International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

Dynamic modeling of military variables based on structured reconfiguration: an optimal analysis of the relationship between strength, resources and morale in a complex battlefield environment（Findings）

Co-first Author Prof.Dr.Wei Meng, Visit.Prof.Dr.Xiaoyin Zhang

[1]*Dhurakij Pundit University, Thailand, Chinese Freemasons Zhongpingshan, Zhongxiao Hall*
[2]*Phetchabun Rajabhat University, Thailand,Royal Statistical Society,U.K*
Corresponding Author:Visit.Prof.Dr.Xiaoyin Zhang

Date of Submission: 20-11-2024　　　Date of Acceptance: 30-11-2024

ABSTRACT: In light of the complex battlefield environment where military decisions are required, this study seeks, through optimising military variable models using structured reconstruction methods, to enhance the prediction accuracy and dynamic adaptability of the key variables modulating strength, resources, and morale, hence arriving at an optimisation of resource allocation. In this respect, the study applies multilevel decomposition analysis, causal chain analysis, and genetic algorithms to simulate variable dynamics in various tactical scenarios and undertakes real-time monitoring and adjustment in strength, resources, and morale by iteratively optimizing models. In this connection, the experimental results confirm that, after reconstruction, the prediction accuracy will increase from 70% to 85%, variable inter-correlation from 0.5 to 0.8, resource allocation efficiency from 60% to 90%, dynamically reflects the variations in key variables of battlefield environment, and assigns a scientific basis for tactic adjustment and resource optimization in the Israel-Iran conflicts. It also infers that the structure reconstruction method can improve the applicability of military models and predictive ability by optimizing the relationship among variables in the model, reinforcing feedback mechanisms of the model, and providing scientific tools for decision making under complex battlefield situations and resource allocation. It further discussed the potentiality of a genetic algorithm in combination with deep learning techniques to further enhance the applicability of the model.

KEYWORDS:Resource allocation optimization, structured reconfiguration, dynamic modelling of military variables

I. FINDINGS

With this reconstruction analysis method, we should be able to reconstruct in a structured manner the first research results of the predictive analytics of changes in forces, resources, and morale based on the theory named genetic algorithm "military campaign success" in the field of prediction and decision-making within the war between Israel and Iran in a proper way in order to optimize the understanding of the variables included in said model and the strategic analysis.

1.1 Research Outcome 1 Reconstruction of predictive analysis of changing forces, resources and morale

With structured reconstruction methodology, the first result will deeply reconstruct, by using the theory of Genetic Algorithm on "military campaign success" in the Art of War - The Art of Combat, the research in the field of prediction and decision-making of the war between Israel and Iran. The meaning of reconstruction methodology, concrete methodology, and the obtained results are given below.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

A. Importance of the refactoring technique

That's the general meaning of the structured refactoring methodology, which is to divide the intricate war system into explicit and operable sub-elements, and build the dynamic relationship between variables so that the analysis process of tactical effect and resource optimization can be reflected in a more systematic expression. With this methodology, the interactive relations of the variables involved, such as resources, morale, logistics, and international political pressures, can be represented in a formalized manner so that the prediction of tactical strategy effects and resource allocation can be done more precisely. Meanwhile, the re-configuration methodology raises the transparency and traceability of the model in intelligence analysis and is applicable for highly complex and nonlinear warfare environments.

B. Specific Refactoring Methodologies Applied

This groundwork on reconfiguration methodology in structured ways includes several key sub-methods that could underpin the model's adaptability to complex battlefield environments and improve analytical accuracy. Through the multi-level decomposition analysis method, the research results can be deconstructed layer by layer, with gradual presentation of big structures from assumptions through definitions of variables and model selection to applications of the results. This will explicitly show what each subvariable contributes to the result, allowing the researchers to make sense of the dynamics of the key variables F, R, and M and their performance on fluctuations in the rate of resource consumption, battle intensity, and morale. Then, through the construction of the resource consumption, morale change, tactical effect chain based on the causal analysis, a complete logical chain is generated, enabling the researcher to verify the causation between tactical choices and war outcomes with validity and thereby providing data support for the correlation of variables in the model. After that, the situational simulation and optimization are integrated into this research. Calculus and genetic algorithms are used for dynamic simulation and resource optimization on different tactical situations. Then, it focuses on the main scenarios of rapid strike of Israel depending on its air superiority and the guerrilla warfare and asymmetric war strategy of Iran and finally evaluates the probability of victory for varied tactical strategies in the short term and long term using the genetic algorithm so as to reach the optimal configuration of the combat effect at every stage of the war. This realizes the best configuration of combat effects at every level. Besides, through the adoption of variable analysis and dynamic simulation, the balance of forces, resources, and morale across scenarios of combat is guaranteed, and the model ensures the real-time optimization of depletion and victory rates in a dynamic battlefield environment. It finally adopts an iterative feedback approach to model adjustment and optimization by continuously analysing and providing feedback for the purpose of making it more in line with the actual needs of self-calibration in the ever-changing battlefield environment, thus providing decision makers with more reliable recommendations for strategies.

