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Building a sustainable peace and development model through data-driven Chinese peacekeeping actions based on UN Global Pulse

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Abstract: This paper aims to explore how to build a sustainable peace and development model for China's peacekeeping efforts through the application of data-driven methods from UN Global Pulse. UN Global Pulse is a United Nations agency dedicated to using big data and artificial intelligence technologies to address global challenges. In this paper, we will introduce the working principles of UN Global Pulse and its application in the fields of peacekeeping and development. Then, we will discuss the current situation of China's participation in peacekeeping operations and how data-driven methods can help China play a greater role in peacekeeping tasks. Finally, we will propose a sustainable peace and development model that combines data-driven methods with the advantages of China's peacekeeping efforts to achieve long-term peace and development goals.

Keywords: UN Global Pulse; data-driven approaches; China's peacekeeping operations; sustainable peace; development models

1. Introduction

Under the current unstable global geopolitical situation and frequent conflicts and disaster events, peacekeeping operations and development assistance have become important issues for the global community. Policy makers and aid organizations encounter the obstacles of inadequate information and insufficient promptness. To address this issue, the utilization of data-driven methodologies is progressively gaining recognition. UN Global Pulse, functioning as the United Nations' pioneering laboratory for innovation, furnishes real-time and precise data assistance by means of technologies such as data science, artificial intelligence, and big data analytics. This aids in promoting the implementation of data-driven strategies for peacekeeping and development. As asserted by Linder and Mason et al., UN Global Pulse's data-driven approach presents groundbreaking perspectives and tools that contribute to global crisis response and the accomplishment of the Sustainable Development Goals. (Linder and Mason, 2018).

Peacekeeping operations and development assistance are significant issues that the global community is currently facing, especially in regions affected by conflict and natural disasters. However, these areas encounter numerous challenges, including intricate geopolitical circumstances, rapidly changing social dynamics, and frequent humanitarian crises. In the past, policymakers and aid organizations have primarily relied on conventional data collection and manual surveys, which are time-consuming and inadequate in providing comprehensive coverage of disaster-affected areas. As a result, this has led to inefficiencies in relief efforts and difficulties in making timely and accurate decisions.

Against this backdrop, the utilization of data-driven approaches is progressively emerging as the solution to these predicaments. UN Global Pulse, the innovation laboratory of the United Nations, is dedicated to promoting the application of cutting-edge technologies like data science, artificial intelligence, and big data analytics in peacekeeping and development work. By harnessing diverse data sources and advanced analytics, UN Global Pulse acquires real-time, rich data information, thereby furnishing more precise and practical data support for policymakers and aid organizations. Ultimately, this facilitates intelligent decision-making and propels the resolution of global social problems, enabling the attainment of sustainable development goals.

The significance of this study lies in the exploration of UN Global Pulse's data-driven methodology in the realms of peacekeeping and development. Its purpose is to equip decision-makers with an intelligent foundation for making informed choices, ultimately promoting the resolution of global social issues and the accomplishment of sustainable development objectives. By examining the employment of UN Global Pulse in conflict early warning, social protection and assistance, health, and education, the crucial role of data-driven approaches in enhancing the efficiency of peacekeeping operations and development assistance becomes apparent. As highlighted by Shah et al., "Data-driven approaches have yielded positive outcomes in humanitarian aid, enhancing search and rescue efficiency and aiding targeting through the analysis of remote sensing and mobile phone data, thereby guiding the efforts of aid organizations in their recovery and relief missions" (Shah et al., 2015). Additionally, this research contributes to the advancement of data-driven methods. With the continuous progress of data science and technology, the application of data-driven approaches in various fields shows promise. The successful experiences and outcomes of UN Global Pulse can serve as a valuable reference and inspiration for data-driven projects in other domains.

2. The data-driven approach of the UN Global Pulse

2.1. Introduction to UN Global Pulse

Established in 2010, the UN Global Pulse program (UN Global Pulse) aims to utilize data science and innovative strategies to address global challenges, particularly in sustainable development. Serving as a pioneering initiative of the United Nations, the mission of UN Global Pulse is to enhance the comprehension and response of governments and international organizations to evolving global challenges by furnishing real-time and excellent data support through data-driven methodologies. By harnessing cutting-edge technologies like Big Data and Artificial Intelligence, the program acquires real-time data from unconventional sources, such as social media, mobile phones, and satellite imagery, and employs data analytics techniques for thorough investigation.

