘\_Apx’ from the caption label so it reads:  
   **Figure A‑1 This is the caption text for a Figure in the Appendix**  
   **TIP:** Instead of deleting each ‘\_Apx’ individually use **Find & Replace** to modify all the labels at once.

Creating Lists of Figures and Tables for Appendices

This template already includes a List of Figures and a List of Tables, however you will have to create two new lists for the ‘Figure\_Apx’ and the ‘Table\_Apx’ labels.

1. Place the insertion point on a blank row after the existing List of Figures
2. Select the **Insert Table of Figures** command on the **References** tab of the Ribbon
3. Set the **Caption Label** box to ‘**Figure\_Apx**’ and click **OK**  
   **Note:** Word will put a single blank line between the original and new lists preventing it from appearing as one seamless list. However if you select the blank paragraph between the tables you can hide it by opening the Font dialog box from the Home tab and selecting **Hidden**.
4. Click after the List of Tables and repeat for the Caption Label ‘Table\_Apx’