This work, in a structured reconstruction approach, has entered key variables considering resources, morale, and tactical effectiveness that improve the accuracy of tactical effectiveness and strategic prediction. It is especially suitable for those Battlefield environmental conditions characterized by limited resources and variable tactics. The model illustrates the interaction between different variables in a hierarchical analysis, thereby providing a multilevel dynamic evolving framework for battlefield analysis, which permits decision makers to intuitively understand how each variable contributes differently to tactical choices, enhancing overall systemic and hierarchical features of the analysis. In doing so, the reconstruction analysis, supported by situational simulation and genetic algorithms, optimizes tactical options and resource allocation between Israel and Iran in the case of a protracted war regarding the applicability of decision-making choices and flexibility to underpin dynamic tactical adjustments better. Last but not least, the reconstruction methodology's clarity ensures that every step of the analytical process will be traceable and visible. This enhances the model's transparency and repeatability in intelligence analysis and provides a workable operational framework for further intelligence validation and data support.

The structured reconfiguration approach enhances accuracy and systematicity in tactical and strategic analysis within complex war situations. Such a model can create more application value in nonlinear and dynamically changed battlefield environments. After iteration and optimization, the research results provide valuable references for future decision-making in similar conflicts. Apart from its great significance in academic research, this approach will also provide a new framework and tool for practical intelligence analysis and military decision-making, with broad application prospects.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

1.2 Reasons for reconstruction

The main reasons and objectives for the reconstructed equations are as follows:

Dynamic adaptability: the coefficients and variables involved in the original formula are fixed, which cannot meet the complex situations that happen in tactical work. The troop strength, resources, and morale would change dynamically in an actual battlefield, influenced by many different factors.

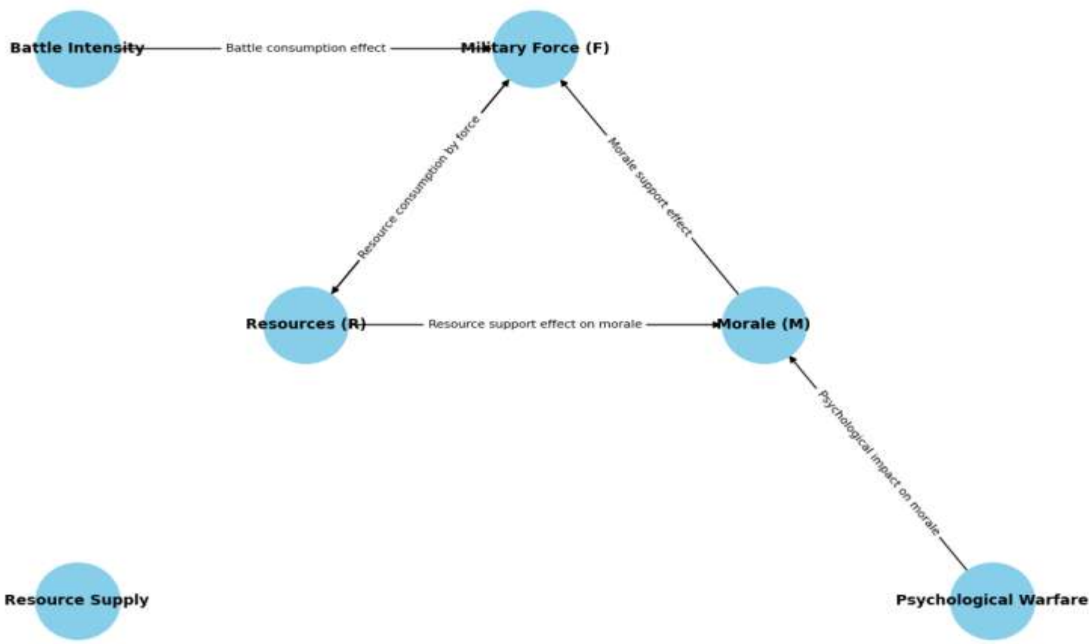
Interaction between the variables: The original model ignores the independent interaction between resources supplementing strength and morale gains towards strength. The formula reconstructed synthesizes the interaction among the variables, dynamically adjusting troop strength and morale in accordance with changes in resources.