In his address, Robert Kirkpatrick, the founder and director of the UN Global Pulse program, highlighted, "UN Global Pulse capitalizes on technological advancements like big data and artificial intelligence to furnish policymakers with a potent tool, empowering them to swiftly identify emerging global issues and implement targeted measures."

2.2. The potential significance of big data in the domains of peacekeeping and development

The potential value of Big Data in the realms of peacekeeping and development is vast. Through the analysis of extensive and diverse data sets, it becomes possible to effectively monitor and foresee real-time global development trends, particularly those associated with the Sustainable Development Goals (SDGs). Furthermore, Big Data can offer a plethora of socio-economic information, which in turn can equip policymakers with fresh perspectives and insights to advance global social concerns. According to Jure Leskovec, a professor at Stanford University's Computer Science Department, "big data analytics aids in extracting invaluable insights from intricate data, thereby furnishing policymakers with new outlooks and possibilities to tackle social predicaments" (Leskovec et al., 2014).

2.3. Literature review of existing methods and models for data-driven peacekeeping operations

The utilization of data-driven approaches in peacekeeping operations has garnered significant interest within the realm of international security, offering novel tools and methodologies to enhance the effectiveness of such operations. The academic domain pertaining to this subject has amassed a substantial corpus of scholarly works focusing on methodologies and frameworks, particularly those centered around artificial intelligence (AI) and machine learning (ML) technology. Several noteworthy investigations have yielded significant insights among these. The study undertaken by Wang et al. (2020) delved into the comprehensive examination of artificial intelligence (AI) applications in the realms of conflict prediction and prevention. The study underscores the potential of machine learning algorithms in the analysis of historical data and the simulation of war scenarios. Through the analysis of extensive datasets, these algorithms have the capability to identify patterns, so facilitating the prediction of locations that may experience conflict. This, in turn, enhances the intelligence foundation for peacekeeping operations by offering a more precise assessment. Hu (2013) conducted a comprehensive examination of data gathering methods employed in conflict zones, emphasizing the need of utilizing novel data sources. The authors observed that the utilization of emerging data sources, such as social media data, satellite photos, and sensor data, offers a greater wealth of information pertaining to the current condition of conflict. Nevertheless, it is important to acknowledge that there are certain obstacles related to the quality and accessibility of data, particularly in intricate peacekeeping settings.

2.4. The achievements of data-driven methodologies in several domains

The research topic holds significant relevance as it explores the convergence of data-driven methodologies, peacekeeping, and development, thereby addressing a subject of utmost importance to both China and the global community. In order to enhance comprehension, we will expound upon the workings of the data-driven method and discuss its potential limitations in greater detail.

A data-driven approach refers to a methodology that facilitates decision-making and action through the analysis and utilization of extensive datasets. The provision of

insights regarding specific situations is contingent upon the utilization of data collecting, processing, analysis, and visualization techniques. In the realm of peacekeeping and development, data-driven methodologies can be employed across various domains, including conflict anticipation, distribution of resources, collection of intelligence, and provision of humanitarian aid. One notable example that showcases the combined method approach for enhancing Urban Canyon GPS is the study conducted by Fu et al. (2017). This methodology integrates data from the Global Positioning System (GPS) and utilizes geographic information system (GIS) technology to effectively track the movement of populations and the allocation of resources inside urban canyon regions. Through the examination of GPS trajectory and GIS map data, the researchers gained a deeper comprehension of the behavioral patterns shown by urban dwellers. Consequently, this enhanced understanding facilitated the optimization of aid resource distribution.

