A Game-Theoretic Model of the U.S. and China Influence in Nepal

A Thesis

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Letter of Recommendation

I certify that this dissertation entitled "A Game-Theoretic Model of the U.S. and China Influence in Nepal" has been prepared by Mr. Prateek Raj Joshi under my supervision. I hereby recommend this dissertation for final examination by the research committee at the Department of International Relations and Diplomacy, Faculty of Humanities and Social Sciences, Tribhuvan University in the fulfillment of the requirements for MIRD 526 Thesis for the Master's Degree in International Relations and Diplomacy.

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Declaration

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Abstract

One of the critical elements of Nepal's contemporary geopolitical reality has been maintaining cordial relations with the superpowers, i.e., the U.S. and China. Realizing its geostrategic sensitivity, Nepal's delicate balancing act is an attempt to avoid being drawn too closely into the trajectory of either country. At the same time, the rising cruciality of Nepal's geostrategic location in South Asia is also not to be ignored, the outcome of which is the more pronounced involvement of these powers in the Himalayan country. With both Washington and Beijing increasing their influence in every South Asian state, both powers compete to make their presence felt and enhance their influence. This sense of competition has been a significant motivator for new initiatives from both sides. These initiatives are generally soft-power based, with one usually countering the other. In the context of Nepal, similar soft-power competition has been visible since the start of the 21st century and is becoming more conspicuous with time. This attempt from both the players to court Nepal resembles a strategic game, where the decision and choice of one of the players define the next move of the other. This leads the research to realize that a game theoretical model of stylization and simplification of the U.S. and China initiative in Nepal attempts to understand better the players' behavior to help Nepal in its decision-making ultimately. Not limited to just the game between the U.S. and China, this research examines the U.S.-Nepal and China-Nepal game to provide insights into the complex strategic dynamics of the U.S. and China's influence in Nepal. Furthermore, using game theoretical attributes, the research also attempts to study the outcomes the games between the U.S., China, and Nepal., while also theoretically predicting the possible outcomes.

Keywords: Game Theory, U.S.-China Game, Prisoner's Dilemma, Nash Equilibrium

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Abbreviations and Acronyms

BRI   Belt and Road Initiative

IR   International Relations

MCC   Millennium Challenge Corporation

MoFA   Ministry of Foreign Affairs

U.S.   United States

USAID   United States Agency for International Development

USSR   Union of Soviet Socialist Republics

Chapter 1

Introduction

1.1. Background Context

The prism of geopolitics has always been a significant factor in the examination of Nepal's foreign policy. This sensitivity is becoming more critical as Nepal becomes an increasingly important player in the enlarging geopolitics of the South Asian region, which has brought Nepal into a more expansive geopolitical game. As a result, the great powers are likely to acquire confrontational diplomacy in Nepal. Especially in the context of the U.S. and China, an effort of one to bring Kathmandu into its ambit has resulted in a setback for the other, further swaying Nepal away from its attempt to achieve a foreign policy based on neutrality and non-alignment.

The high-level diplomacy from Beijing and Washington to exert their influence over the country has been a strategic game. Since the inception of the 21st century, an effort from one of the two countries has come hard on the heels of the other. While the rise of China and its increasing presence in South Asia is a topic of concern for the U.S., China also perceives the expanding and extended presence of the U.S. in the region as a factor that frustrates its regional interests. Here, the U.S. and China resemble the players of a game where the decision from one is based on the actions of the other, ultimately vying for power and influence. And this is what defines the game theory. Concerning how Neumann & Morgenstern (2007, p. 48-49) have defined a game, in the context of the U.S. and China in Nepal, the competition between one another to court Nepal resembles the ultimate gain, with every particular instance as the play, and the moves and strategies of the two powers as the component elements of the game.

A game is a situation in which the interaction between more than one player results in the outcomes (payoff), with the primary aim of individual players to maximize their gains

and minimize losses. Based upon this, game theory, as a branch of applied mathematics, enables players to make decisions based on the other player's possible decision to formulate a strategy. Different models could be used to stylize these strategies into a common framework, based on which the strategy, rationale behind the strategies, and outcomes could be analyzed. In international politics, the application of this theory is hardly new but has been gaining popularity based on the application of new models and sophisticated explanations.

As the field of international relations primarily deals with the interaction and interlink between state and non-state actors, the insights of game theory have provided a framework for how different actors in the international realm with conflicting interests and goals make decisions and take action in sophisticated situations. "The ultimate payoff of game theory is the use of game models to understand different aspects of international politics in terms of a unified theory" (Snidal, 2016, p. 25). These aspects include deterrence, alliances and cooperation, trade and economic policy, negotiations, diplomacy, and many more. With the same view, the U.S. and China are also engaged in perennial competition in Nepal. Therefore, the analysis of strategies for dealing with competitive situations where the outcome of a participant's choice of an action depends critically on the action of another participant seems the best fit.

This research attempts to identify different game theory models in the games between the U.S., China, and Nepal. It employs game theory as a tool for the analysis and exploration of various factors that shape the soft-power-based foreign policy of the U.S. and China in Nepal to provide a comprehensive understanding of the strategic interaction between the two major powers. In doing so, the games are not just limited between the U.S. and China but also encapsulates the U.S.-Nepal and China-Nepal game. Furthermore, different attributes relating to these games would be used to assess the games' outcomes. These

provide a further pragmatic and wholesome picture of the interactions and the corresponding outcomes, helping this research provide significant implications for policymakers, practitioners, and scholars in the IR field.

1.2. Statement of the Problem

For centuries, Prithvi Narayan Shah's Divya Upadesh, or "Divine Counsel," has shaped the foreign policy of Nepal. These principles primarily emphasize Nepal's neutrality and its protection from foreign imperial forces. These policies were highly successful in the protection of the sovereignty and integrity of the country while also assisting in the unification of Nepal. From there on, King Mahendra, also entitled as the architect of Nepal's foreign policy because of the pursuance of the policy of neutrality between the neighbors and for the attempt to extend Nepal's diplomatic relations, gained enormous reverence. These guiding principles are still very much relevant to Nepal as neutrality plays an immense role in not only enhancing the nation's dignity but also playing tactful diplomacy in the existing geostrategic challenges.

However, with the transformation of the relationship between states as a result of all the advancements and increasing scope of international relations, the influence of major powers in Nepal has diverted towards the game of economic and soft power diplomacy. In such a scenario, Nepal must adopt a more proactive and dynamic foreign policy, as disengagement from the global community or attempting to appease every other large power does not work. With the development of new partnerships with countries outside the region while attempting to secure its national interest, Nepal needs to understand the game that the major powers attempt to play, usually by extending their persuasion and soft power.

Based on the aforementioned concerns, this research attempts to employ game theory to model ways through which global forces, especially the U.S. and China, vie to exert

influence in the Himalayan country. The expanding scope of the game theory as an instrument of international relations provides numerous forms through which the simplification and stylization of states' interaction could be done, leaving a clear footprint of how the players, the U.S. and China, in this case, their strategies, and preference over outcomes help to generate explanation regarding those preferences. Through the construction of equivalence between abstract concepts and real-life observations, game theory, as a deductive method, also helps to obtain new explanations about the decision-making process of these actors.

By stylizing the interaction between the U.S., China, and Nepal, this research attempts to identify the unknown and unexplored territory of knowledge regarding how game theory could be modeled to explain the interaction between their actions. It will examine basically the economic and political strategies employed by these two major powers in Nepal using different theoretical models, such as the simple payoff game, and Prisoner's Dilemma. While doing so, the research also endeavors to identify various attributes such as the Nash Equilibrium, Pareto optimal, and Hicks optimal corresponding to each game to further uncover the efficiency of the outcome in every scenario. In addition, the analysis will also game theoretically investigate the implications of these outcomes to point out whether the outcomes were in the best interest of Nepal.

1.3. Research Question

This research is primarily aimed at exploring the elementary game theoretic models as a part of analyzing the strategic interaction between the U.S., China, and Nepal in the Nepalese political landscape. To achieve this, the research questions have been broken down into the following sub-questions.

1. How can game theory be utilized to model the strategic interaction between the U.S., China, and Nepal, along with the key assumptions and limitations of this approach?

2. How can game theoretical attributes- the Nash Equilibrium, Pareto Optimal, Hicks Optimal, and Dominant Strategy be used to describe the outcomes in the U.S., China, and Nepal game?

3. What are the implications of the game theoretical analysis for the future trajectory of the U.S.-China strategies in Nepal?

1.4. Research Objective

The primary objective of the research is to provide a comprehensive analysis of the U.S. and China's influence in Nepal through different game theoretic models to elucidate the underlying strategic considerations in their respective policies and activities in Nepal. In the end of the completion, this research aims:

〕 To simplify and stylize the strategy of the U.S. and China in Nepal into different game theoretical models that fit the best. This also includes identifying the key assumptions and limitations of the models and exploring different scenarios and outcomes associated with each model.

〕 To utilize the game theoretical attributes such as the Nash Equilibrium, Dominant Strategy, Pareto Optimal Solution, and Hicks Optimal to analyze the outcomes based on their stability, efficiency, and equity.

〕 To understand the future trajectory of the Sino-U.S. game in Nepal and explain the rationale behind the initiation of the game between these two major powers.

1.5. Significance of the Research

The diplomatic relations between the U.S. and China are vital for the international community and have been an extraordinary field of study for international scholars.

Especially this relation is getting more and more sensitive as the subtle and extraordinary use of soft power diplomacy from the Red Dragon has been propelling its push for influence and dominance, especially across the Indo-pacific region. "The pattern of ups and downs over the past quarter century took a clear and possibly irreversible turn for the worse in the U.S-China relations, which has provoked debate about whether China and the U.S. have already become rivals, perhaps adversaries, in a new cold war" (Goldstein, 2020). The emergence of China has been a direct challenge to the U.S.'s tactical supremacy. Consequently, the global historic position of the U.S., both politically and economically, seems to experience a setback. Therefore, tensions between Beijing and Washington have been steadily increasing all over the world, and Nepal is no exception. By this logic, it is essential for a country like Nepal to understand the strategic play between these mega powers by transcending away from the conventional thought of foreign policy and by implementing models that help best to understand their decisions.

For Nepali IR scholars whose most of interest and exertion are based upon understanding Nepal's strategic dilemma and the transformation of this dilemma into its advantage, it is essential to formulate, structure, analyze, and understand the scenarios to understand the possible strategies that big powers like the U.S. and China might employ in Nepal to gain influence. With an endless list of games available, this geopolitical game of courting Nepal into its sphere of influence needs to be explained through a more intuitive and objective explanation that gives a blueprint of how the decisions are being made, if the decisions have resulted in a maximum yield for Nepal, and which attributes help explain these phenomena.

Furthermore, game theoreticians, like mathematicians, are not concerned about the practical use of the designed frameworks. They model game theories to analyze the strategies that the players have or should adopt and also to identify if a combination of

strategies could yield outcomes that are simultaneously considered acceptable by all the players. This seems to be the urgency of the hour for Nepal. A clear understanding of the strategies implemented by the U.S. and China in Nepal by pragmatically identifying real-life strategies and payoffs provides bases for forecasting their future by bringing the expected and unexpected outcomes upfront. In addition, linking one game to the other in the U.S., China, and Nepal interplay enables a more pragmatic analysis of the rationale behind each player's strategy.

In terms of adding value to the existing literature, there is a dearth of research relating to the competition of major powers in Nepal, where game theory has been applied to analyze strategic interactions. While research concerning Nepal's strategic dilemma is readily available, none of them models the interaction using games that fit the best. Therefore, this thesis can add to the limited literature on the subject by presenting a detailed case study of the strategic interaction between the US, China, and Nepal.

Moreover, the research can also directly assist Nepalese diplomats and policymakers on the nuances of the game and the potential outcomes that need constant consideration while charting Nepal's foreign policy decisions. The construction of the payoff matrix, along with the use of game theoretical attributes like Dominant Strategy, Nash Equilibrium, Pareto Optimal, and Hicks Optimal, can help describe the possible outcomes of the game and identify strategies that Nepal can adopt to maximize its benefits.

All these analyses are expected to provide a new paradigm to view the U.S. and China influence in Nepal. This acts as an effective tool in the hands of Nepalese diplomats, policymakers, people in leadership positions, and most importantly, IR scholars to analyze situations of contestation between the U.S. and China using different attributes of game theory and their implications. Similar to this research's methodology, different game theory models can be modified to fit the contemporary scenario and obtain the best

fit. Doing this not only provides a careful analysis of the interaction process between the U.S. and China in Nepal but help players reach an optimal-decision making when confronted by these types of actors that vie for a non-cooperative game.

1.6. Organization of Study

To particularly model, analyze, and interpret the strategic influence of the U.S. and China in Nepal, the research requires cases where the models could be applied. These cases and models are segregated into different chapters. Following the introduction, review of the literature and conceptual framework, and research methodology, Chapter 4 of this research entails the U.S.-Nepal game. This section creates a simple payoff matrix explaining the game during the ratification process of MCC in Nepal. As the result of this game is already known, the game's theoretical attributes help to understand whether the outcome was in the players' best interest. Subsequently, there is an influx of Chinese initiatives following MCC's ratification, as explained in Chapter 5. This chapter deals with the rationale behind the delay the BRI has been experiencing and the underlining strategies of both China and Nepal to obtain the optimum output.