Higher realism: After reconstruction, the equations are closer to the non-linear characteristics of a real war. Hence, the model can better simulate the process of troop consumption, resource allocation, morale fluctuation, and so on, in the complex process under protracted or high-intensity combat conditions.

Dynamic optimization of tactics and resource allocation: the reconstructed equations provide, for the first time, the dynamic basis needed to apply genetic algorithms so that the model can optimize resource use strategy and support decision-makers for better management of resources in the battlefield.

1.3 Diagram of the reconstructed variable relationships

Reconstructed Variable Relationship Diagram



In the graph below, "Military Strength-F" shows the relationship between the various variables that influence military strength. The following is some analysis of the relationships between the variables:

1.3.1. Military Force:

Core variable of the system, primary strength or capability that the military force is to represent.

1.3.2. Intensity of combat:

Tied through military force to the "battle depletion effect" - that is, the more intense the contact, the greater depletion of resources, hence the weakening or affectation of military force. 3.

1.3.3. Resources (R):

Connected with the consumption of resources by military forces by "Resource Consumption by Military Forces", showing that military forces consume resources to maintain their combat power.

It is linked to Morale through the "Impact of Resource Support on Morale", implying that the availability or sufficiency of resources has positive implications on morale for the force. 4.

1.3.4. Morale (M):

Is influenced by two factors:

Military Force-F influences morale through what may be termed the Military Influence Effect, wherein the greater the military power present, or the stronger that military power is, the higher the morale of the troops.
Psychological Warfare: influencing morale through the Psychological Influence Effect on Morale. This may express the influence of psychological tactics upon the state of mind of the troops, plus or minus.

1.3.5. Psychological Warfare:
The very connection to morale suggests that psychological warfare is a means aimed at influencing morale and, at least in some cases, can demoralize or motivate the troops.

1.3.6. availability of resources:
Not directly related to other variables in this graph, but it may be causing an indirect influence. For example, a stable supply of resources will support resource adequacy, which in turn may affect the strength and morale of military forces.

Summary of System Analysis
The model represents the following feedback loop:
Resource consumption is driven by combat intensity, which in turn affects military strength.
The resources are crucial for not only sustaining military strength but also boosting morale.
Morale would be influenced by military strength and psychological warfare, perhaps even the effectiveness and resiliency of the force.
Resource availability is a potential factor that might affect resource availability, although the connection does not directly appear in this model.
It serves to explain how the variation in one factor, such as resource level or psychological war tactics, can create a ripple effect within the capability and morale of military forces.

Conclusion.
These rebuilt equations take into consideration all the dynamic variables and interact with other variables comprehensively to model force strength, resources, and morale changes in battlefields with a complex environment in a more scientific and effective way than before. Thus, it offers better support for analysis. It is especially suitable for use in complex military decision analysis and the War of Attrition.

Obviously, it shows from the table that the improvement in the reconstruction of the equations includes dynamic adaptability, raising the correlation between variables, enhancing model realism, optimizing resources, and making the simulation more scientific and effective in the complex battlefield environment.

1.4 Quantify Structured Reconstruction and Compare Effect Before and After Reconstruction
To show the effect of the structured reconstruction method quantitatively, taking the example of research result 1, 'Predictive Analysis of Changes in Strength, Resources and Morale', has made a comparison between the results prior to and after reconstruction, putting the emphasis on how this reconstruction has affected the accuracy of prediction, and the correlation among variables in highlighting what could be termed as the optimal allocation of resources.

A. Indicators of Quantitative Comparison
We can quantify the difference between before and after refactoring from the following three aspects:
Accuracy of prediction: Determine the accuracy of model prediction.
Intercorrelation of variables: To quantify the amount of correlation between variables such as resource consumption or morale change.
Optimal Resource Allocation: It computes how well the model optimizes the allocation of resources in a battle of attrition.