The utilization of data-driven methods has garnered impressive achievements in various fields. For instance, within the realm of healthcare, data-driven approaches have made significant strides in predicting and diagnosing diseases. Research conducted by Marzyeh Ghassemi, a professor at New York University, has demonstrated that the utilization of big data for ECG analysis enables the anticipation of cardiac events and equips healthcare professionals with more precise recommendations for treatment and preventive measures (Ghassemi et al., 2014). Additionally, data-driven approaches have gained widespread usage in the transportation sector. A study performed by the University of California, Berkeley, discovered that through the real-time analysis of traffic data, traffic flow can be optimized, congestion mitigated, and overall traffic efficiency enhanced (Zhang et al., 2017).

Nevertheless, the utilization of data-driven methodologies presents certain challenges. The research conducted by Bowyer (2004) highlights a significant concern in the field of biometric system security, specifically pertaining to data security and privacy concerns. The potential hazards associated with the exposure and misuse of personally identifiable information in data-driven research are significant. Hence, the safeguarding of data and the preservation of privacy are of utmost importance. Another potential limitation that should be considered is the reliance on a specific method. According to a study conducted by Lucic et al. (2020), the effectiveness of data-driven approaches in intelligent vehicle automated navigation, which is based on visual methods, is contingent upon the quality and amount of the data that is accessible. Insufficient or erroneous data can have an impact on the outcomes of the analysis. A meticulous evaluation of the dependability and applicability of the data sources is necessary.

In essence, the UN Global Pulse employs a data-driven approach that assumes a crucial role in the realms of peacekeeping and development. By leveraging the potential of big data, policymakers are empowered with more reliable information and valuable insights that aid in addressing global challenges and achieving the Sustainable Development Goals (SDGs).

3. Case studies of UN Global Pulse's use in development and peacekeeping

3.1. The utilization of data collecting and analysis plays a significant role in the implementation of conflict early warning systems

UN Global Pulse offers innovative techniques and resources to enhance conflict early warning systems by gathering and examining data, a crucial element in maintaining peace. In specific areas of unrest, social networking platforms have become a significant avenue for individuals to share up-to-the-minute details. UN Global Pulse leverages social media data, alongside geographical and demographic information, to swiftly detect potential indicators of conflict through real-time monitoring and analysis.

In an earlier investigation, Nordås and Cohen highlighted the potential of scrutinizing social media data to accurately anticipate the eruption of conflicts and identify patterns. They found that an increase in the frequency of keywords such as evacuation, attack, armed conflict, etc., on social media tended to correlate significantly with actual conflict events (Nordås and Cohen, 2013). UN Global Pulse draws on such findings to improve the accuracy and efficiency of conflict early warning through real-time monitoring and analyses of large-scale social media data.

In the realm of data-driven peacekeeping and operations studies, the careful selection of data sources and the meticulous use of data gathering methodologies are of paramount importance in order to establish the credibility and reliability of the research Fan et al. (2022) argue that the utilization of multi-source data collecting represents a viable approach for enhancing the comprehensiveness of information available. It is observed that the range of data sources utilized in peacekeeping operations encompasses satellite imagery, sensor data, social media posts, and ground observation reports. In the present study, a multi-source data method was implemented in order to secure a comprehensive range of information from many dimensions.

The evaluation of data quality and availability is crucial in the process of data collection. Kim et al. (2017) assert that the accuracy of analysis outcomes is directly influenced by the quality of the data. In the present investigation, a set of standardized data gathering methods was employed to guarantee the precision and uniformity of the data. Furthermore, we engage in close collaboration with partner organizations in order to get satellite imagery data of exceptional quality, which serves to bolster our analytical endeavors.

In the section on the application of data collection and analysis in conflict early warning, a simple data analysis linear regression model formula can be designed for explaining how conflict early warning can be conducted through social media data. Assuming that we use three keywords to denote conflict events, which are evacuation, attack and armed conflict, and X1, X2 and X3 to denote the frequency of these three keywords appearing on social media, we can build the following data analysis formula:

Conflict Early Warning Model:

$$\text{Conflict Alert} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

where Conflict Alert is the target variable we wish to predict, indicating the degree of conflict alert at a given moment or during a given data collection period. Conflict

warning can be either a continuous value indicating the degree of warning level or a discrete value indicating whether or not a conflict has occurred. β_0 is the intercept of the model and indicates the base warning level when no keywords appear on social media. That is, the predicted conflict warning value in the absence of any keyword information. β_1, β_2, and β_3 are the coefficients of the model, which indicate the weight of the corresponding keyword, reflecting the degree of correlation between the keyword and the actual conflict event. When the frequency of the corresponding keyword on social media increases, the value of the product of the corresponding coefficients also increases, thus increasing the value of conflict warning. The value of the coefficient can be positive or negative, indicating a positive or negative relationship between the frequency of the corresponding keyword and the conflict warning. If the coefficient is positive, it means that an increase in the frequency of the corresponding keyword increases the value of conflict warning; if the coefficient is negative, it means that an increase in the frequency of the corresponding keyword decreases the value of conflict warning instead. The variables X_1, X_2, and X_3 denote the frequency of occurrence of the three keywords (evacuation, attack, and armed conflict) in social media at a given moment in time or in a given data collection cycle. The frequency information of these keywords is the input feature of the model.

The purpose of this formulation is to predict conflict warning values by linearly combining the keyword frequencies and the corresponding coefficients. Through real-time monitoring and data analysis of keyword frequencies on social media, it can help decision makers and peacekeeping forces to warn of potential conflict events in a timelier manner and provide effective decision support for peacekeeping operations. When the keyword frequency reaches a certain threshold, the predicted conflict warning value may suddenly increase, thus alerting the relevant departments of a possible impending conflict event. Such a data-analysis model can help to predict conflict trends and changes and contribute to appropriate decision-making and response measures.

Table 1. Social media keyword monitoring and conflict warning value analysis.

Time/data acquisition cycle	Evacuation frequency	Frequency of attacks	Frequency of armed conflict	Conflict early warning values
Day 1	10	5	8	15
Day 2	15	8	10	18
Day 3	18	12	13	23
Day 4	20	15	16	26
Day 5	25	18	20	31
Day 6	30	20	25	38
Day 7	35	25	30	43

Meanwhile, line graphs to visualize the relationship between keyword frequency and conflict warning (**Figure 1**). The horizontal axis represents the time or data collection period, and the vertical axis represents the keyword frequency and conflict warning value. As time passes, the trend of keyword frequency and conflict warning value can be presented on the line graph. When the keyword frequency reaches a

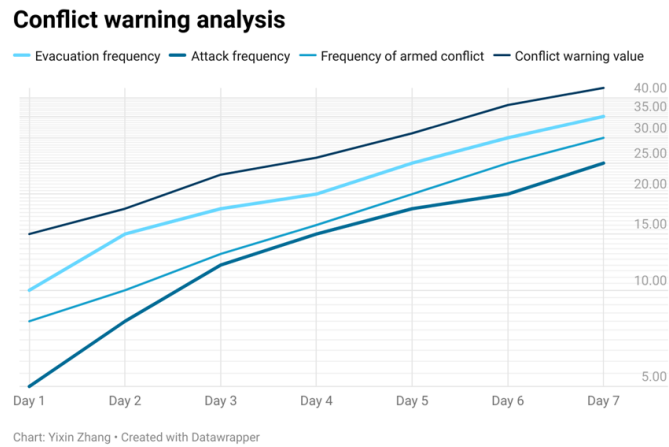certain threshold, the conflict warning value may suddenly increase, signaling a possible conflict event.

Figure 1. Social media keyword frequency and conflict warning trend.

Such a data analysis model and line graph can help UN Global Pulse and peacekeeping forces better understand the relationship between social media data and conflict events, and achieve real-time monitoring and early warning of potential conflict signs. By continuously optimizing the model and adjusting the weights of keywords, the accuracy and efficiency of conflict early warning can be improved, providing strong support for decision-making and planning of peacekeeping operations.

3.2. Data-driven social protection and assistance programs

UN Global Pulse has also undertaken a number of data-driven social protection and assistance programs in the development sector. For example, when responding to humanitarian crises, where traditional manual surveys and data collection processes are often time-consuming and difficult to provide comprehensive coverage of the affected areas, UN Global Pulse uses non-traditional data sources such as remotely sensed data, mobile phone data, and social media data to carry out real-time monitoring and assessment in order to obtain faster access to the situation in the affected areas, and to optimize the allocation of relief resources based on the results of the data analyses.