Chapter 6 presents the ultimate game, i.e., the game between the U.S. and China in Nepal, which has been depicted using the Prisoner's Dilemma model of the game theory. Being a non-cooperative and everlasting game, this chapter not only assists in simplifying the game using game theoretical models but also predicts the future of the game between these major powers in Nepal, answering the third research question. Finally, based upon the attributes that have been analyzed on all three games, the research moves towards elucidating the findings and the conclusions.

Chapter 2

Review of Literatures and Conceptual Framework

2.1. Review of Literatures

2.1.1. Theoretical Review

Game theory is a branch of applied mathematics that analyzes the players' (decision-makers) behavior in a strategic situation. A peculiar characteristic associated with game theory is the dependency of the action of one player on the other. Theory of Games and Economic Behavior by mathematician John von Neumann and economist Oskar Morgenstern considered the groundbreaking text that initiated game theory as an interdisciplinary research field defines a game as "The totality of the rules which describe it, where each player selects his strategy- i.e., the general principles governing his choices- freely and these sequence of strategies or moves is what game consists" (Neumann & Morgenstern, 1944, p. 49).

Game theory has a long and complex history that dates back to the 18th century; however, its development as a well-defined recognizable field of study was incepted in the 20th century. Gradually, the scope of the theory expanded and engulfed a wide range of scenarios, such as economics, political science, social aspects, and so on. Particularly in international relations, Anatol Rapoport was one of the early pioneers of the application of game theory, where he studied the strategic interactivity between the U.S. and U.S.S.R. during the cold war era through a game theoretical approach. "Game theory, at its simplest level, was used by Anatol Rapoport to generate ideas about enhancing world peace and was also at the forefront of the game theoreticians who sought to conceptualize strategies that could promote international cooperation" (Simpson, 2016, p. 2).

A typical definition of international relations (limited for the purpose of this paper) is the interaction between nation-states that are interdependent and outcome-oriented.

Interdependency means that the achievement of the outcomes for a nation-state is not just contingent on their actions but the actions of their counterpart as well. De Vries (1990, p. 429) mentions that the first basic idea underlying the view of interdependence is that interdependent nations are likely to consider one another's interests. If this point of view is to be considered, the field of international relations and game theory practically coincide in their subject matter.

However, this is not to say there is a clear line of coincidence between these two disciplines. "Despite the agreement between the game theory and international relations, determinants of power, one of the most important factors influencing the actions available to nation-states in the theory of international relations, receives little or no attention in game theory" (Correa, 2001, p. 190). This is a huge setback as the determinants of power emphasize the ability to structure and constitute the nature of interaction in the international realm. However, with the richer models and extensive research, it is uncontested that they can best be used to provide an understanding of the decisions made by the nation-states.

With the primary focus on implementing game theory in inter-state interaction, the following classifications of game theory are essential to understand- cooperative/non-cooperative, zero-sum/non-zero-sum, and simultaneous/sequential. In a cooperative game setting, players receive the highest payoff while collaborating, i.e., players are able to make binding agreements. In contrast, in a non-cooperative game, binding agreements are impossible because of the absence of trust and an extreme attachment to achieve their goals. Similarly, in a zero-sum game, a player's gain or loss balances the other's gain or loss. For instance, a gain for one of the players would definitely mean a compromise in the payoff of the other, ultimately summing the total payoff to zero. However, in a non-zero-sum game, all players can win or lose at the same time. Contrary to the zero-sum

game, one player's gain does not correspond to another's loss. Therefore, there is a high probability of achieving a 'win-win' situation in the non-zero-sum game. In a simultaneous game, the players make decisions at the same time and, therefore, have no idea about the other player's decision. While in a sequential game, players are aware of the availability of decisions of another, and there is a turn to decide.

The basic idea of these game theories is vital in this research as all the games need to define the type to assign appropriate payoff initially. Furthermore, depending on whether the game is U.S.-Nepal, China-Nepal, or U.S.-China, the levels of cooperation, strategies, and outcomes differ. Therefore, it is better to understand the basic concepts of these types before diving into the intricacies of players' strategies, payoffs, and outcomes.

2.1.2. Methodological Review

While the papers strictly relating to the stylization and simplification of the U.S. and China strategies in Nepal seems lacking, there is ample research related to the geopolitical dilemma of Nepal amid the presence of the U.S. and China and also relating to the employment of game theory to model international competition and cooperation. Therefore, the review of the literature is based on the examination and analysis of this literature to identify the existing models being used, evaluate their performance, assessment of their relevancy in the contemporary geopolitics of Nepal, and identify the existing knowledge in the field related to U.S.-China competition in Nepal.

Since the early 2000s, significant changes have occurred in global politics, with a notable shift in the economic power from the West to Asia. This shift marks the departure from conventional geopolitics, and even in the change of hotspots. Poudyal (2022), staying inside this premise, has studied the involvement of international actors in Nepal with their strategy-loaded initiatives, such as the BRI and MCC. According to the study, "Nepal is under pressure to accommodate the geopolitical interest of both superpowers by adhering

to its policy of non-alignment" (Poudyal, 2022, p. 13-14). This makes the study of these strategies by the major power urgency of time if Nepal is to transform its strategic positioning into a geopolitical advantage. Poudyal (2022) has used the metaphor of a chessboard to define the strategic game of the U.S. and China in Nepal to explain the geopolitical confrontation that Nepal is experiencing. Furthermore, the research also asserts the antiquated understanding of geopolitical relations regarding just geography and politics to reflect the rising importance of soft power measures. Therefore, as the paper suggests, there is a need to use meticulous diplomacy by Nepal that involves diplomatic maneuvers and strategic use of foreign policy. Based on the same ground, this research is also an attempt to analyze and understand the changing geopolitical context through the initiative and strategies that the U.S. and China have taken in Nepal to not only talk about the rationale behind the strategies but also the possible outcomes in every scenario and analyze them using the game theoretic attributes.

Furthermore, a paper by Vater (2020) argues that Nepal's search for higher ground in the current competition between the U.S. and China is driven by its desire to maintain its independence and sovereignty and its pursuit of economic development. For Nepal, the most prudent foreign policy decision is to balance U.S. and China while also pursuing closer ties with India and other regional powers. Because it emphasizes the value of comprehending Nepal's foreign policy decisions in the context of its history and current strategic goals, Vater's (2020) work is pertinent to the research issue of game theoretic analysis of U.S. and Chinese competition in Nepal. It also underlines the necessity of taking a holistic approach to the contest and taking into account the incentives and motives of all participants, including Nepal itself. By taking into account the historical, political, and economic context of the competition, the research helps understand how the 'game of influence' has existed since long ago, along with its progress over time. This is

particularly important in this research's third question, which is about predicting the outcome of the future interaction between the U.S. and China in Nepal, as there would be more cases to study. Ultimately, the author mentions, "A smart ruling elite can navigate the upcoming risks and opportunities" (Vater, 2020). However, for this to happen, the highly complex geopolitical game in Nepal needs to be modeled down into a simple framework first to get an overview of the actor's behavior and gradually start adding the impact of externalities. This research attempts to complete the former part of it.

However, before modeling the U.S. and China interaction in Nepal, the competition dynamics and the potential for cooperation and conflict need to be studied. Jervis (1998) 's article entitled "Realism, game theory, and cooperation" acts as an excellent literature for this. The article is an intersection of game theory with the realism school of thought and the possibility of cooperation between nation-states. According to the article, game theory, which offers a framework for examining strategic conduct and cooperation, and realism, which emphasizes self-interest and the pursuit of power, may be reconciled. The author contends that realist assumptions about state behavior can be modeled using game theory, enabling a more nuanced understanding of how states interact in the global system. This approach is highly relevant for the game-theoretic understanding of the U.S. and China in Nepal. Because of the sense of competition, both countries will likely act in their self-interest, enhancing the game-theoretic analysis as a valuable tool to understand their behavior. It also offers a theoretical framework for analyzing the dynamics of cooperation and conflict. Both are the foundations of understanding the sense of conflict and cooperation between the U.S. and China in Nepal and modeling the state behavior.

Furthermore, Cho's (2018) paper focuses on the power politics between the U.S. and China through institutional analysis and uses game theoretic models to explore how the institutional power dynamics between these major powers can affect their outcomes in

various scenarios. A methodology for applying game theory to examine institutional power dynamics is also provided in the article. Despite not focusing on Nepal specifically, the article's research on institutional power dynamics and game theory offers a good framework for examining the rivalry between the U.S. and China in Nepal. The article emphasizes the significance of considering the larger institutional context when examining power relations, which can be especially pertinent in a nation like Nepal, which is sandwiched between two powerful nations.

Along with the power dynamics, the identification of strategic goals and objectives of the two countries should be well-researched before diving into the pool of U.S. and China's competition for influence. Karim (2019) employs a qualitative approach to highlight the various areas of cooperation and competition between the two countries while also providing insights into their respective strategic visions for the South Asian region. The research explicitly mentions the need for cooperation between the two players, especially in the South Asian region, to enhance better confidence and security-building measures. While holding on to the importance of regional integration, the author believes that the U.S. and Chinese rivalry could be overcome. "Strategic ideas will always be envisioned by the stronger powers, but what is critical is to hold those back, given an opportunity, by applying soft power" (Karim, 2019). However, the research misses the mark that race to assume leadership roles between these countries also exists in the soft-power world. Soft power initiatives such as the BRI and MCC have already created divisions in the South Asian nations. Therefore, rather than having optimism in soft measures, countries like Nepal need to understand the broad qualitative strategic interaction and the rationale behind the player's decision if it is to achieve maximum payoff in the game. Therefore, using the various areas of cooperation and conflict that Karim (2019) highlights, the use

of game theory to develop a more nuanced understanding of the interaction between the two countries seems pertinent.

After understanding the strategic interaction between the U.S. and China through different academic research, the literature review moves towards identifying how game theory could be employed in international relations. For this, Correa (2016) analyzes the advantage and disadvantages of game theory as an analytical tool and explores the wide range of its application in IR. It explains how game theoretic analysis of state interactions helps specify how interactions are likely to proceed. The research uses the Israel-Palestine conflict and models it into a simple 2x2 payoff matrix. From the matrix, the research has concluded that, despite cooperation between the two states giving maximum cumulative payoff, "Both Israelis and Palestinians consider confrontation as their most preferred condition because of high individual payoff" (Correa, 2016). A similar approach could be used in the U.S. and China games; however, due to the sophistication of different external factors and also to depict the repetitiveness of the game, the game of Prisoner's dilemma, with a sub-game, might be more insightful.

Talking particularly about the model of game theory to be employed, Shinder (2022) references the game of Prisoner's dilemma to elucidate why the U.S. and China, because of their own self-interest to achieve global influence, do not cooperate even when it is easier to collaborate. This deduction is based on the hypothesis that transgressive behavior from both players results in higher yield for both. "Decisions about future cooperation or betrayal — or, in great-power relations, rule adherence or norm-breaking —cannot be inferred about one's counterpart because of a lack of trust and understanding between the parties" (Shinder, 2022). While this is true, the article lacks the comparison of payoff, stating that the yield on competition is higher than that of cooperation. In a Prisoner's game, the sense of cooperation yields maximum, and because of the lack of

trust between the prisoners, they are likely to defect from cooperation. Therefore, a modified version of the Prisoner's dilemma seems more probable, which this research aims at studying. Overall, China and the "prisoner's dilemma," an article by Shinder, offers a helpful framework for comprehending China's strategic actions in international relations, especially its rivalry with the U.S. By building on this foundation, this research attempts to develop more sophisticated models to take into account the unique complexities of the U.S. and China interaction in Nepal while also using different attributes of Prisoner's dilemma to investigate the outcomes further.

However, the process of modeling state behavior in game theory is easier said than done. Along with the issue of rationality, the presence of externalities, and uncertainties, there are other multiple hindrances to the precise and accurate employment of game theory in strategic situations. Saloner (1991) believes that there could also arise the problem of multiple Nash equilibria, where "a wide range of equilibrium behavior may be consistent with the same underlying set of basic assumptions" (p. 129). The research presents that in such a scenario, it is essential to determine the equilibrium to 'look at' as multiple equilibria do not provide robust decision-making. However, in IR and state interaction, the presence of multiple equilibria also has a specific meaning. Assuming that states are rational, there is a high chance that the decisions taken could fall on Nash equilibrium. Therefore, the presence of more than one of them means that now the decision is up to the player that has the diplomatic capability to enhance its payoff while worsening or without any change in the payoff of the other. This situation is highly likely in state interaction and might also be visible in the research. Saloner's work further highlights the significance of including uncertainty and imprecise information in game theoretic models. This is especially pertinent to the proposed research since various unpredictable external circumstances would affect how the US and China interact strategically in Nepal.