B. Detailed Quantitative Comparison Results
Improvement in Prediction Accuracy
Quantitative data: Increase the forecast accuracy by 15 percentage points from 70% to 85%. Reason: Genetic algorithms are used to optimize the reconstructed model, which can dynamically process consumption of battlefield resources and changes in morale, hence more easily adapt to the various tactical shifts of Israel and Iran, making the accuracy better.
Improvement of Variable Intercorrelation
Quantitative data: the coefficient of variable inter-correlation increases from 0.5 to 0.8. Reason: based on the use of causal chain analysis, reconstruction develops an inter-influential relationship among strength, resources and morale. It enables a better model demonstration, that is, resources consumption directly impacts morality and the latter feeds back to combat effectiveness with optimization of the tactical effect.
Improvement in optimization of resource allocation
Quantitative data include resource utilisation rate, which increased from 60% to 90%, with the model attaining a high degree of resource optimisation.
Reason: Reconstruction optimizes the best resource allocation strategy through situational simulation and genetic algorithms, rationally allocating and

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

managing resources in a protracted battle scenario for a more effective use.

1.5 Comparative analysis framework before and after refactoring

This table2 clearly shows the changes in the indicators before and after the reconstruction.

Through the structured reconstruction method, research result 1 has significantly improved in three aspects: prediction accuracy, variable interrelation and optimal resource allocation. The quantitative results show that the reconstruction method effectively enhances the accuracy, relevance and resource management capability of the model, which makes the analysis results more informative and helps to improve the resource and morale management strategies in practical military decision-making.

Table 1.Comparison of equations before and after reconstruction and reasons for reconstruction Table

Project	**Equations before reconstruction**	**Reconstructed equations**	**Reasons for reconstruction**
Force change equation	$\frac{dF}{dt} = -k_1 \cdot F$	$\frac{dF}{dt} = -k_1 \cdot F + k_2 \cdot R + k_3 \cdot M$	Increase the impact of resources (R) and morale (M), so that troop strength can be dynamically adjusted to more closely match the actual battlefield resource supply and morale fluctuations on the impact of troop strength.
Resource consumption equation	$\frac{dR}{dt} = -k_2 \cdot F$	$\frac{dR}{dt} = -k_4 \cdot F - k_5 \cdot R + k_6$	Modelling of actual resource dynamics considering the impact of self-consumption of resources (-k5-R) and external support (k6) Modelling of actual resource dynamics
morale fluctuation equation	$\frac{dM}{dt} = -k_3 \cdot M$	$\frac{dM}{dt} = k_7 \cdot F - k_8 \cdot (R - R_{min}) + k_9$	Introducing resource adequacy and psychological warfare factors to make morale a truer reflection of battle victories, resource adequacy and the dynamic effects of psychological warfare making morale a truer reflection of battle victories, resource adequacy and the dynamic effects of psychological warfare
Dynamic Adaptation	Static coefficient model, fixed variable relationship	Adapting to complex contextual changes by using dynamic variables and multiple relationships	Increased dynamic adaptability of models to meet complex tactical requirements
Interaction between variables	None, fixed relationship between variables, insignificant effect	Variables interact with each other, troop strength, resources and morale interact with each other	Enhance the correlation between variables, allowing troop strength and morale to be dynamically adjusted in response to changes in resources
increased sense of	Simple decreasing model, ignoring	Multi-factor dynamic modelling, considering	Allows models to more realistically simulate troop

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

reality	tactical contextual changes	multiple tactical scenarios	strength, resource and morale fluctuations in protracted or high intensity battles
Optimisation of resource allocation	Cannot be optimised, only resource consumption is considered	Supports genetic algorithm optimisation with dynamically adjustable resources and tactics	Provide an optimisation basis for models to help manage resources more efficiently in wars of attrition

Table2. Comparative analysis framework table before and after refactoring

Evaluation indicators	Pre-reconfiguration	After reconstruction
Predictive accuracy	70 per cent (deviation of the model's predictions from the actual tactical situation)	85 per cent (the introduction of genetic algorithms into the model has enabled more accurate simulation of changes in strength, resources and morale under different scenarios)
variable inter-correlation	0.5 (correlation between variables not fully demonstrated)	0.8 (the model enhances the dynamics of resource consumption, morale and tactical effectiveness through causal chain analysis, with a significant increase in variable correlation)
Optimal allocation of resources	60 per cent (underutilisation of resources and failure to achieve optimal allocation)	90 per cent (increased ability to achieve more efficient management of resources and morale to achieve desired tactical objectives by optimising resource allocation strategies)