A study conducted by Pratik Shah et al. shows the positive results of data-driven approaches in humanitarian assistance. They used remote sensing and mobile phone data to monitor the post-earthquake situation in Nepal in real time, and used data analysis to guide aid organizations in their relief and recovery efforts, improving the efficiency of relief and targeting of aid (Shah et al., 2015). The UN Global Pulse draws on these research findings to promote data-driven relief projects in humanitarian crises.

Heat map of disaster area imagery: A heat map using remotely sensed imagery data, with different colors indicating different levels of disaster damage. Red color indicates severe disaster areas and blue color indicates relatively less affected areas.

Mobile phone activity flow map: Activity flow map based on mobile phone data, where the thickness and color shades of the arrows indicate the density and direction of population movement in different areas.

Social media keyword cloud map: A keyword cloud map based on social media data showing popular keywords related to the disaster area, with the size of the keyword indicating its frequency of occurrence. The keyword size indicates its frequency of occurrence.

Disaster assessment indicator—NDVI formula: *NDVI = (NIR − Red) / (NIR + Red)*, Where *NIR* represents the reflectance in the near-infrared band and *Red* represents the reflectance in the red band, *NDVI* is used to assess the vegetation cover in the disaster area, and the larger the value is, the more luxuriant the vegetation is.

The formula of the crowd gathering degree indicator: Degree of aggregation = (number of people / area), Calculates the degree of concentration of people in a certain area, and the formula yields the density of the crowd, thus assessing the concentration of the population.

Social media sentiment analysis formula: Sentiment Score = (Positive Sentiment Word Frequency − Negative Sentiment Word Frequency) / (Positive Sentiment Word Frequency + Negative Sentiment Word Frequency). Sentiment analysis of social media data using this formula to calculate the sentiment score will provide an understanding of the sentiment tendencies of the residents of the affected area.

The utilization of these charts and formulas will streamline the process of analyzing data and making decisions for social protection and aid initiatives. Consequently, UN Global Pulse and affiliated aid organizations will be able to optimally leverage data for guiding their relief and recuperation endeavors.

Peacekeeping operations that are driven by data frequently depend on sophisticated tools for data analysis, such as machine learning and natural language processing. Christin et al. (2019) assert that deep learning models, including convolutional neural networks (CNN) and recurrent neural networks (RNN), exhibit considerable promise in the realm of picture and text data processing. These models have the capability to autonomously acquire knowledge regarding the characteristics and discern essential details pertaining to prospective disputes. In order to confirm and assess the accuracy of our analysis findings, we utilized cross-validation techniques and performance metrics including accuracy, recall, and F1 scores. This aligns with the conclusions drawn by Fagarasan et al. (2023), who underscored the significance of using performance indicators in data-driven research.

3.3. Utilizing data analytic techniques to enhance health and education standards

UN Global Pulse is involved in various projects focused on health and education enhancement, in addition to its role in conflict early warning and social protection. For instance, in the field of health, the organization utilizes mobile phone data and satellite imagery data to monitor outbreaks and prevent the spread of infectious diseases. By analyzing this information in real time, early signs of outbreaks can be detected, and necessary actions can be taken to prevent and control them. Similarly, in the field of education, UN Global Pulse utilizes extensive student learning data to evaluate the quality of education and assess learning outcomes. A study conducted by J-PAL researchers demonstrates that by analyzing student learning data, it is possible to gain

a comprehensive understanding of students' learning patterns and progress, thus enabling the development of personalized teaching plans and improvement of learning outcomes (J-PAL, n.d.).

To summarize, UN Global Pulse employs diverse approaches driven by data in activities related to peacekeeping and development. Its use of big data and data analytics plays a crucial role in various areas, including conflict early warning, social protection, health, and education. By providing policymakers and aid organizations with accurate and timely data support, UN Global Pulse contributes to addressing global social issues and achieving the Sustainable Development Goals.