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However, to enhance simplicity and avoid compromising objectivity, the research assumes all other factors constant except what has been considered, i.e., *ceteris paribus.*

In terms of strictly sticking to game theory, research by Moorthy (2013) gives a general review of game theory as a method for examining rivalry and tactical choice-making in various settings, including business and politics. He talks about using game theory to simulate interactions between two or more players, each with their own preferences and aims, and to figure out each player's best course of action in light of what the other players are doing. This research can therefore provide the theoretical framework for what this research attempts to do. The Prisoner's Dilemma, the Chicken Game, and the Stag Hunt Game are just a few examples of game theoretic models mentioned in Moorthy's article that can be used to simulate various forms of rivalry and cooperation. To help determine each actor's incentives and motives and propose potential competition solutions, these models can be customized to the unique setting of the US and China competition in Nepal. This is what the research will attempt to do in the following chapters.

2.2. Conceptual Framework

Game theory in IR can be operationally defined as a mathematical framework where players' decisions can be analyzed through a payoff matrix where the summarization of the necessary information about a player's strategy is numerically calculated to identify different attributes relating to the outcome of the play. This research uses the exact operational definition to model the interaction between the U.S., China, and Nepal.

However, before diving into the diagram depicting the progression of game theory throughout the research, some basic terminologies need to be defined, specifically to illustrate how the terms have been used in the context of this research.

1. Players: These are the entities or participants involved in the game to make strategies to achieve the desired outcome. In the context of this research, the U.S., China, and Nepal are the major players.

2. Strategies: These are the actions or choices available for the players. For instance, in this research, Nepal has the strategies to accept or reject the aid provided by the donor countries.

3. Payoff: Payoff is an amount assigned for a particular strategy. It depends upon the outcomes or rewards the players receive based on the combination of strategies they choose and is also impacted by the other player's choices. It is a vital element of the payoff matrix. For instance, if it is in the best interest of Nepal to accept foreign aid, then the payoff assigned to the accepting choice receives the maximum payoff.

4. Dominant Strategy: The strategy that yields the maximum payoff for a player, no matter how the opponent player may play, is called the dominant strategy. Game theory predicts that players will always have a dominant strategy.

5. Nash Equilibrium: Nash equilibrium is a fundamental solution concept in a non-cooperative game theory in which no player is incentivized to change their strategy. "An equilibrium point is a point where each player's mixed strategy maximizes his payoff if the strategies of the others are held fixed and therefore, each player's strategy is optimal against those of the others" (Nash, 1951, p. 287). It models a steady state where there is no benefit in unilaterally changing its strategy. However, it does not mean that there are no better outcomes. It is important to note, specifically for this research, that more than one Nash equilibrium can exist in a game.

6. Pareto Optimal strategy: Pareto optimal strategy is a strategy where there is no other choice where the payoff of one could increase without hurting the payoff of the other. In other words, an outcome is Pareto Optimal if no action is available to make one player

better off without worsening the other. More than one Pareto Optimal strategy could exist in a game.

7. Hicks Optimal: The Hicks Optimal outcome, named after John Hicks, is a situation or outcome where the sum of the payoffs is the most compared to the total payoffs on other choices. In a game theory payoff matrix, a Hicks-optimal outcome is always Pareto optimal, while it might not be true the other way around. Also, more than one Hick's optimal can exist in a game.

The operational definition of the game theory and the terminologies provide an essential foundation for this research. This information should now be connected with the various aspects of the research, all of which are based on modeling different games depending on the players and their strategies.

In 2022, a momentous event occurred: Nepal's successful signing of the Millennium Challenge Corporation (MCC) through parliamentary ratification. "After eleven years of its inception in Nepal, the House of Representatives of the Federal Parliament, at last, ratified the MCC on February 2022" ("MCC Ratified by…", 2022). The point of ratification of MCC was followed by a myriad of events that pointed to the fact that the "game of influence" had already started, and this is where this research attempts to commence the game theory. "The fact that the Nepali parliament ratified the MCC with a two-thirds majority no less is as big a political setback for China as it is a strategic one" (Gambhir, 2022). As a result, the strategic rivalry between the U.S. and China became more visible in Nepal. Soon after the ratification of the MCC, Chinese Foreign Minister Wang Yi visited Nepal, which some claim was a step to "send Wang Yi as an envoy to understand Nepal's attitude towards China after the MCC approval" (Lamichhane, 2022). During the visit, although no progress was made regarding advancing BRI, Nepal and China signed nine agreements relating to economic and technical cooperation; safety and

health condition protocol; handover certificates for highway projects, and so on (Ranjan, 2022). These consecutive initiatives from the U.S. and China can be considered as their strategies to expand their influence in the region, with the strategy of one charting and affecting what the other chooses to do- an exact definition of the game theory. However, since a single model of a game theory cannot best explain the game between the three players- the U.S., China, and Nepal and also since the game existing between any two of these players differs based upon the relations they enjoy, the ambitions they have, the histories they share, the extent of cooperation and many more, the research would attempt to identify, implement, and elucidate the model that fits perfect for each game. Therefore, the research uses a series of game theory approach to individually model players into a two-player game while also attempting to link one to the other.

The approach of this thesis can be diagrammatically explained using the flowchart below. It explains the series of games that will be modeled, along with their progression with time.
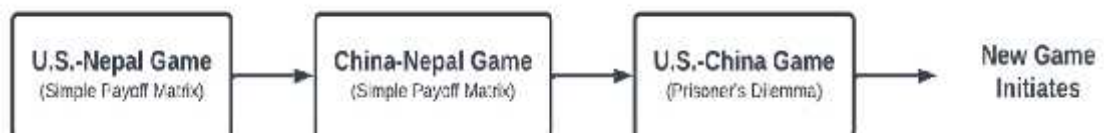
Figure 2.1 The sequence of game theory models

As mentioned in the flowchart, three game theory models have been employed in the research: a game based on a simple payoff matrix, and a Prisoner's dilemma. However, in an attempt to achieve more accuracy and reliability, the stylization of the games between the countries has been done in a modified version of these models. These modified versions carry the same essence as their original counterpart and are based on replicating these models in a real-world scenario. Furthermore, it provides a more nuanced understanding of the strategic interaction between the players.

2.2.1. The Game of Simple Payoff Matrix

A payoff matrix is an outcome-based table that shows the payoff of different strategies or choices in the game. It is an essential tool used in game theory that displays the rewards or payoffs associated with each combination of strategies in the game.

As mentioned earlier, this research consists of only two-player games. Therefore, a simple example of a 2x2 matrix can be used to represent the game's outcomes, with the rows and columns corresponding to the two players' choices.

Here is a simple example of a 2x2 payoff matrix with each player's respective strategy and associated payoffs.

Table 2.1 A simple 2x2 payoff matrix

		Player 2	
		Strategy 1	**Strategy 2**
Player 1	**Strategy 1**	Choice 1 (4, 2)	Choice 2 (3, 1)
	Strategy 2	Choice 3 (2, 3)	Choice 4 (1, 0)

In the above payoff matrix, both players have been provided strategies: Strategy 1 and Strategy 2. The combinations of these strategies have a different payoff for both the players, clearly denoting that the payoff received by a player not only depends upon the strategy it chooses but also on what the other player opts for. It is to be noted that the payoffs have been assigned randomly to exemplify the process of generating outcomes and explaining the attributes of a payoff matrix.

Based on the payoffs assigned, we can enlist the preferences of the players:

For Player 1: Choice 1> Choice 2> Choice 3> Choice 4

For Player 2: Choice 3> Choice 1> Choice 1> Choice 4

It is clear from the above preference that Choice 1 and Choice 3 are the dominant strategies for Player 1 and Player 2, respectively.

Identification of Attributes

By the definition of Nash equilibrium, we need to identify the choice in which none of the players want to switch strategies if the other does not. In the matrix above, given that Player 2 chooses Strategy 1, Player 1 would also go for Strategy 1 as it yields the highest payoff. Furthermore, if Player 2 opts for Strategy 2, Player 1 would again go for Strategy 1. Similarly, if Player 1 chooses Strategy 1, Player 2 would also choose Strategy 1, and if Player 1 chooses Strategy 2, Player 1 would again choose Strategy 1.

This can be diagrammatically shown as below:

Table 2.2 Identification of Nash Equilibrium- 1

		Player 2	
		Strategy 1	**Strategy 2**
Player 1	**Strategy 1**	Choice 1 (4, 2)	Choice 2 (3, 1)
	Strategy 2	Choice 3 (2, 3)	Choice 4 (1, 0)

Table 2.3 Identification of Nash Equilibrium- 2

		Player 2	
		Strategy 1	**Strategy 2**
Player 1	**Strategy 1**	Choice 1 (4,2)	Choice 2 (3, 1)
	Strategy 2	Choice 3 (2,3)	Choice 4 (1, 0)

Therefore, in this simple payoff matrix, the Nash equilibrium lies in Choice 1.

This payoff matrix has two Pareto Optimal outcomes: Choice 1 and Choice 3. This is because one cannot shift from any of these choices without worsening the payoff of the other.

Similarly, there is a single Hicks Optimal, i.e., Choice 1, because the sum of payoffs is highest in this choice.

In this research, a similar payoff matrix has been used in two games- the U.S.-Nepal and the China-Nepal game, using the same method of identification of Nash equilibria, dominant strategy, Pareto Optimal, and Hick's Optimal. The implication of Nash equilibria in both games is that it sheds light on the best choice where all the players must feel that the solution gives the best payoff. This ensured that Nepal did not irritate any of the two powers during the decision-making. Similarly, Pareto Optimal outcome reflects the two players' consideration for one another's choice. Moreover, Hicks optimal shows that the decision made produces, cumulatively, the highest payoff for both the players, which is an important consideration since the game between U.S-Nepal and China-Nepal are both cooperative.

In both the U.S.-Nepal and China-Nepal games, to maintain uniformity, the maximum payoff assigned is '5'. However, the lowest payoff is '-1' for the U.S.-Nepal game and '1' for the China-Nepal game. This is because there is a heavy loss on the U.S.'s side for one of the choices.

Framework of the U.S.-Nepal Game

The U.S. and Nepal were the two players in this game. The U.S. had the strategies to amend the controversial provisions to make the ratification process easy or stick to the initial provisions, spurring a plethora of skepticism in Nepal. For Nepal, the options were whether to ratify or reject the agreement. All these options had their own set of

repercussions and implications, based upon which payoffs have been assigned, as shown in Figure 4.1.

Framework of the China-Nepal Game

China and Nepal are the two players in this game, with China having the strategies to whether re-think on the loan component of BRI to give dynamism to the initiative or to stick around on the existing loan provision. For Nepal, the options are whether to go on with the initiative as it is or delay the project as long as it gets some concession from the Chinese side. All these options had their own set of repercussions and implications, based upon which payoffs have been assigned, as shown in Figure 5.1.

2.2.2. Prisoner's Dilemma

As one of the most well-known examples of the non-cooperative version of the game theory, the Prisoner's dilemma is a hypothetical game where two criminals are kept in a separate room with no means of communication; the interrogators do not have sufficient evidence on who the actual culprit is and therefore, offer each Prisoner to testify against the other or remain silent. Therefore, both the prisoners have two choices to choose from- to betray the other by testifying (also called "defect" as the two suspects do not cooperate with each other) or to stay silent (also called "cooperate" as neither of them confesses).

Let us suppose that if both of the players cooperate, i.e., stay silent, they both get the punishment of 2 years each, as the judge will not have enough evidence to prove them guilty. If both players defect, then the punishment rises to 5 years each. However, if one decides to cooperate and the other defects, the one cooperating would receive larger punishment, i.e., 7 years, as there is evidence against the one trying to defect. Overall, "each player is tempted to maximize his or her own gains by defecting, but if both defects, both lose compared to the situation in which both cooperate" (Heuer & Orland, 2019).

These payoffs can be described through a payoff matrix to calculate other attributes. It is to be noted that all the payoffs here are negative because they are punishments (years in jail) and not rewards.

Table 2.4 A sample payoff matrix of Prisoner's Dilemma

		Prisoner 2	
		Cooperate	**Defect**
Prisoner 1	**Cooperate**	Choice 1 (-2, -2)	Choice 2 (-7, 0)
	Defect	Choice 3 (0, -7)	Choice 4 (-5, -5)

Based on the payoff matrix, here are the preferences of each Prisoner.

For Prisoner 1: Choice 3> Choice 1> Choice 4> Choice 2

For Prisoner 2: Choice 2> Choice 1> Choice 4> Choice 3

Here, Choice 3 and Choice 2 are the dominant strategies of Prisoner 1 and Prisoner 2, respectively. However, Choice 4, i.e., the choice for both prisoners to defect, is the Nash Equilibrium. Even though mutual cooperation leads to a better outcome, it is not a rational option because of the self-interest of the parties involved and the secrecy of the other party's decision. In a Prisoner's dilemma setting, both the suspects do not know the choice taken by another suspect, and therefore, there is a dilemma. Therefore, the most rational decision from the perspective of self-interest is to defect, i.e., blame the other suspect, even though cooperation yields the best result.