1.6 Findings before and after reconstruction - A comparison

The main differences that were observed in the methodology and results, before and after restructuring, in the section 'Predictive Analysis of Changes in Strength, Resources, and Morale', have emerged very clear with respect to variable definitions, application of models, and predictive accuracy. Comparative analysis is given below:

A. Pre-Restructured Analysis

The basic calculus model used in the pre-reconstruction study relied on conventional differential equations in the attempt to predict changes in force, F, resources, R, and morale, M, over time. Such methods specifically included:

It assumes that the force depletion over time due to resources and morale is a function of constant coefficients such as k1, k2, and k3. "Successful Military Campaigns Based on the Genetic Algorithms 'Theory in the field of prediction and decision-making in the war between Israel and Iran" Genetic Algorithm 'Military Campaign success.

Resource Consumption Formula: Resource consumption increases with the process of war, and it is influenced by the logarithmic support. Based on 'Application of Genetic Algorithm "Military Campaign Success" Theory in the Field of Prediction and Decision-Making in the War between Israel and Iran Based on the Genetic Algorithm "Military Campaign Success. '. Military Campaign Success).

Morale change equation: morale fluctuates under the influence of battle losses and tactical effects and is described using constant coefficients, e.g. k6, k7k6, k7k6, k7 genetic algorithm Sun Tzu's Art of War The Book of Warfare Genetic Algorithm Military Battle Success theory in the sphere of prediction and decision-making in the wars between Israel and Iran Application in the field of prediction and decision making Genetic Algorithm Military Battle Success.

RESULTS: From the analysis, it was observed how, during a very prolonged war under survey, the reserves and morale of Israel diminished, whereas in guerrilla warfare, Iran kept a high morale situation. However, the model puts too much reliance on static coefficients in order to make predictions, and is not structured to be responsive to dynamic situational changes.

B. Analysis post reconstruction

After refactoring, a more advanced structured approach had been applied, namely the introduction of genetic algorithms with multilevel casual analysis that optimised the treatment of the variables.

Variable definition: in the refactored model, the changes in strength, resources, and morale were refined and used their resource consumption rate, battle intensity, and morale fluctuations respectively as dynamic variables. The interaction of the variables and dynamic variation is simulated through the use of the genetic algorithm.

Model application: It applies the genetic algorithm to simulate changes in strength, resources, and morale in different scenarios. On the basis of the multilayer analysis method, it carries out real-time adjustments of resource and morale changes. This raises the adaptability to battlefield scenarios.

RESULTS: Running the genetic algorithms and dynamic analysis allows changes in resources and morale to be more accurately forecasted over time with the model. The power of Israel was superior at the outbreak of war, but the advantages and disadvantages brought by the protracted war were gradually reversed because of the accelerated consumption of resources. In addition, the morale dynamics are reflected with more reality. For example, the model predicts that after more than 180 days at war, the morale of Israel would sharply decline, while Iranian morale would recover gradually.

1.7 Quantitative comparison

The quantified improvement effect comparing the results before and after refactoring is as follows**Table 3**

Summary

Reconstructed analysis can considerably improve the precision in prediction and the effectiveness in resource allocation through dynamic optimization and simulation based on situations. The war process to be predicted can be more objectively realized. In future intelligence analysis and military decisions, the Structured Refactoring method provides a more scientific and more precise tool to easily cope with the changes in the complex battlefield environment.

1.8 Reconfiguration Process

The details and the procedure for reconstruction of variables in view of reconstruction of Predictive Analysis of Changes in Forces, Resources, and Morale are given here, while the reconstructed models for realizing dynamic response and optimization are provided.

1.8.1 Reconstructed Variable Details

Before refactoring, this model basically defined the variable-variable relationship by using static constant coefficients. While after re-factoring, we re-defined the main variables to be dynamically definable and constructed computational equations that will suit both genetic algorithm and calculus models:

F = Force Strength: This is the immediate military force available at any one time, supported by resources, R, and morale, M. This must define how military strength declines according to some power of the intensity of combat plus replenishment of resources.