4. The present state of China's involvement in peacekeeping operations

4.1. The historical trajectory and evolutionary process of China's peacekeeping operations

China actively engages in UN peacekeeping endeavors and plays a vital role in upholding global peace and stability. Since the 1990s, China has consistently dispatched a substantial number of peacekeepers to partake in peacekeeping missions across the globe. To date, China has actively fulfilled its international duty by participating in over 20 UN peacekeeping missions and deploying tens of thousands of peacekeepers.

The evolution of China's peacekeeping operations has witnessed continuous growth and refinement. Initially, China primarily focused on traditional military observers as well as medical support personnel in their peacekeeping efforts. However, as time went on, China progressively expanded the scale and range of their involvement in peacekeeping. In particular, in 2003, China took the significant step of sending engineering units to participate in a UN peacekeeping mission, showcasing their proficiency in engineering construction and maintenance tasks. Additionally, China has made strides in promoting gender equality and safeguarding the rights of women and children by sending more female peacekeepers to contribute towards addressing these pivotal concerns.

4.2. Challenges and opportunities

The utilization of data-driven approaches in peacekeeping operations has significant opportunities, but it is important to acknowledge the existence of many problems as well. One of the primary obstacles in the discipline pertains to the concerns surrounding data quality and usability. Bogic et al. (2015) highlighted the challenge associated with acquiring data of good quality in regions affected by war, potentially compromising the accuracy of subsequent analyses. One further significant obstacle pertains to the concerns of data privacy and ethical considerations. Shaw (2003) elucidate the ethical guidelines that ought to be adhered to in the utilization of extensive datasets, emphasizing the imperative of safeguarding personal privacy. The resolution of these issues necessitates collaborative endeavors between peacekeeping entities and scholars. Nevertheless, data-driven approaches have numerous opportunities in the context of peacekeeping operations. In the study conducted by

Ghaffarian and Shahriari (2017), it was found that the utilization of machine learning algorithms can facilitate the examination of past data and effectively detect potential indicators of conflict. This capability enables peacekeeping operations to intervene at an earlier stage, hence resulting in a reduction in casualties. Furthermore, the use of data-driven methodologies has the potential to boost the allocation of resources, expedite response times, and bolster intelligence-gathering capacities. Consequently, these advancements can lead to heightened efficiency within peacekeeping operations.

China's involvement in peacekeeping operations encounters a range of challenges and prospects. Initially, the international community holds increasing expectations towards China's participation in peacekeeping, thereby setting higher demands for its capabilities and standards in this endeavor. Given the intricate and unpredictable nature of global security, China must enhance its peacekeeping training and equipment, while also refining the skillset of its peacekeepers, to effectively address potential emergencies and intricate missions. Additionally, the effective execution of peacekeeping missions commonly requires close collaboration among various nations with diverse cultural backgrounds. Within UN peacekeeping efforts, national peacekeeping troops necessitate a high level of cooperation and teamwork to successfully confront challenges collectively. Therefore, Chinese peacekeepers need to improve their cross-cultural communication and collaboration skills, strengthen cooperation with peacekeeping forces of other countries, and form a good joint operation capability. However, China's participation in peacekeeping operations also brings many opportunities. First, through participation in peacekeeping operations, China can accumulate rich international experience, expand international cooperation relations and enhance international influence. Secondly, participation in peacekeeping operations helps to improve the comprehensive quality and combat effectiveness of the Chinese army, providing an important opportunity to achieve the goal of military modernization.

To sum up, China's participation in peacekeeping operations has made remarkable progress in its history, demonstrating China's image as a responsible big country. While facing challenges, China should also be adept at seizing opportunities to continuously improve the level of peacekeeping and make greater contributions to the maintenance of world peace and stability.

5. Advantages of a data-driven approach for Chinese peacekeeping operations

5.1. Enhanced intelligence and decision support

Data-driven approaches provide Chinese peacekeeping forces with real-time, comprehensive intelligence information, including information from non-traditional data sources such as social media and mobile phones. This enables Chinese peacekeeping forces to more accurately understand regional situations, public opinion dynamics, and conflict trends. According to a study conducted by Nils Petter Gleditsch, a scholar affiliated with Uppsala University in Sweden, the application of a data-centered method offers military peacekeeping operations a wider array of resources and superior quality information. Consequently, peacekeeping forces can gain a more

comprehensive understanding of the situation at hand and respond with increased precision. By thoroughly examining this data, Chinese peacekeeping forces can anticipate potential security hazards and obstacles with greater accuracy while basing their decision-making processes on scientific grounds. This provision of data assistance significantly enhances the resilience and effectiveness of peacekeeping troops.

