**Ph.D. Research Proposal**

Relative Combat Power and Force Ratio

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1. **Introduction**
2. In the beginning combat power and force ratio was a subject of skilled soldiers like Sun Tzu, Clausewitz and others. In the 1900s, the subject attracted the attention of engineers like Lancaster. At this stage, mathematical explanations were used to explain the importance of the subject. With the rapid development of technology, the subject has become the subject of operational research. Researchers like Depuy and Briddle have examined the subject with the help of well-designed mathematical models.
3. I think this **subject is worth to attention because**; the abilities of **modern programming languages** like Python exploits the already in place information to the level hard to imagine even at the end of the century. Calculation and analysis capability of this discipline that framed in the field **Data Science** provides useful tool for explaining the issue once more with different dimensions.
4. **Primary issues** in this research will be to find **the explanatory power of force ratios** along with other relative combat power factors (leadership, morale, maneuver, firepower and protection) for the outcome of the battle. Moreover, my intention is to **develop a mathematical model** which will also attempt to explain the nonmaterial factors of war of **morale and leadership** with quantitative analysis.
5. I have studied this topic in my Turkish War College education between 2007-2009. I did operation analysis and force comparisons at the brigade and corps levels. In this master thesis I also had the opportunity to examine this subject with examples of war history. Doctrine in that time advises some sort of action according to force ratios. One general acceptance was if you have 3:1 force ratio you may plan to attack.
6. It is my initial judgement that force ratios are too deterministic, and needs to be analyzed. Because there are armies in history fight and win the war although they have less manpower or means to fight.
7. So, **my research questions** will be;
   1. What is the degree of explanatory power of force ratios and other relative combat power factors on the outcome of the battles fought between state actors?
   2. What is the leverage of morale and leadership on the outcome of these battles?
8. I will determine the variables of the combat power through two samples selected from the wars of two periods of different characters. Then, using these variables, I will try to develop a mathematical model by using the battles fought in the same two periods as data. In both periods, I will deal with the Napoleonic wars, where military art was systematically used in wars, and the wars of the second world war, where technology was used extensively. My focus will be on morale and leadership factors.