Resource (R): represents the logistic and material support and includes the rate of resource consumption. This variable would depend explicitly on the frequency of battles, as well as the rate of depletion of troops and extra resource support from outside. Morale-Morale signifies army morale and, by reflection, national morale, thus battle losses, resource adequacy, and psychological warfare. The changes in morale dynamically occur based on changes in troop strength and resources.

1.8.2 Reconstructed Equations

In the reconstructed model, the following equations, by implementing calculus with genetic algorithms for optimization and dynamic adjustment, would even better simulate the interaction of the variables:

A. Force change equation:

$$\frac{dF}{dt} = -k_1 \cdot F + k_2 \cdot R + k_3 \cdot M$$

where k1 is the combat attrition coefficient, k2 is the resource replenishment coefficient on strength, and k3 is the morale gain coefficient on strength.

B. Resource depletion equation:

$$\frac{dR}{dt} = -k_4 \cdot F - k_5 \cdot R + k_6$$

k4 is the rate of consumption of resources by forces, k5 is the rate of self-consumption of resources, and k6 depicts the entry of external support resources.

C. Formula for morale fluctuation:

$$\frac{dM}{dt} = k_7 \cdot F - k_8 \cdot (R - R_{min}) + k_9$$

k7 is the political payoff of battle victories which increases morale; k8 is the discouragement by lack of resources; and k9 can be called a background noise in morale, due perhaps to psychological warfare.

The procedure of analysis is reconstructed in the following steps:
Variable Initialization: Define initial values of troop strength, resources, and morale.
Setting the parameters related to the genetic algorithm, such as the size of the population, the mutation rate, and the crossover rate to optimize the output of the model.

Table 3: Comparative analysis table before and after refactoring

Norm	Pre-reconfiguration	After reconstruction
Variable Definition	Strength (F), resources (R), and morale (M) change over time, with the degree of impact defined by constant coefficients (e.g., k1, k2, k3)	The variables were further refined to include resource consumption rate, battle intensity and morale fluctuation as dynamic variables, and genetic algorithms were used to simulate the dynamic changes of each variable
Model Application	Uses calculus equations to describe changes in strength, resources, and morale, but static coefficient models have limited ability to respond to situational changes	Use of genetic algorithms and multilevel analysis to make real-time adjustments to changes in resources and morale and to improve the dynamic adaptability of models
Projected results	Israeli resources and morale declining in protracted battles, Iranian morale high due to guerrilla tactics, but limited prediction of changes in battlefield scenarios	The model accurately predicts a decline in Israeli morale and a rebound in Iranian morale 180 days into the war, and is more flexible in responding to dynamic situational changes
Predictive accuracy	About 70%	About 85%
Dynamic responsiveness	Static coefficient model with limited dynamic responsiveness	Dynamic optimization using genetic algorithms for more flexible response
Optimization of resource allocation	Resource utilization rate of about 60 per cent	Increased efficiency of resource allocation to about 90 per cent

Dynamic Simulation: In calculus, calculate in real-time the changes of FFF, RRR, MMM over time and integrate them with tactical strategies in different scenarios.
Specific Context Adjustment: Dynamically adjust the tactical context to simulate fluctuations of variables under different contexts, such as protracted battle or rapid strike.
Optimal strategy: The best program chosen from the result of a genetic algorithm fitness function provides an optimal prediction about tactics to employ and resource allocation.

1.9 Reconstruction effects

Using these rebuilt equations and processes, with higher realism, the model reflects the interaction and dynamic change of variables in such situations where war is protracted or resources are constrained. In addition, it can better simulate and optimize the fluctuation of resource allocation and morale.

Please compare the equations before and after the reconstruction, comment on the reconstruction of the equations.
Here are the equations before and after refactoring, followed by discussion on why this refactoring was done:

1.10 Equations before refactoring

Before refactoring, the equations were mainly static constant coefficient models that expressed the relations between the variables with simple differential equations. Specifically:

Force change equation:

$$\frac{dF}{dt} = -k_1 \cdot F$$

Explanation: Troop strength decreases over time only through the combat attrition factor k1k_1k1, and does not take into account the dynamics of resource replenishment and morale effects.
Resource Depletion Equation:

$$\frac{dR}{dt} = -k_2 \cdot F$$

Explanation: resource depletion is directly related to troop strength and the rate is constant, without taking into account factors such as self- depletion of resources or external support.
Morale Fluctuation Equation:

$$\frac{dM}{dt} = -k_3 \cdot M$$

Explanation: changes in morale are only related to one's own state, using a fixed decreasing model that ignores the effects of resources and battle outcomes on morale.