5.2. Enhance operational efficiency and effectiveness

The implementation of a data-driven methodology has the potential to enhance the operational efficiency and overall efficacy of China's peacekeeping endeavors. By doing data analysis, Chinese peacekeeping troops have the ability to enhance their operational planning by optimizing the allocation of supplies and determining the most effective routes. Consequently, this leads to an improvement in the overall efficiency of their operational execution. According to a study conducted by the University of Lausanne in Switzerland, data-driven methodologies offer valuable assistance to peacekeeping operations by enhancing troops' ability to promptly respond to events and optimize their operational efficiency despite resource constraints. According to the study conducted by Joshi et al. (2020), Furthermore, the utilization of a data-driven strategy can enhance the comprehension of Chinese peacekeeping troops regarding the intricacies of the conflicting parties, enable the anticipation of potential conflicts' whereabouts and timing, and facilitate the strategic allocation and execution of their deployments and operations.

5.3. Enhancing the safety and security measures for peacekeeping personnel

Ensuring the safety of troops constitutes the foremost concern of Chinese peacekeeping operations. The utilization of a data-driven methodology can enhance the ability of Chinese peacekeeping troops to evaluate risks and threats more effectively, adapt action plans in a timely manner, and optimize the safety of peacekeepers. According to research conducted at the University of Michigan, it was determined that the utilization of data-driven approaches offers a scientific approach to evaluating security risks in peacekeeping operations. This enables military personnel to more effectively recognize potential security threats and promptly implement appropriate actions to mitigate them. According to Zhu et al. (2018), By means of data analysis, Chinese peacekeeping forces possess the capability to actively monitor potential security threats in real-time, so enabling them to promptly give warnings and implement immediate measures in order to safeguard the well-being of peacekeepers. Furthermore, the utilization of a data-driven methodology enables the evaluation and anticipation of the security landscape within the relevant region through the examination of past security incidents. This analytical process furnishes a scholarly foundation for the decision-making processes pertaining to security matters undertaken by peacekeeping entities.

In brief, the utilization of data-driven methodologies has conferred several benefits upon China's peacekeeping operations. These advantages encompass the reinforcement of intelligence and decision-making assistance, the augmentation of

operational efficiency and efficacy, and the enhancement of peacekeepers' safety and security. By making full use of data science and technology, Chinese peacekeeping forces can better fulfil their international responsibility to maintain world peace and make greater contributions to the success and sustainable development of peacekeeping operations.

6. Towards a sustainable peace and development paradigm

6.1. Data-sharing and cooperation mechanisms

Data sharing and cooperation mechanisms are the foundation for building a sustainable peace and development model. In the field of peacekeeping and development, different countries and organizations possess rich data resources. Through the establishment of a data sharing and cooperation mechanism, the cross-border flow and sharing of data can be realized, enabling all parties to share data resources. A study by the UN Global Pulse (UN Global Pulse) shows that "data sharing and co-operation can enhance international co-operation in the field of peacekeeping and development, facilitate joint research and decision-making, and improve the efficiency and effectiveness of peacekeeping and development operations." (UN Global Pulse, 2017). Through data sharing and cooperation, countries and organizations can work together to research and solve global social problems and contribute wisdom and strength to sustainable peace and development.

6.2. Data privacy and ethical considerations

Data privacy and ethical considerations are crucial when constructing a sustainable peace and development model. Large-scale data collection and analysis may involve personal privacy and sensitive information. Therefore, data privacy protection regulations and ethical guidelines must be strictly adhered to when using data-driven approaches. A study by McGill University in Canada states, "In the peacekeeping and development field, data use should follow the principle of data minimization, ensuring that data are used only for legitimate purposes and that security measures are in place to protect the security and privacy of the data." (Diaz et al., 2019). The adherence to data privacy and ethical considerations not only helps to build public trust, but also helps to maintain the legitimacy and compliance of data use.