A similar pattern is visible in the international scenario whenever major powers contend for influence. Since the other's intention or plan is unknown, states are likely to maximize its outcome through competing; they generally do not opt for cooperation. "The Prisoner's dilemma explains an important issue, which is that the rational behavior that the state adopts towards a specific issue or towards another competing state does not necessarily

lead to the acquisition of the benefits that the state wants since it does not fully know the intentions of the states or the other state towards it" (Alzawahreh, 2021, p. 31). As a result, countries, especially the ones vying to enhance their influence, prioritize short-term interests over the long-term benefits of cooperation. This dynamic is particularly relevant in the competition between the U.S. and China, where they often engage in the strategic calculation to maximize their own influence in different regions, and Nepal is no exception.

Framework of the U.S.-China Game

The U.S.-China game hints towards non-cooperation, where players decide on their own strategy to maximize their profit, and therefore, this game can be modeled into Prisoner's dilemma. The U.S.-China game in Nepal can be entirely modeled into the game of Prisoner's dilemma as it shares common properties such as non-cooperation and the fact that each individual player is motivated to make a competitive choice. This is because choosing the competitive choice in Prisoner's dilemma leads to a higher payoff regardless of what the other player does. "What is really interesting about the Prisoner's dilemma is that although it is common sense that collaboration would bring the best overall outcome for the two prisoners (a total of 2 years in jail), our analysis contends that the best choice is to defect (compete) which would cause the prisoners to spend at least 3 and most probably 4 years in jail" (Gaviotis, 2015, p. 2). Also, similar to Prisoner's dilemma, this game is arranged so that a positive yield for one player does not always hurt the other player (it is not a zero-sum game).

One thing to note here is that a non-cooperative game requires more analysis, "a finite non-cooperative game always has at least one equilibrium point, also called the Nash equilibrium" (Nash, 1951, p. 286). Therefore, this part attempts to identify the implication

and relevance of the Nash equilibrium that exists in the game between the U.S. and China with a detailed analysis.

Regarding game theory, the game between the U.S. and China is quite complex in Nepal's scenario. Therefore, a prisoner's dilemma matrix, with another Prisoner's dilemma as a "subgame" in the event that both countries opt to compete, can be used to explain how the situation is transforming into what is going on till now. We call this the modified Prisoner's dilemma.

Similar to the game of Prisoner's dilemma, the main game has two strategies for both the U.S. and China- whether to compete or cooperate. However, the payoff becomes quite interesting in the sub-game. Here, the U.S. has two strategies- staying quiet after MCC or continuing its influence on Nepal through new approaches. For China, since the BRI is still in a dilemma, its strategies are to either wait for BRI to materialize in Nepal or search for and initiate alternatives.

Chapter 3

Research Methodology

3.1. Research Design

The research largely employs a qualitative approach, utilizing game theory as the primary analytical framework to explore the strategic interaction between the U.S. and China in Nepal. Utilizing game-theoretic models to examine the tactical interactions between these actors in a situation is called "modeling game theory" as a research design. The use of these models of game theory as a mathematical framework helps to analyze the decision-making of these actors and the possible outcomes of the interaction, along with the optimal strategies for each state. "It is commonly believed that game theory is an efficient and applicable method to model the mathematical behaviors of agents under different competition and collaborative circumstances, where both cooperative and non-cooperative scenarios capture good meanings and can reveal important insights" (Choi et al., 2019). Among the several advantages of modeling game theory as a research design, some include simplifying complex interactions, creating structural frameworks for examining decision-making, generating testable hypotheses and predictions, and so on. However, an important thing to note is that the results obtained from game theory are as accurate as the assumptions and data used in the model. Therefore, this research uses extensive research during the data collection and employs ceteris paribus to consider factors other than the ones being considered constant.

The qualitative approach of game theory modeling means that qualitative methods and non-numerical data from texts, journals, newspaper articles, government documents, press releases, and observations are gathered and examined. To gather information on U.S. and Chinese policies and actions in Nepal as well as the opinions and attitudes of pertinent Nepalese actors towards these policies and activities, qualitative methodologies

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will be used in this study. Furthermore, through the qualitative approach, the payoffs of each strategy in the game theory will be determined. Analyzing the aforementioned pertinent texts will be a part of qualitative ways of assigning payoffs to comprehend the objectives and motivations of the U.S. and China in Nepal. A clear and detailed explanation of this has been mentioned in the conceptual framework- assigning payoff sub-chapter. Although qualitative techniques of assigning payoffs may not be as accurate as quantitative methods, they can offer essential insights into the intricate dynamics of players' strategic interactions, especially when data is scarce or difficult to quantify. It is crucial to remember that the caliber of the data gathered and the rigor of the analysis employed to analyze it determine how accurate qualitative techniques of assigning payoffs are.

3.2. Research Site

In terms of where the research is being conducted, the research site is Nepal. Situated at the pivot of the Himalayan, the crucial and geostrategic location of Nepal attracts the interest of both the superpowers- the U.S. and China. The growing significance of this country in the geopolitical paradigm has transformed it into a hotspot where the U.S. and China vie for their enhanced presence. However, strictly adhering to the principle of non-alignment and neutrality, it is difficult to predict Nepal's side or even expect Nepal to take any side. This makes the U.S. and China game interesting as both powers would venture to inch Nepal towards their sphere. Therefore, while Nepal aims to transform its geostrategic significance to a strategic enhancement of its economy and development, the U.S. and China have always been the major competitors, not shying away from implementing soft-power diplomacy to attract Nepal. "The promising global connectivity offered by the major powers raises two consequences for Nepal- whether it can bridge the chasm of reshuffling supply chains among like—minded countries, or it will be torn

asunder by geopolitical rifts" (Vater, 2020). This makes Nepal an ideal country to be analyzed using the game theoretic models of the U.S. and China competition, as both countries have attempted to increase their influence and presence through different initiatives relating to development, aid, and investment. Overall, most of the study of this thesis revolves around the initiatives employed by the U.S. and China through soft power diplomacy.

Similarly, in terms of area from where the research has been fulfilled, the qualitative game theoretic approach has been implemented using the selection of different primary and secondary sources as library-based research and desk research.

3.3. Data Collection Methods

The primary purpose of data collection in this research is to assign a payoff to the different choices in the game. It follows a qualitative game theoretic modeling, and therefore, qualitative analysis has been performed to assign a payoff to the cells of the payoff matrix. Overall, the data collection methods for this study combine primary and secondary sources according to the study's unique research questions and objectives.

In terms of the primary sources, the study involves the analysis of sources such as government documents, press releases, statements from diplomats, politicians, and other stakeholders, raw data from international organizations, and so on. For instance, one of the sources used is the Press Release from the Ministry of Foreign Affairs of Nepal after the Foreign Ministers of China and Nepal met in Kathmandu in 2022. These sources provide valuable insight into the actual stance of the governments without any third-party interpretation. Similarly, the secondary sources used are research journals, books, existing literature and their conclusions, newspaper or magazine articles, and other media sources. All the sources mentioned above had to be related to the initiatives of the U.S. and China in Nepal, especially regarding their attempt to enhance soft power in Nepal through

different soft power approaches. Furthermore, sources that mention the gains and losses of Nepal in each of the strategies have also been collected. The combination of both these sources has then been analyzed to provide a payoff matrix for the game theoretic modeling. The potential outcomes of different strategies and scenarios are analyzed using the collected data to ultimately examine the outcomes using different attributes of the game theory.

3.4. Data Analysis Method

As mentioned earlier, constructing a game theoretic payoff matrix to model the strategic interactions among the U.S., China, and Nepal is based on the collected primary and secondary data. The payoff matrix will allow the researcher to pinpoint the choices that are most likely to yield maximum outcomes for the players as well as the outcomes that are most likely to come about as a result of these choices., which has been carried out through the content analysis of the existing documents and available literatures, the method of description of which has been described below.

Assigning payoffs in a game theory payoff matrix corresponds to determining the outcomes or yields of the strategies. These are the rewards the players receive due to their choices. Usually represented by numbers in the cells of the payoff matrix, these are the essential elements of determining the attributes of game theory.

In a perfect information setting, payoffs can be the factual representation of the rewards the players receive. However, in the international political environment with uncountable externalities, the prediction cannot be entirely objectified.

3.4.1. Assigning Values to Payoffs

In all the games of this research, the payoffs are assigned for countries other than Nepal based on the impact a particular strategy has on their quest to increase their influence in Nepal. For example, if a particular strategy decreases its presence in the region, the

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payoff is lessened by a particular unit. Similarly, the payoff is increased if a particular strategy leads to an increment. Again, suppose one of the players increases its influence in Nepal, and the other decreases its influence. In that case, the player who increases their influence may receive a higher payoff than the other player. On the same condition, if there is a case of decrement of the influence, a player might also receive a negative payoff. However, the exact values of these payoffs would be determined by specific circumstances of the game and the players' preferences. For Nepal, the payoffs mean the advantage (political, economic, and social) that it gets for a particular strategy.

To maintain uniformity in assigning payoffs, the maximum and minimum payoffs of similar games have been kept in the same range. In all games modeled, the highest payoff assigned is '5'; and the lowest is '0'. Similarly, negative payoff indicates that the players' cumulative reward is negative, i.e., there is an overall loss if that particular choice is adopted.

The process of assigning the payoff based on their minimum and maximum values is explained in the flowchart below:
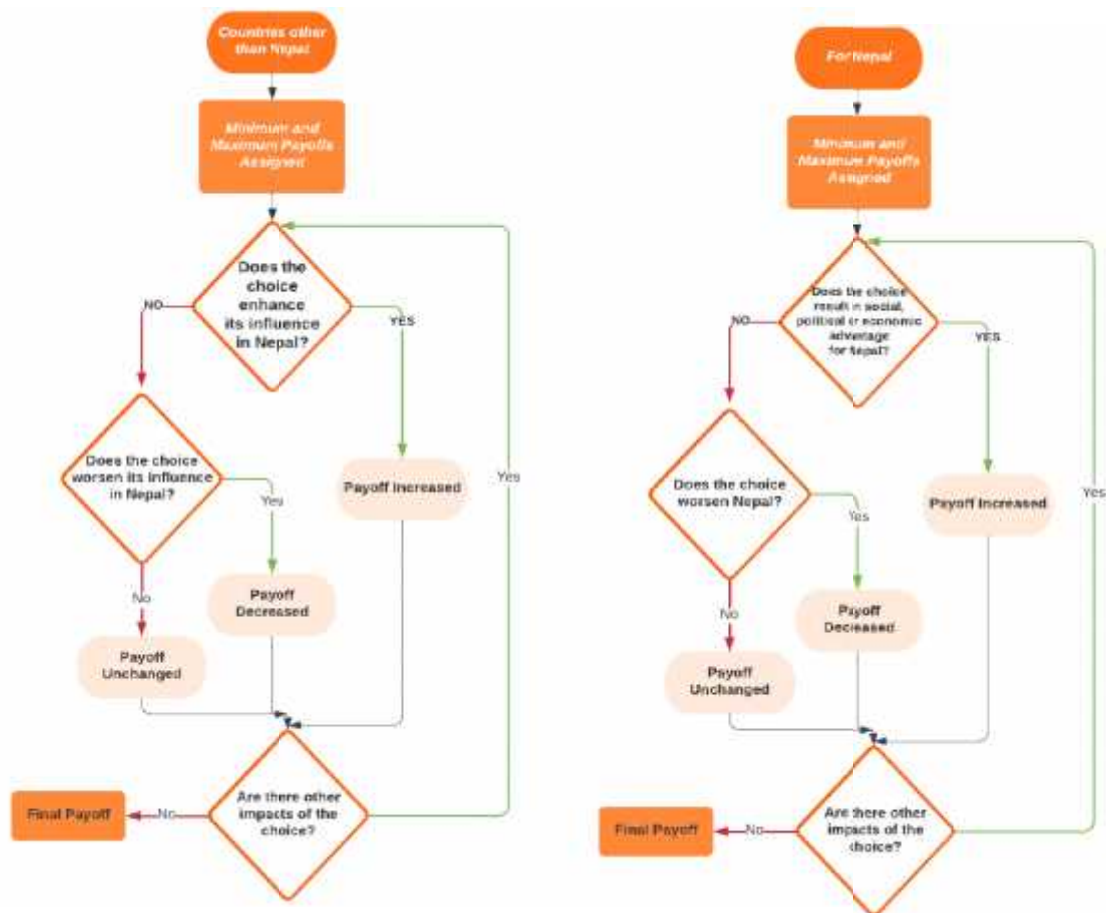
Figure 3.1 Flowchart for determining the payoffs

One thing to note is that the minimum and maximum payoffs do not carry a particular meaning besides maximum and minimum influence and are introduced to set a boundary while assigning them. However, depending upon the increment or decrement of influence a particular strategy carries, the payoffs would also change. This would give a clear idea of which strategy or choice the players would choose, as a numerical comparison would be apparent. This is where the use of ordinality also comes into play. The increment and decrement of payoffs also help rank the choices by preferences, which allows for determining the dominant strategy and Nash equilibrium. While Pareto optimal and Hick's optimal are identified using the cardinality of the payoffs.