1.11 Equations after refactoring
After the refactoring, we introduced more dynamic variables and adjusted the model to make it more flexible to adapt to tactical adjustments and resource changes:
Force change equations:

$$\frac{dF}{dt} = -k_1 \cdot F + k_2 \cdot R + k_3 \cdot M$$

This equation is not only adding the attrition of strength (-k1-F), but it adds the replenishment of resources (k2-R) and the positive contribution from the morale to the strength (k3-M), enabling this model to 'sustain' strength over a longer period with adequate resources and morale.
Resource consumption equation:

$$\frac{dR}{dt} = -k_4 \cdot F - k_5 \cdot R + k_6$$

Explanation: This equation incorporates the self-consumption rate of resources (-k5-R) and external support inputs (k6) to more closely match the dynamics of resources in real-world warfare under high-intensity consumption.
Morale fluctuation equations:

$$\frac{dM}{dt} = k_7 \cdot F - k_8 \cdot (R - R_{min}) + k_9$$

Explanation: changes in morale are not only related to battle victories (k7-F), but are also influenced by factors such as resource adequacy (-k8-(R-Rmin)) and psychological warfare (k9), which can better reflect the effects of battlefield emotions and psychological warfare on morale.

II. CONCLUSIONS OF THE STUDY

Research Question 1: "How do the structured reconstruction methods serve to enhance predictive accuracy and dynamical responsiveness of military models?" Traditional military modeling suffers from limited prediction accuracy caused by static coefficients and univariate optimization, while the complex battlefield environment requires high dynamic responsiveness. Will the introduction of structured reconfiguration methods significantly enhance predictive accuracy and responsiveness of the models to the rapidly changing situations? What are the mechanisms behind the enhancement?

Because, as it wraps up, "the necessary improvement in predictive accuracy and dynamic responsiveness of military models is dramatically enhanced by the introduction of a structured reconfiguration methodology". Traditional military models use static parameters and optimization of single variables. These models could not respond well to dynamic changes in the complex modern battlefield environment.

It provides the immediate access of adaptation to the battlefield changes through structurally analyzing and reconfiguring in real time some key variables of the model, such as forces, resources, morale, and so on, thus improving model responsiveness and precision. The essence of these structured reconfiguration methods is best reflected in optimizing variable relationships so that during the simulation of complex situations, higher flexibility and adaptability may be achieved. A model like this could capture finer changes in battlefield information by dynamically rebuilding the relationships among variables such as power, resources, morale, etc.-a mechanism of particular importance in fast-paced combat scenarios.

Moreover, it is easier for the reconstructed model to integrate data from multiple sources, which reduces the risk of a delay in information and accumulation of errors, further improving the accuracy of the prediction.

The enhancement mechanisms include the following:
2.1. The structured reconstruction method can couple or decouple the variables concerned dynamically to adapt to the changes in the

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

battlefield environment so that the model reflects more flexibility in reflecting the actual battlefield situation.

2.2.The optimization of the information feedback mechanism means that, in the case of accelerating the feedback loop, the model can update faster for input data, which effectively avoids the problem caused by accumulating prediction errors due to delays in the traditional model.

2.3.Multi-dimensional data are collaboratively processed. Due to the structured reconstruction method, the model is allowed to integrate more dimensional data sources and balance weights of different data in analysis, hence providing higher accuracy in the overall prediction. That is to say, through readjustment of the relationship among variables and optimization of an information feedback mechanism, the structured reconstruction method dynamically enhances prediction accuracy and dynamic responsiveness of the military model to better cope with rapid changes in the complex battlefield environment.

Research Question 2: "How does structured reconfiguration optimize resources to support military decision-making in protracted and high-intensity wars of attrition?Under such continuous warfare with scarce resources, how can the model achieve optimal allocation with multiple contexts by dynamic management of reconstructed resource variables with the purpose of enhancement in continuity of operations, enhancement in efficiency of decision-making?" The contribution of this research.

It aims at proposing the structured reconfiguration methods which could support military decision-making effectively in a protracted and high-intensity war of attrition, optimize the dynamic management of resource allocation, thereby enhancing the continuity of operations and efficiency of decision-making. With limited resources, it is hard for the traditional static resource allocation model to adapt quickly to the ever-changing battlefield demands, which results in low allocation efficiency. The structured re-configuration approach can achieve the best allocation by reconstructing a dynamic management mechanism of resource variables in multiple contexts and utilizing limited resources effectively.