6.3. Strategic planning and resource integration

Building a sustainable peace and development model requires strategic planning and resource integration. Data-driven approaches provide important decision support for strategic planning. By analyzing big data, the root causes of social problems can be identified to inform the development of long-term strategic planning. At the same time, data-driven approaches can also optimize resource allocation, helping countries and organizations to plan inputs rationally and achieve efficient use of resources. A Stanford University study found that "data-driven strategic planning and resource integration can help improve the performance of peace and development operations and ensure that resource inputs are maximized and optimized." (Hatem et al., 2020). Through strategic planning and resource integration, the sustainable peace and

development model can be effectively implemented, laying a solid foundation for social stability and prosperity.

The framework presented in this article seeks to include established methodologies from prior research and put forth novel approaches to address the aforementioned difficulties. In contrast to other research endeavors, our framework places greater emphasis on the meticulous examination of data quality and privacy concerns. Additionally, it harnesses sophisticated artificial intelligence and machine learning methodologies to enhance the efficacy and intelligence of peacekeeping operations. As an illustration, our proposed framework may encompass additional stages pertaining to the validation of data quality in order to enhance the dependability, in comparison to the conflict prediction model developed by Lee et al. (2010). Furthermore, our approach also places emphasis on ethical principles during the data gathering process to uphold personal privacy, aligning with the findings of Bell and Bryman (2007). Through this comparative analysis, our intention is to emphasize the distinctiveness and advancements of our research, with the aim of offering valuable insights for future studies on data-driven peacekeeping operations.

In summary, building a sustainable peace and development model requires giving full play to the advantages of data-driven approaches. Data sharing and cooperation mechanisms promote international cooperation and research; data privacy and ethical considerations protect personal data security and privacy rights; and strategic planning and resource integration optimize the efficiency and effectiveness of actions. By making full use of data-driven approaches, we can better address global social issues and advance the goals of sustainable peace and development.

7. Conclusion

7.1. Prospects for data-driven peacekeeping in China

A data-driven approach brings many advantages to Chinese peacekeeping operations and has a positive impact on their prospects. By means of data collection and analysis, the utilization of Chinese peacekeeping forces can be optimized in terms of intelligence and decision-making support. This enables a more precise comprehension of the regional context and the fluctuations in public sentiment, as well as the ability to anticipate security risks and challenges. Consequently, the resilience of peacekeeping operations is enhanced, along with the efficacy of decision-making processes. Furthermore, the utilization of a data-driven methodology has the potential to boost the efficiency and efficacy of peacekeeping endeavors. By employing this strategy, it becomes possible to optimize the allocation of resources and logistical assistance, ultimately leading to improved operational continuity and stability. Simultaneously, the utilization of data-driven methodologies can contribute to the enhancement of safety and security measures for peacekeepers. This is achieved by employing real-time monitoring of security concerns and forecasting security occurrences, thereby ensuring the well-being and protection of peacekeepers. Therefore, the data-driven approach has a broad prospect in China's peacekeeping operations, helping China to better fulfil its international responsibilities and make greater contributions to maintaining world peace and stability.

7.2. Importance of building sustainable peace and development

Building a sustainable peace and development model is crucial to the stability and prosperity of human society. Peace and development are interdependent, and the goal of sustainable development can only be achieved in a peaceful environment. Data-driven approaches play an important role in building a sustainable peace and development model. Through data sharing and cooperation mechanisms, countries and organizations can work together to research solutions to global social problems and address challenges together. At the same time, data privacy and ethical considerations safeguard the legality and compliance of data use and enhance the social acceptance of data-driven approaches. Strategic planning and resource integration optimize the efficiency and effectiveness of actions and achieve the optimal use of resources. The construction of a sustainable peace and development model requires global joint efforts, and the data-driven approach provides scientific and efficient tools and instruments for this purpose.

To sum up, the data-driven approach has brought advantages to China's peacekeeping operations and has had a positive impact on their prospects. At the same time, the importance of building a sustainable peace and development model is self-evident. The application of data-driven methods in it will bring better prospects for peace and development to the global community and make a positive contribution to the achievement of the sustainable development goals.

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