There are some rules that this research has followed while assigning payoffs in a model. First, the payoffs are not given based on prior knowledge; instead, they represent possible

future outcomes or consequences. For the events that have already taken place, these payoffs have been somewhat validated. Furthermore, as (Bueno de Mesquita & Lalman, 1986) also mention the importance of valid justification of the payoff or utility, which means a close to an accurate representation of the payoff. This has been done through an extensive study of the available research materials to determine whether the particular strategy is beneficial and change the payoffs accordingly. This process ensures replicability to some extent as well.

The completion of the payoff matrix after assigning the payoffs is followed by the identification and calculation of different game theoretical attributes such as dominant strategy, Nash Equilibrium, Pareto optimal, and Hick's optimal to analyze the outcomes of each game.

3.5. Limitations

The limitation section of this research has been divided into two major parts- the limitation of the application of game theory in the IR discipline and the limitation of the study. The problems plaguing game-theoretic models in IR are specified in the former part. In the latter, the limitations consist of the restraints in assigning the payoffs, the extensive use of the ceteris paribus, and other methodological constraints that have been acknowledged.

3.5.1. Limitations of Game Theory in IR

A significant advantage of game theory in IR comes from the disciplined stylization of international interplay. As discussed earlier, the standard definition of international relations perfectly fits the game scenario adopted by the game theory. However, while it is a powerful tool for analyzing decision-making, a list of pitfalls needs to be considered. The first of it lies in the fact that in the modern world, international relation is not just limited to states but also influenced by interactions among individuals, public and private

entities, and different levels of government. Therefore, determining the players while modeling international interaction in game theory should be wider than just the states, which is a complex process to consider in a standard game theory having a limited number of players.

Similarly, Neumann & Morgenstern (1944, p. 49) have defined the game as "the totality of the rules which describe it, and these precisely described rules provide conditions for the strategies of the players." However, it cannot be guaranteed that any fixed set of rules guides states' interaction in the international scenario. Donnelly (2000, p. 8) has mentioned, "Nation-states pursue their own national interests defined primarily in terms of power, and there exists skepticism toward international laws, institutions, and ideals that attempt to transcend or replace nationalism." This means that unlike how game theory assumes its players to sit under the boundary of the game's rules, international laws and treaties cannot restrict the international activities of nation-states, and ethical or humanitarian considerations hardly guide them. This makes it challenging to model state interaction in terms of game theory. In the game between the U.S. and China in Nepal, defining what constitutes the rule in this game is not a simple matter; therefore, the use of game theory in such a situation might miss the mark.

Furthermore, the theory can only generate important testable predictions if the assumption of a self-interested and rational player is correct. All actors have the perfect information and act rationally based on that information is the simplifying assumption of game theory, which may not be the case in the international scenario. Foreign policy decision-making is a multi-level approach."The challenges put forward by cognitive psychology and organizational theory have punctuated the rational choice theory in foreign policy analysis" (Brulé & Mintz, 2017). Therefore, the fact that states' actions might also be

influenced by irrational factors such as emotions, ideologies, and so on impedes the application of the game theory in IR.

In addition to this, the dynamic nature of the international system also presents a considerable setback for the game theory as it assumes a static game where players make simultaneous or sequential decisions, and these actions do not impact the game's future. This makes it challenging to predict the behaviors or strategies of the players accurately. Dynamism also results in players' changing preferences, which is challenging to encapsulate in the static nature of the game theory.

At the end of the day, while the application of the framework of the game theory model makes us assume many of the elements of international relations are problematical, resulting in a supposition of a very idealized and structured global world, they can still help to provide insights on the methods employed by states to achieve their ultimate goal. Furthermore, the resurgence of new applications of game models in international politics has also helped to acknowledge some of the pitfalls, enhancing its applicability.

3.5.2. Limitations of the Research

While the pitfalls of game theory, as mentioned earlier, also get reflected in this research, this section mainly talks about the specific limitations that need to be acknowledged before understanding the procedure of this thesis.

First, the thesis is entirely based on creating a payoff matrix for every game. As a result, it is essential to assign a numerical value to every strategy depending upon the outcome it provides to the players. These payoffs denote the points the players or the states receive as a result of a particular strategy. Naturally, the greater the payoff, the more the state prefers the strategy. However, assigning a specific payoff for a strategy is challenging, especially in social science- a field inundated by subjectivity. Ideally, allocating a specific number refers to finding a strategy's exact impact, which is almost impossible to predict in international relations. However, the research uses an extensive study of primary and secondary materials

to determine the payoffs, which enhances its credibility. Furthermore, because of the limitations posed by cardinal payoffs, an ordinal payoff or a ranking system has also been applied, illustrating players' preference over the strategies without the need for exact allocation of quantitative payoffs. Even if the payoffs assigned are based on extensive research of sources, this field's subjectivity might constrain the ability to generate a holistic understanding of the particular situation.

Another limitation of this research is that to model the U.S., China, and Nepal games to best fit in the game theory models, numerous externalities and their respective variables had to be considered constant, i.e., Ceteris Paribus. "Building a game out of a real-world system necessitates modeling to reduce actual real-world complexity to a manageable level" (Roungas, Bekius & Meijer, 2019). While this helps to transform the extremely complex decision-making process of states into the game theoretic models, in reality, many factors and determinants can influence the states' behavior, making it challenging to isolate the impacts of these individual variables. In simple terms, there is always a tradeoff between simplicity and the number of variables to be considered. In IR, these variables refer to the determinants of foreign policy decision-making, ignoring which could impact the validity and accuracy of the model's prediction.

There is also a lack of previous studies in this particular research area. While the literature relating to Nepal's strategic dilemma between the U.S. and China are readily available, there needs to be more prior research that attempts to model the interaction between these states through different game theory models and create a payoff matrix depending upon the possible outcomes. Therefore, identifying the scope of the work that has already been done so far in this research seems lacking. However, because there was limited closely related literature upon which to build this thesis, it provided an excellent opportunity to explore this topic from a fresh perspective and develop an original methodology that can add value to the existing literature.

Furthermore, one of the common methodological limitations- i.e., the insufficiency of data is also a constraint for this research. The game theory requires empirical data to calibrate and validate the models properly. However, it is challenging to obtain enough empirical evidence and sampling data in the field of IR and diplomacy. In this research, the game theory analysis began in February 2022, when Nepal ratified the MCC. Therefore, using only the sources published after February 2022 could limit the accuracy of this research. To overcome this, while the game's inception is from the start of 2022, the data being used dates back to 2017 when Nepal signed MCC and BRI. This lends enough credibility to the game theory model and the research findings. Furthermore, expanding the time frame enhances the completeness of the research by capturing a full range of factors that influence the players' decision-making process.

In conclusion, while there are limitations to using game theory to analyze the influence of the U.S. and China in Nepal, it is still vital as it presents a simplified version of the complex interaction between them. Even with these limitations, the game theoretical analysis of the U.S. and China influence in Nepal has the potential to elucidate how decision-making has been taking place in the game play between these actors in Nepal after the ratification of MCC and what the game theoretical attributes tell us about the efficiency of the outcomes of these strategies, to help Nepal for informed policymaking.

3.6. Ethical Concerns

The research involves the geopolitical competition between two global superpowers in a small and strategically important country like Nepal. Therefore, a set of principles have guided the research practice and design of this study to support the values required for scientific research.

First and foremost, the prime objective of this research is to model the interaction between the U.S. and China in Nepal through a game theoretical lens. Therefore, the researcher is well informed that questions regarding biases could occur and the objectivity of the research might

be compromised. A systematic and transparent approach to data selection has been employed to avoid bias in any aspect of this research, including design, analysis, interpretation, and identification of payoffs and outcomes. No desired outcome or preconceived notion is attached from the researcher's perspective, which could lead to biased conclusions. For this, primary and secondary sources were selected on neutral ground. As the topic itself is arguable, it is also essential to acknowledge all the limitations regarding the subjectivity of the thesis, which has also been reflected in the limitations section of the research.

The research also involves collecting data from various sources, and it also believes that the more sources are analyzed, the closer the analysis will be to accuracy. However, in the name of extensive sources, the research has ensured that sensitive and confidential content has not been used. The sources used for data collection are already published government documents, press releases, journal papers, books, and magazine articles that are readily available on the internet or in academic libraries.

Acknowledging the fundamental discipline of every academic writing, the research also ensures that all data or information acquired from outside sources has been appropriately cited and referenced to avoid plagiarism. The research respects the intellectual property right of every researcher and content creator and steers away from all types of plagiarism, including direct, mosaic, paraphrasing, and patchwork.

Finally, the conclusion acquired from the game theoretical analysis has no intention to disturb or question the non-alignment foreign policy of Nepal. It is rather a blueprint of the strategies used by the major powers in Nepal to calculate if those players could be modeled into the game theory to analyze outcomes. The research does not attempt to promote any potential impact on Nepal's relationship with the U.S. or China. The study has been conducted to respect the sovereignty and cultural sensitivity of the countries involved and their people and not undermine any national interest.

Chapter 4

The U.S.-Nepal Game

The first half of 2022 became an adventurous journey for U.S.-Nepal relations. With the U.S. putting strenuous effort and active participation in Nepal and Nepal needing to decide upon its previous commitments, the communication between Singha durbar and the White House surged, attracting not only the attention of the local and international media but also an acute observation from the citizens. "Along with the Indo-Pacific Strategy, domestic legal challenges, issues with intellectual property rights, and auditing of expenditures made possible by the MCC grant were some of the other main concerns surrounding the ratification of MCC" (Thapa, 2022, p. 2). Immense attention from different corners of the country cultivated controversies and, therefore, inundated the period with skepticism, interrogations, cross-examinations, and conclusions. This period marks the inception of the game theoretical analysis.

MCC's ratification was not a straight path, as it was overwhelmed with several hurdles. However, the focus of this paper is not on the analysis of the controversial provisions present in the MCC but on how the process of ratification of the MCC could be modeled into a game theory to elucidate if the outcome- the ratification by Nepal without any amendments from the U.S.'s side, serves the best interest of both the players.

Table 4.1 Payoff matrix of the U.S.-Nepal game

		The United States	
		Amendments	**No - Amendments**
Nepal	**Accept**	Choice 1 (5, 3)	Choice 2 (4, 5)
	Reject	Choice 3 (2, -1)	Choice 4 (2, 0)

Other than the factors being mentioned while assigning payoffs in this game, ceteris paribus.

4.1. Setting Payoffs of the Choices

4.1.1. Choice 1 and Choice 2 (Nepal: Accept; U.S.: Amend or Not Amend)

Choice 1 represents Nepal ratifying the agreement with amendments on the controversial provisions from the U.S. side. Choice 2 signals the same, but with no amendments. It is uncontested that on the economic front, the MCC, as one of the largest grants in Nepal to date, and the developmental implications of the compact would enhance Nepal's infrastructure in numerous domains. "MCC is the result of a diagnostic study conducted in Nepal in 2013-2014 to identify the areas where foreign aid could benefit Nepal and its people, and it identified two major areas- building transmission lines and maintenance of roads" (Thapa, 2022, p.2). Therefore, accepting the compact would be a much-needed boost in Nepal's economic sector, giving Nepal a maximum payoff if the deal succeeds. However, it must not be ignored that it also became a major divisive force in Nepal. In its existing form, not only Nepal's political parties were sharply divided over the decision on whether to accept the U.S. grant assistance, but the whole of Nepal was in turmoil. Jha (2021) sheds light on the serious differences that MCC brought among the major political parties of Nepal; the entire country was divided- with one section supporting the ratification and the other opposing it. The opposition had specific concerns at hand. Thapa (2022) enlisted these concerns as relating to domestic legal challenges, intellectual property rights issues, provisions regarding the auditing of expenditures, and so on. Furthermore, while not ideal, it is natural to have a hint from the Chinese side regarding their reservations about MCC. "Many political observers believe that China did not want Nepal to ratify the MCC compact as many in China perceived it as a geopolitical tool to stir up trouble surrounding China" (Ranjan, 2022). As a result, the ratification of MCC

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without any amendments regarding provisions of Nepal's concern is certain to give a hit to Nepal's payoff. Therefore, a value '4' has been assigned to Nepal for the ratification of MCC without amendment.

From the U.S.'s perspective, there would have been a hit in the payoff had it chosen to amend the controversial provisions. This is because MCC is not a compact limited to Nepal. Therefore, an "amendment to the MCC would not be acceptable to the U.S. as it could have ramifications with other countries with whom it has signed such an agreement" (Jha, 2021). Therefore, a payoff of '3' has been assigned to the U.S. On Nepal's side, it was always on the driver's seat of MCC since its inception. Therefore, the projects that MCC dealt with were selected after a close diagnosis and consultation with the Nepalese government. The U.S. government also clarified Nepal's concerns. "The U.S. government sent a 13-page clarification to Finance minister Janardan Sharma on September, as a clarification on 11 questions related to the agreement" (Jha, 2021). The clarification, to a large extent, assisted in securing Nepal's payoffs while Nepal decided to pass the agreement with no amendments. What also helped to maintain the payoff was the compact's ratification along with a 12-point interpretative declaration. "The interpretive declaration stated Nepal's understanding is that the MCC compact is just a development grant, it is not above the country's constitution, and Nepal can terminate it if there is anything that goes against the national interest" ("China says it has…", 2022). While the Vienna Convention on the Law of Treaties identifies interpretive declarations just as a unilateral statement, it acknowledged the voices of the oppositions and helped heal the existing faction regarding MCC. Overall, Nepal's payoff does not dwindle substantially given the aforementioned reasons, and therefore, a payoff of '4' has been assigned in this scenario.