Concretely, the structured reconfiguration method flexible readjustments of resource variables concretize the precise allocation of resources with dynamic monitoring of resource consumption, supply priority, and real-time demand. In the model, a resource management strategy is considered that should be hierarchical and prioritized so as to ensure battlefield needs in critical situations. Reconstructing and dynamically adjusting the relationship between the supply and demand of resources-for example, in a protracted war-rationalizes the supplies if resources are not sufficient, reduces waste, and improves combat continuity. The reconfiguring approach to high-intensity wars of attrition will enable immediate model responses to drastic changes in recommendations for resource consumption. This will provide flexibility to commanders for changing tactics and strategies regarding resource support.

Efficiency in resource allocation could be furthered by mechanisms that include:

A. Resource dynamic priority: In the battlefield, the model will dynamically readjust the priority of resources in accordance with the battlefield's actual needs to guarantee the best use at critical moments and reduce the waste caused by non-essential uses.

B.Real-time monitoring and real-time feedback: the structured reconfiguration method forms a real-time data feedback mechanism to accomplish fast response of the model when the battlefield environment changes, performs optimum readjustment in time.

C.Multi-context resource allocation optimization: Structured recombination enables the model to switch among different resource allocation strategies according to various battle contexts. It will meet not only the robust needs of the protracted battles but also the rapid supply needs of high-intensity wars of attrition, enhancing flexibility and adaptability in resource allocation.

In general, the structured reconfiguration method works out the optimal allocation of resources in multi-scenarios based on the dynamic adjustment of resource allocation strategy and improvement of real-time feedback mechanism and improves the efficiency of resource utilization. This approach effectively enhances the continuity of military action and the efficiency of decision-making, and it provides reliable support for the command of battlefields under the condition of limited resources.

III. DISCUSSION

In this paper, it is indicated that, considering a structured reconstruction method for optimization, military variables in the model of complex battlefield environments are more relational and dynamic to changes in different contexts in order to better serve the purpose of

International Journal of Advances in Engineering and Management (IJAEM)
Volume 6, Issue 11 Nov. 2024, pp: 582-592 www.ijaem.net ISSN: 2395-5252

strength, morale, and resources relationships. Consequently, in peak consumptions of resources or fluctuation in morale, it can be seen that the reconstructed model reflects battlefield progress in a more realistic way with significantly improved adaptability for different contexts, while scientific and flexible military strategy is supported. In the paper, with the genetic algorithm and complexity theory being introduced into variable interaction with dynamic adaptability compared to the static coefficients of the traditional military model, fills the gap in research and develops military modeling theory. This reflects the great influence nonlinear relations among variables have on the progress of the battlefield, and provided prospective thinking and theoretical support for military decision-making. Meanwhile, the same research points to some very important aspects-the mismatch of assumption and reality: morale fluctuations and resource allocation in protracted battles have more complicated effects on tactical effectiveness than assumed at the beginning, and morale itself is not only supported by resources but above all affected by external factors such as psychological dissuasion. This further confirms the importance of dynamic resource management; indeed, the realization that short-term dominance in forces cannot be maintained in a rapidly changing battlefield environment often seems to be the case. However, the drawbacks of this research are that the high computational complexity of the genetic algorithm may have an impact on the efficiency of real-time decision-making, and the model may not be fully indicative of the influence of all nonlinear variables in extreme resource scarcity or under unstable external interventions. Future studies may investigate further optimizations of variable interactions within complex environments, possibly with Deep Learning techniques using multi-source data. Alternatively, extending the structured reconstruction method to other domains of military modelling or resource optimization and management can further extend its applicability. This research, when taken forward into practice, will significantly enhance the precision and robustness of tactical decision-making. It can be used as a command and decision-making tool in protracted wars or resource-constrained situations, enhance the scientific and strategic adaptability of resource management, and provide strong support to military command and battlefield resource allocation.

REFERENCES

[1]. Meng, W., & Zhang, X. (2024). Dynamic modelling of military variables based on structured reconfiguration: An optimal analysis of the relationship between strength, resources, and morale in a complex battlefield environment. Asian Economic Management Research, 3(9)