4.1.2. Choice 3 and Choice 4 (Nepal: Reject; U.S.: Amend or Not Amend)

Rejecting the U.S.'s assistance might have had serious consequences for Nepal, at worst. Along with the loss of probable aid in Nepal, the risk of cracking the decades-long relationship with Uncle Sam looms. U.S. Assistant Secretary of State Donald Lu warned regarding reviewing U.S. ties with Nepal had failed to endorse the MCC compact within the stipulated deadline (Pradhan, 2022). While this is not a cordial statement to be made to a sovereign nation, it does hint at the fact that the rejection would have resulted in no gain for Nepal. Nonetheless, on the bright side, scrapping the deal with the U.S. would have made the immediate North happier. "The Chinese see the MCC as an American strategy to expand Washington's influence and counter China" ("Beijing says it commends…", 2022). Also, since the compact had the risk of being associated with the Indo-Pacific strategy (though the U.S. Embassy clarified that it was not), Nepal would have denigrated the relevancy and sustainability of the non-Alignment, at least for the ones that do not align right with the West. Therefore, Nepal gains a specific payoff, even if it decides to reject the grant. Therefore, in both Choice 3 and Choice 4, a minimal payoff is associated with Nepal, i.e., '2'. In the U.S. context, the failure of MCC would have meant more opportunities for Beijing. As a result, the U.S. would have not only lost the advantage of implementing its ambition in a strategic location but would have become unsuccessful in confronting Beijing-led initiatives. Therefore, in both Choice 3 and Choice 4, the payoff assigned to the U.S. is minimum. An interesting thing to note on the Choice 3 is the negative payoff assigned to the U.S. This is because agreeing to amend the controversial provisions and then getting rejected by the Nepalese government would have put more things at stake for the U.S. and its acclamation in Nepal.

4.2. Identification and Analysis of the Attributes

We will now analyze the players' preferences based on the aforementioned choices and their respective payoffs.

For Nepal: Choice 1> Choice 2> Choice 3> Choice 4

the U.S.: Choice 2> Choice1> Choice 4> Choice 3

In simple terms, a dominant strategy is superior to the particular player and independent of the other player's action. In terms of a game theory model, since there is minimal gain associated if Nepal chooses to reject MCC, Nepal's dominant strategy is to accept the agreement. Given the strategy of the U.S. to either amend or not amendthe controversial provisions, the dominant strategy for Nepal will be to accept the proposal. Similarly, given the strategy of Nepal to accept or reject the compact, the dominant strategy for the U.S. will be to not amend the existing provisions.

However, accepting amendments by the U.S. gives the highest payoff to Nepal. Therefore, it would have been the best case for Nepal if the U.S. agreed to amend the controversial provisions and then Nepal chose to accept them. However, the dominant strategy for the U.S. is not to opt for amendment since it gives the payoff, i.e., 5. As a result, Nepal's payoff was dependent upon U.S.'s decision regarding whether it agreed to amend the provisions or not.

-) Given the strategy of the U.S. to make amendments, the Nash equilibrium for Nepal will be Choice 1, i.e., to accept the compact.

-) Given the strategy of the U.S. to not amend, the Nash equilibrium for Nepal will be Choice 1, i.e., to accept the compact.

-) Given the strategy of Nepal to accept, the Nash equilibrium for the U.S. will be Choice 2, i.e., to not amend.

) Given the strategy of Nepal to reject the compact, the Nash equilibrium for the U.S. will be Choice 4, i.e., to not amend.

In this game, the unique Nash Equilibria is Choice 2 (see the method of identification in Conceptual Framework), as there is minimal payoff gain in the case of rejection. For the U.S., since there is a substantial gain in opting for Choice 2 compared to Choose 1, with a minimal loss from Nepal, Choice 2 is directed towards the strategy where both the players lack the incentive to change their initial strategy. However, the intriguing analysis of this game lies in the Pareto optimal solution. Choice 1 and 2 are Pareto optimal outcomes because shifting from one to another might have an incremental benefit for one, but it also worsens off the other player. This also elucidates the delay that MCC experienced regarding its ratification. In game theory terms, there was a contest between the players on which Pareto optimal strategy to opt for. In other words, both players had their own Pareto optimal preferences. However, Choice 2 would be a Hicks-optimal outcome as it is the outcome among the Pareto optimums where the total payoff is the most. In other words, shifting from Choice 1 to 2 would have a smaller impact on Nepal's payoff than the U.S. would have had if the strategy shifted from Choice 2 to 1. Therefore, in the end, Nepal had to opt for Choice 2, which is the Pareto optimal as well as a Hicks optimal outcome.

Chapter 5

The China-Nepal Game

In 2017, Nepal officially joined the Belt and Road Initiative (BRI), which was seen as a significant strategic win for China in South Asia and also as an opportunity for Nepal to attract Chinese interest in Nepal's infrastructural development. The membership was equally revered in Nepal as well. "The economic partnership under the BRI would reduce Nepal's geographical and economic dependency with its southern neighbor by boosting connectivity and opening up new economic opportunities" (Poudyal, 2017, p. 37). However, the initiative failed to continue the initial momentum as none of the promises materialized, at least in Nepal. Along with the disagreements in the loan component, BRI also got embroiled in numerous controversies, especially relating to the "debt trap," cases of irregularities, and many more. "Along with the debt hangover as a major hidden debt issue for recipient countries like Nepal, there lies a skepticism of feasibility and benefits of some of the schemes that will further create a tribulation in the future for the nations under BRI" (Shrestha, 2021). As a result, while other regular developmental activities, aids, investments, and assistances continued, the most enthusiastic infrastructure project could not earn the pace.

What fueled the fire was MCC's approval without amendments, which prompted high-level diplomacy, visits, and alternatives from Beijing, and therefore, immediately after the U.S-Nepal game, the China-Nepal game started getting traction. In this game, Nepal has no privilege to withdraw its membership as the repercussions could be the worse- both for Nepal's international reputation as well as its relationship with its Northern neighbor. However, it is also visible that Nepal, at a time when it is facing hurdles to achieve economic stability, has not been enthusiastic about moving the BRI projects forward. Along with the unpreparedness of Nepal in the selection of the projects, the loan

component of BRI has also been a considerable setback for Nepal. According to AIDDATA, "A typical loan from China has a 4.2% interest rate and a repayment period of fewer than 10 years" (Wooley, 2021). However, in comparison, "multilateral donors such as the Asian Development Bank and the World Bank provide soft loans at around 1.3% interest rate with a more extended repayment period" (Dahal, 2022). On that account, both Beijing and Kathmandu seem to have opted to delay the project until a substantial clarification is made regarding the skepticism about the feasibility, financial methods, and potential benefits of the proposals.

Table 5.1 Payoff matrix of the China-Nepal game

| | | China | |
		Concessions	No Concessions
Nepal	**Accept**	Choice 1 (4, 3)	Choice 2 (2, 5)
	Delay	Choice 3 (5, 4)	Choice 4 (1, 1)

Besides the factors mentioned while assigning payoffs in this game, ceteris paribus.

5.1. Setting Payoffs of the Choices

5.1.1. Choice 1 and Choice 2 (Nepal: Accept; China: Concession or No Concession)

Choice 1 is simple; Nepal agrees to move along with the BRI project with the condition that the Red Dragon agrees to re-consider the loan component. Generally, the loan factor of the BRI is extended in commercial terms through the Silk Road Fund (SRF) and the China-led Asian Infrastructural Investment Bank (AIIB), the interest rate of which exceeds the one Nepal would receive if it opts for other multilateral donors. "The average interest rate on a Chinese government loan is 4.14%, which is nearly twice as high as the average interest rate (2.10%) on a World Bank loan" (Morris, Parks & Gardner, 2020, p. 14). The research also mentions that the World Bank is ahead of the Chinese government

in providing a longer loan maturity period and a more generous average grace period. Therefore, other things aside, materializing the BRI initiatives under the existing conditions is sure to cause pain to Nepal's vulnerable economy. While there are empirical examples regarding the generosity of Chinese governments providing some degree of concession when a loan-bearer struggles to repay the debt, Nepal currently is not likely to afford loans on such Mega Projects. Furthermore, the recent failure of Sri Lanka to put its national interest first by opting for a high-interest loan of six percent is frequently linked to Chinese investment, creating a wave of skepticism in Nepal. In a conference held in July 2022, some experts and senior economists of Nepal warned, linking the Sri Lankan economic collapse to the failure in identifying the right project, that "Nepal could fall into a debt trap, and could even undermine its sovereignty in the long run if implemented" ("Chinese BRI would…, 2022"). Nevertheless, the cooperation areas under BRI show a future of land-linkedness and a strong bond with China. Therefore, a payoff of '2' has been assigned to Nepal if it proceeds with BRI with no concession and a payoff of '4' for concession.

On the Chinese side, choosing not to provide any concession would give it the largest payoff as China wants to apply the same modality everywhere and not provide country-specific treatments, which would mean confusion and disagreements within the project. Liao (2021) highlights that the problematic BRI projects have enhanced the risk of international financial infrastructure financing for China, and because of the rising domestic debt, there is a lot less appetite for Beijing for overseas lending. In such a scenario, there are a lot of risks for China to put another megaproject under its ownership, especially with a country that is already struggling with its economy. Therefore, a payoff of '3' has been assigned to China if it decides to provide a concession. This minimum value signifies that even though lending or concession would be risky for China, in terms

of geostrategic benefit, it would help China remain in the U.S-China game in Nepal and orient Nepal's commerce towards the North.

5.1.2. Choice 3 (Nepal: Delay; China: Concession)

Choice 3 is an interesting observation because the payoff associated with Nepal in this Choice is maximum- even more than the payoff that Nepal was assigned if China immediately agrees to provide concession. This is because, in addition to Nepal's preference for grants and soft loans from China, there are some other significant issues attached to the initiative as well. "Geopolitical concerns, Nepal lacking proper homework regarding the nature and principle of the BRI, and Nepal's preference for competitive bidding in BRI projects" (Giri, 2019) have been some of the further issues that need to be resolved before stepping into the initiative. It is better for Nepal, or even both parties if these matter in question gets addressed with time. Furthermore, in the wake of the COVID-19 crisis, its repercussions, and worldwide inflation, Nepal has witnessed a massive decline in economic activity in the post-pandemic period. According to the macroeconomic and financial situation report based on six month's data ending Mid-January, 2022/23 from the *Nepal Rastra Bank*, "Exports have decreased by 32 percent, with the inflation at 7.26 percent, along with an increase in domestic credit by 8.7%" (N.R. Bank, 2023). As a result, the country's economic health has been battered, with more time required to acquire some positive trends. Similarly, as debt distress has been frequently linked with the initiative, Nepal is in no position to hut its economy further. According to a study by a Washington-based *Center for Global Development*, based on an identified pipeline of project lending associated with the BRI, 10-15 countries could suffer from debt distress due to the future of BRI-related financing, with eight countries of particular concern (Hurley, Morris & Portelance, 2019, p. 11). Therefore, Nepal

receives a maximum payoff of '5' if it decides to hold up unless the Chinese side agrees to soften the loans and reach a negotiated agreement on the other outstanding issues.

For China, this strategy leads to a payoff of '4' because unlike rejecting Nepal's concessional request right away, where it would get a payoff of '5', delaying and resolving the domestic debt and the aforementioned issues would put them in a better position to offer concessions. That said, China does not get a maximum payoff because of the initiatives that the U.S. has already taken regarding the MCC, and the USAID's grant, which puts them in a better position for the time being. Also, from China's eye, taking more time would be tantamount to giving the West more room to play its strategic move in Nepal.

5.1.3. Choice 4 (Nepal: Delay; China: No Concession)

Choice 4 is the strategy with the least payoff. Here, China decides to stick to its existing BRI model, and Nepal, hoping for concession, delays the agreement. Both players have the least points to take home in such a scenario. Neither Nepal, whose expectations are high for the initiative for its ability to boost Nepal's infrastructural development, would receive any materialized output, nor China, which considers the initiative as a bridge between China and South Asia and as a revolutionary project to maintain, if not, enhance its influence in the Himalayan country, would see its soft diplomacy working. Therefore, a payoff of '1' has been assigned to each player.

5.2. Identification and Analysis of the Attributes

With this, it is time to analyze the payoff preferences of the players:

For Nepal: Choice 3> Choice 1> Choice 2> Choice 4

For China: Choice 2> Choice 3> Choice 1> Choice 4

Through the method of identification of the dominant strategy, we can see that none of the players have a dominant strategy, and it depends upon what the other players choose to do. However, for Nepal, it is in its best interest to opt for Choice 3, whereas, for China, it is Choice 2.

- Given the strategy of China to provide concession, the Nash equilibrium for Nepal will be Choice 3, i.e., to delay.

- Given the strategy of China to not provide concession, the Nash equilibrium for Nepal will be Choice 2, i.e., to accept and implement the project.

- Given the strategy of Nepal to accept, the Nash equilibrium for China will be Choice 2, i.e., to not provide concession.

- Given the strategy of Nepal to delay, the Nash equilibrium for China will be Choice 3, i.e., to provide concession.

Therefore, the Nash Equilibria of this game are Choice 2 and Choice 3. Choice 2 and Choice 3 are also the Pareto optimal outcomes in this game because moving away from any of these options would hurt one player's payoffs. However, when it comes to Hicks optimal, Choice 3 has the highest total payoff. This might be why there is a dilemma between the two countries when deciding upon materializing BRI in Nepal. While Nepal needs to welcome the initiative for its overall development, its most preferred strategy from Nepal's side, i.e., Choice 3, hints towards delaying the project to resolve the outstanding issue first and also expect China to provide some concessions given the vulnerability of Nepal's economy at the present condition. Furthermore, since Choice 3 has highest total payoff for both the players, it seems more pragmatic.

The BRI cooperation between Nepal and China is comatose; however, it has not been bogged down. Nepal's decision to give up on the idea of receiving high-interest commercial loans makes sense as its payoff would reduce significantly in such a scenario. However, for China, even though Choice 3 does not provide it with the maximum payoff, the Pareto optimality and Hick's optimality associated with the Choice do hint at the notion that it would not only provide China a buffer to maintain its influence in the region, but also rethink on its outstanding issues not to replicate the issues that BRI faced in other nations.

Chapter 6

The U.S.-China Game

Similar to the previous models, the story of this model also begins with Nepal's ratification of the MCC. While the trend of "stepping up" one's influence to counter the other has been going on for decades between the U.S. and China in Nepal, this game considers a small yet contemporary portion of the case study to elucidate how a new game initiates every time, following the end of the previous game. It also attempts to identify the Nash Equilibrium, along with the Puerto optimal outcome and Hick's optimum, to better understand the rationale behind the players choosing specific strategies.

As the economically and militarily weaker of the two nations, in a general sense, it might seem that China has the most limited options, with the most attractive being the tit-for-tat strategy while dealing with the U.S., which was conspicuous during the 2018/2019 trade war. "Although China is the weaker one, the Chinese administration has announced officially that China is not afraid of a trade war and accepts friendly and effective negotiation to fix friction" (Jiang, Gong & Cheng, 2020). However, in this paper, the game between the U.S. and China is based in Nepal. This gives significant room for China as Nepal readily accepts the essence of its Northern neighbor, especially to boost its national construction, while also as a strategic partner to fulfill its complaints with its Southern counterpart. With that being said, the U.S. policy objectives that center around helping Nepal build a democratic and peaceful society cannot be ignored. Factually speaking, Nepal established its bilateral relations with the U.S. long before it inaugurated its ties with China. With the global geostrategic environment turning increasingly Asia-centric, the geographically distant country has spared no pain in filling the distancing gap through frequent high-level visits and aid promises. In recent years, this gratitude is not

just seemed one-sided. Scholars and journalists have even claimed that Nepal's distinctive decision at the 2022 U.N. General Assembly to demand Moscow to pull its troops, amid its neighbors like Bangladesh, India, and China abstaining from voting, signifies its title towards Uncle Sam, even though Nepal government claims that it does not point towards Nepal taking sides. "It is doubted that Nepal, which was an advocate of a non-aligned policy, has deviated from its stand and chosen to fall into the geopolitical traps of the USA" (Jha, 2022). These events indicate that both countries have a similar footing and probability of influence in Nepal. Therefore, analyzing that both countries have their own set of strengths based on their unique connections with Nepal makes it easier for the game theory model to entirely focus on the strategy and, to some extent, ignore the externalities.

All in all, it is to say that pay off matrix and, ultimately, the strategic game theory existing between the U.S. and China in Nepal is not established upon their economic and military capability or competition because the recipe to achieve greater advantage or utility in this game depends more on the strategies that both the countries opt. Of course, enticing Nepal with more considerable aid and donations could help to get greater ground. Still, the battle here is not about who becomes more generous but whose strategies will likely result in the optimum yield.

A fascinating phenomenon to be observed in this game is the fact that it transforms into a modified Prisoner's dilemma where the decision to compete among the two players leads to specific cases where they have actually or at least attempted to compete.

The payoff matrix of the modified prisoner's dilemma in the case of the U.S. and China's influence in Nepal is given below.

Table 6.1 Payoff matrix of U.S.-China game

		China	
		Cooperate	**Compete**
U.S.	**Cooperate**	Choice 1 (4, 4)	Choice 2 (1, 5)
	Compete	Choice 3 (5, 1)	Choice 4 (2, 2)

Choice 4 (2, 2):

China / U.S.	**Wait for BRI**	**Alternative**
No Expansion	Choice A (2, 1)	Choice B (2, 4)
Expansion	Choice C (5, 1)	Choice D (5, 4)

Other than the factors being mentioned while assigning payoffs in this game, ceteris paribus.

6.1. The Main Game

6.1.1. Choice 1 (U.S.: Cooperate; China: Cooperate)

Modeling the basic concept of the Prisoner's dilemma, the U.S. and China have two major strategies, i.e., either to cooperate or to compete. Both the U.S. and China would have a similar influence in the region, and in the absence of efforts to obstruct the other's initiative, the yield of their individual initiative would also be high. However, none will have a stronger influence or prominent position in Nepal, which limits their payoff to '4' each.

However, this scenario is highly unlikely because the U.S.-China geopolitical competition is real; nobody can wish that away. "The United States and China are engaged in

transformative power transition with implications for the balance of power; therefore, the current trend toward unmitigated conflict in U.S.-China relations is neither inevitable nor irreversible" (Ross, 2020). Also, in terms of the theory of realism that emphasizes the role of power, self-interest, and the behavior of seeking to maximize power and security, this scenario is improbable. Considering these observations from the point of view of the Game Theory, "realist perspective to a more complex world where the concern is less exclusively with problems of conflict and as much with problems of cooperation" (Snidal, 1985). Therefore, the sense of cooperation between the U.S. and China is also rarely visible in Nepal, making the payoff (4, 4) improbable.

6.1.2. Choices 2 and Choice 3 (U.S.: Cooperate or Compete; China: Cooperate or Compete)

However, if one cooperates and the other decides to compete, the one competing takes the highest payoff of '5', with the cooperating one left with '1' units. While the one deciding the cooperation would work on finding ways to reach a win-win situation, another player would be employed to expand its sphere and extent of influence, resulting in a high difference in the payoff. Also, these payoffs are assigned under the basic assumption of the Prisoner's dilemma.

6.1.3. Choice 4 (U.S.: Compete; China: Compete)

Choice 4, i.e., both players choosing to compete, is the ground reality of the U.S.-China engagement in Nepal. In recent years, both countries have entitled the other as their greatest strategic competitor, the repercussions of which is apparent in Nepal as well. "While the U.S. seeks to minimize rising Chinese influence in the Himalayan region with strategies involving more democratic instruments of cooperation, China remains cautious of the U.S. support to the more than 20,000 Tibetan refugees living in Nepal" (Gupta,

2022). These are a few among a myriad of areas where the countries contest. As a result, this is the strategy that the two countries have decided on with one another.

While it is in the best interest of Nepal for the two countries to cooperate in their initiatives to receive the highest payoff, the geopolitics of the region and contemporary international relations make this expectation a highly unlikely scenario.

The research attempts to take this analysis a step further by using a modified game theory approach where this particular strategy to compete is further demonstrated through the case study after Nepal ratified the MCC agreement, creating a sub-game under the main game. This case has been applied in the previous games as well, and therefore, the same is used in this scenario to model the situation in a game theoretical approach and link it with the previous games.

6.2. The Sub-Game

As mentioned earlier, the game starts after the ratification of MCC by the Nepalese parliament. Here, the U.S. has two strategies- staying quiet after MCC or continuing its influence on Nepal through new approaches. For China, since the BRI was still in a dilemma, its strategies were to either wait for BRI to materialize in Nepal or to search for and initiate alternatives.

6.2.1. Choice A (U.S.: No Expansion; China: Wait for BRI)

Choice A corresponds to the scenario where the U.S. halts its further initiatives in Nepal, and China decides to wait till the commencement of BRI projects. As such, the U.S. would have already gained a certain payoff compared to China because of the successful ratification of MCC in Nepal, enabling constant engagement between the U.S. and Nepal. Therefore, the U.S. gets a payoff of '2', and China gets a minimum payoff of '1'. However, this situation is only possible if Nepal's spotlight, because it is a strategic country, fades away, which is almost impossible due to its geographical permanence.

6.2.2. Choice B(U.S.: No Expansion; China: Alternatives)

Choice B refers to the scenario where the U.S. implements MCC without any other significant initiatives. At the same time, China, because of the delay caused by the BRI, decided to move forward with more prudent and influential projects. In the such storyline, the U.S. would only receive the payoff it would gain from the MCC, while China, supposing that it would plan a more prominent and noteworthy strategy, would receive a higher payoff of '4'.

6.2.3. Choice C(U.S.: Expansion; China: Wait for BRI)

Choice C is the most preferred strategy for the U.S. Along with its payoff from MCC, the U.S. would be expanding its influence over Nepal through other initiatives, providing it with a high payoff of '5'. While on the Beijing side, the setback on the BRI and failure to initiate any further initiatives would provide it with the lowest payoff of the game, i.e., '1'.

6.2.4. Choice D (U.S.: Expansion; China: Alternatives)

Choice D, to a large extent, resembles the contemporary scenario. Here, the U.S. and China, irrespective of the success or failure of the previous initiative, would move ahead on their strategic game to acquire the upper hand in the Himalayan region. In the context of the U.S., right after the ratification of MCC, it continued to execute its economic diplomacy through a USAID grant. "Nepal will receive $659 million in grants in the next five years from the United States as the Nepal Cabinet has approved a new draft five-year agreement with the USAID, an approval that came almost two months after the parliament ratified the MCC" ("After MCC, the U.S.," 2022"). Along with the continual flow of grants under the U.S.'s economic diplomacy, U.S.'s renewed interest has been quite visible owing to the high-level visits after the compact's ratification. "Nepal is seeing a flurry of high-level visits for several reasons: concern for Nepal's geopolitical leaning after the formation of a new government; concern for Nepal-U.S. bilateral

relations; and to look at alternative ways to engage Nepal after the latter rejected the SPP" (Poudel, 2023). These advances from the U.S. represent its preference for the expansionist strategy, providing it with a maximum payoff of '5'.

Amid all these expanding options from the geographically distant U.S., China has also not opted for quiet diplomacy. The growing Chinese influence in Nepal in the areas of connectivity, investment, hydropower, and so on hung back after the ratification of MCC. However, China also had to opt for alternatives to achieve maximum payoff on the game. Unsurprisingly, "the Chinese state media called out the MCC agreement, calling it a "poisoned pact" which threatened "peace and development in South Asia"" (Gupta, 2022). Soon after the ratification of MCC, the Chinese foreign minister Wang Yi arrived in Kathmandu, but "due to the differences between the two sides, especially regarding the conversion of commercial loans to grants or soft loans, the BRI discussion was shelved" (Giri, 2022). This would have left China with the lowest payoff of '1'. However, reflecting its interest in finding alternatives to regain its influence in Nepal, the two states signed a 9-point agreement to continue cooperation on various economic and medical matters ("Press Release on Bilateral…", 2022). Later on, a number of high-level visits were imitated from China, signaling their intention to achieve a maximum payoff, i.e., '4'. One thing to note in these payoffs is the difference between the maximum payoff of the U.S. and China. As already discussed, the former is relatively in-between position because of the successful ratification of the MCC.

It should be noted that this matrix is only one possible representation of the situation. Other factors, such as Nepal's political and economic situation, the resources available to each country, and their diplomatic strategies, could also play a significant role in determining the outcome. Additionally, the payoffs are notional and could be adjusted based on further analysis or new information.

With this, it is necessary to list the preference of these players based on the payoffs they receive.

For the U.S.: Choice C> Choice D> Choice A> Choice B

For China: Choice B> Choice D> Choice A> Choice C

From the preferences and the payoff matrix, it is clear that the dominant strategy for the U.S. is expansion, and the one for China is taking alternatives. Since this is a non-cooperative game, going for the dominant strategy makes the players indifferent or unaffected by what the other player chooses to do. Therefore, both the U.S. and China are highly likely to go for scenario D, which, as discussed, reflects the contemporary scenario. In addition to this, Choice D also represents the Nash equilibrium in this game as they have no incentive to change their strategy, and therefore, it is highly likely that the players will stick to this choice. Unlike the previous games, a fascinating analysis of this sub-game is that the Nash Equilibrium is both the Pareto optimal strategy, where there is no other choice where the payoff could increase without hurting the payoff of the other and also the Hicks optimal, where the total payoff is the largest. In such scenarios, players are highly motivated to choose Choice D.

6.3. The Emergence of a New Game

The maximum payoff associated with Choice D is also why a new game initiates whenever there is competition between the two giants in Nepal. In the above payoff matrix, when both the players decide to compete in the main game and again compete through 'expansion' and 'alternatives' in the sub-game, it elucidates that a new game has already begun, and this pattern has been visible since the U.S.-China competition started in Nepal. The vying between the two countries to create an interest-based friendly space in Nepal loops as long as the two giants opt to compete for maximum payoff. This means, the games are highly likely to have a "domino effect" in the long run, where the output

(as a result of competition), leads to the emergence of another game and the loop continues.

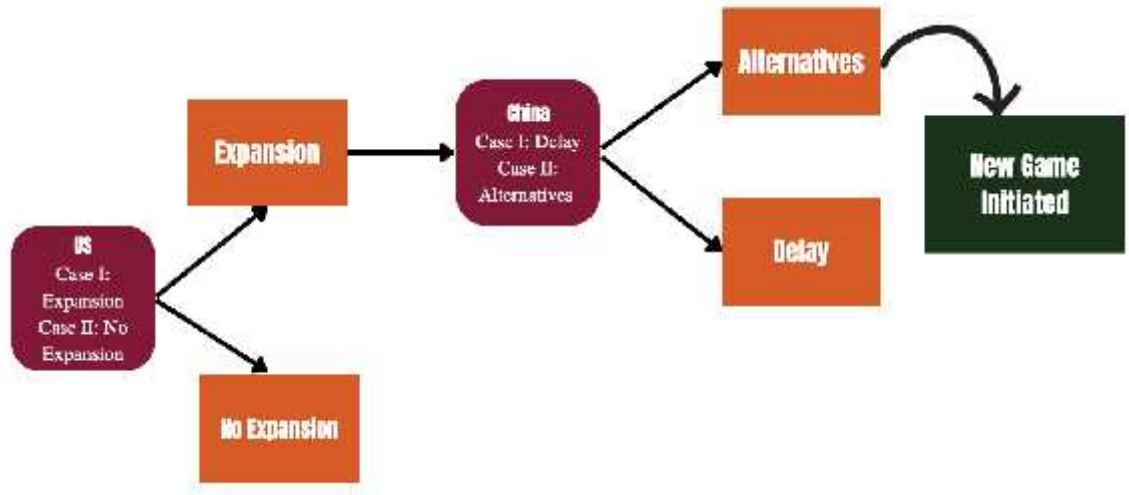This could be further explained through the flowchart below:

Figure 6.1 The emergence of new game in U.S.-China game

Chapter 8

Findings and Conclusion

7.1. Findings

With the notion that countries must act strategically to prosper in the international realm, this research has attempted the simplification and stylization the interaction of the U.S. and China's engagement in Nepal. The game theory, also known as the interactive decision theory, has helped us understand the rationale behind these big players, the payoff they receive on every strategy, and the possible outcomes of the strategy. However, it is to be noted that, unlike N-person games, implementing a single model to understand the interaction between the U.S., China, and Nepal might be wide off the mark: due to the chronological approach that this research attempts to implement and also the varying nature, levels of cooperation, ambition, and intention of the players. As a result, the research has limited every game to a two-person game and has employed models depending on the nature of the gameplay between the players. However, to ensure that the games do not disconnect from one another, there is a link established between every game.

The game between the U.S. and Nepal attempts to answer the cooperative game between the two countries to analyze whether the decision to ratify the MCC without any amendments was in the best interest of both players. The dominant strategy of the U.S. was victorious in this game; however, Nepal's payoff is not to be ignored as well. While not maximum, the payoff received by Nepal was significant for what it expects the agreement to fulfill. In total, the Pareto optimality has been achieved, inferring the impression that both players received the maximum gain, with the U.S. getting a slight advantage.

The China-Nepal game was initiated after the end of the U.S.-Nepal game; however, the components of this game travel back to 2017 when Nepal acquired the membership of BRI. In this game as well,two single Nash equilibria existed, which are also the Pareto optimal. However, the Hick's optimal exists on only one of them i.e., delaying BRI from Nepal's end with an expectation towards Beijing to provide concessions. This exact scenario is currently on the run, and since this is in the best interest of Nepal, i.e., the dominant strategy, the outcome is in Nepal's favor. Furthermore, the availability of the MCC agreement has made China more desperate to put forward a counter-initiative plan, which makes the Beijing-led initiative more critical for China. In simple terms, China had more to lose, and therefore, Nepal, to some extent, had the upper hand in this game.

Both the aforementioned games are strategies based upon a simple game theory payoff matrix. There is always a sense of cooperation when it comes to any game between Nepal's donors and Nepal, as it is rare for a donor and a recipient country to engage in a non-cooperative game. However, there is always a question of who benefits the most. In a way, letting the U.S.'s dominant strategy become victorious in the U.S.-Nepal game provided Nepal with leverage to become more assertive in the Nepal-China game, the consequence of which is visible in the U.S.-China game where China is in search of alternatives to compensate the loss of BRI getting delayed. However, this does not represent the entire scenario, as Nepal's financial vulnerability is the prime reason for Nepal's adamant stance regarding a concessional BRI. Nevertheless, the payoff also considers this factor and concludes that Nepal has more significant ground in the China-Nepal game.

The use of the Prisoner's dilemma model of game theory is depicted by the U.S.-China game due to their non-cooperative nature. Unlike how the game between a recipient and a donor takes a cooperative turn, the game between two strategic competitors is rarely

cooperative in nature. And in the context of the U.S. and China, this competition has been elucidated in a two-level game: with one main game and another sub-game. The main game simply represents the payoff obtained by the players when they compete. Similar to a Prisoner's dilemma, cooperation provides a maximum payoff. However, it is the most unlikely scenario since both players are likely to decide to compete to receive the maximum payoff irrespective of what the other does. Here, the sub-game is the most intriguing part. In the contemporary scenario, it can be interpreted from the sub-game payoff matrix that if they are to compete, then it is in the best interest of both the players if they attempt to expand their influence through new approaches while also receiving the advantage of their previous projects. In the current scenario, while Uncle Sam has been taking the initiative to supply more grant-based projects and high-level visits, the Northern neighbor has also applied a similar strategy through the relatively new 9-point agreement and frequent official visits. Also, these advancements give us an idea that a new game has already begun between the two players, where both prefer competing over any other strategy.

The main deduction drawn concerning the game between the U.S., China, and Nepal is that game theory has a strong appeal to determine the expected outcomes between different players based upon the payoffs they are assigned, which is derived from how they rank their preferences. In this research, the attention is focused primarily on different game theoretical models that could be employed to analyze the interaction between the state players in Nepal. This has been done based on the players' basic preferences and strategic environment to inspect how they rank various strategies. While doing this, the noteworthy point is that every game is different, and it is difficult to model all the players in a single game. However, these games do link to one another and, to some extent, influence the decisions and outcomes of the succeeding game as well. In terms of the U.S.

and China competition in Nepal, we could see the number of games that had to be played between different actors to explain their further initiatives, which concludes the statement that due to the geostrategic situation of Nepal, every initiative from one of these nations is a challenge for the other, giving rise to another game where the players vie to receive a maximum outcome.

Another crucial outcome this research implicitly mentions is the rationale behind small states and their preference for multilateral aids and grants over bilateral ones. Aid recipients prefer multilateral channels to bilateral ones, especially the smaller and less influential states that occupy crucial geostrategic locations. Bilateral donors are generally motivated by the need to control, influence, account for, and be visible in their selected region. The influx of more than one of such donors intertwin these over-arching motivations into a never-ending strategic loop. This research also shows that the decision to ratify the MCC grant transformed Nepal into a new hotspot. A decision from Nepal to receive economic assistance from one of the bilateral donors initiated a game, which seems perennial as the motivation to compete provides the player with the highest payoff every time they have to make a strategic decision. This was particularly visible in the U.S.-China game, where expecting cooperation would be a half-witted presumption. This research does not assert that ratifying the Washington-led grant was an imprudent commitment. However, it does incline to the conclusion that had the grant been received from a multilateral agency; the game might not have even been initiated. Nevertheless, the bright side of this game provides Nepal with a strategic advantage that offers greater possibilities to transform its geopolitical insecurities into its strengths.

All in all, some of the major findings of this research can be briefly summarize below:

⟩ The game theory has helped us understand the rationale behind the U.S.-China game in Nepal, the payoff they receive on every strategy, and the possible outcomes of the strategy.

⟩ In the U.S.-Nepal game, the U.S. obtained a slight advantage compared to Nepal; however, since both Pareto optimal and Hick's optimal has been achieved, the outcome has been in the interest of Nepal.

⟩ In the China-Nepal game, there were two Nash equilibria, which explains the ongoing dilemma on the BRI project. However, Hick's optimal shows that the current scenario also benefits both players.

⟩ The U.S.-China game can be explained using the Prisoner's dilemma model, and the sub-game under this model pointed out that the payoffs the players receive as a result of their strategy to compete are the reason why both countries are always contesting in Nepal. This game also explains the rationale behind the emergence of a new game or domino effect whenever there is significant progress in influence from one of the players.

⟩ On the U.S.-Nepal and China-Nepal games, Nash equilibrium falls under the choices that were actually made, indicating that both the players, in their game with Nepal, have been comparatively satisfied with the outcome, as a result of which, the bilateral relations have strengthened.

7.2. Conclusion

Overall, it is apparent from the studies that employing game theoretic models to analyze the strategic considerations underlying the U.S. and China's influence in Nepal provides many insights regarding the players' behavior and the game's outcomes. However, it is to be noted that it is challenging for a single model of game theory to explain the strategies because depending upon the players and their intentions, the level of cooperation, the type

of game, the payoffs, and the outcomes change. Considering this, the research has used multiple two-level games, starting from a simple payoff matrix, and Prisoner's dilemma, to analyze the interaction between different players. In each of these games, ceteris paribus was specified to simplify the theoretical models and isolate various other variables that would have impacted the outcome of the game, enhancing the complexity. Similarly, applying game theory attributes such as Nash Equilibrium, Pareto Optimality, and Hick's optimality has provided valuable insights into the strategic dynamics of the U.S. and China's influence in Nepal. For the games that have already been completed, the Nash equilibrium pointed towards the outcomes that actually happened in a real-life scenario, indicating that Nepal has received considerable payoffs and has employed tactful diplomacy in the games till now. In such games, even though Nepal has not always achieved its dominant strategy, the fact that Nash equilibrium was achieved shows that the other players had no incentive to change the outcome, resulting in the maintenance of cordiality and goodwill in the bilateral relationship.This explains that as long as the decisions made by Nepal's donors and Nepal, in any projects, fall under Nash equilibrium, it is less likely that any of the two sides would have reservations. This denotes the continuation of cordial relationships, especially with the U.S. and China, which provides Nepal with economic, infrastructural, and technological advantages as long as the game exists. In terms of Puerto Optimal outcome, both the U.S.-Nepal and the China-Nepal game had two Puerto optimal outcomes, meaning that while one of the players would want to change the outcome to the one where it receives the highest payoff, the fact that it hurts the outcome of the other player meant that a dilemma would exist while deciding upon the two outcomes.

In terms of the game between the U.S. and China, the modified version of the Prisoner's dilemma not only elucidated the reason for the two countries always to maintain a sense

of competition in the region but also predicted that because of the higher outcome associated with both sides competing, the loop of both countries attempting to expand its influence is never-ending. This predicts that as long as both the U.S. and China develop a sense of cooperation, which will definitely provide the highest payoff individually, the lack of trust and self-centeredness in the international realm will continue to make Nepal a hotspot in the soft-power competition between these giants.This will result in a "domino effect" where a game between the two countries would result in the emergence of a new game because the payoff received by each of these major powers is highest when they decide to compete, making this event an everlasting process.

Interview with the Experts

In an attempt to measure the validation and add credibility to the research, two experts were approached: Mr. Suvanga Parajuli (currently the Under Secretary at the MoFA) and Mr. Santosh Sharma Poudel (Co-founder of Nepal Institute for Policy Research). While this method may seem like a method of triangulation through interviews to address the research question, this section merely exists to provide an overall understanding of what the experts and practitioners have to say on modeling the game theory in the U.S.-China game and does not fall under the methodology of the research.

Mr. Parajuli, as a diplomat and a practitioner of Nepal's foreign policy, provided his valuable insight on the importance and essence of analyzing Nepal's diplomatic decisions through game theoretic lens. According to him,

> "Before making a foreign policy decision, a country needs to meticulously consider what others are doing, thinking and saying. With accentuating connectedness as well as complexities in world politics, the need for conceptual clarity and nuanced understanding is more pertinent. In such a context, academia can contribute by introducing fresh and diverse insights through sound theoretical modelling. Negotiations and diplomatic choices, in particular, involve bargaining games where one has to grapple with dilemmas, contesting priorities, and divergence of interests. For Nepal's diplomatic practice as well, understanding these ubiquitous dynamics is crucial. Game theoretic modelling of foreign policy decisions involving multiple players has therefore a conceptual significance.
> These models can inform the policymakers, not as prescriptive blueprints, but as imperfect yet useful tools to parse the puzzles for arriving at an optimum outcome that suits national interests."

Similarly, Mr. Poudel answered some key questions related to the research. He entirely agreed with the relevance of game theory to model the U.S. and China interaction in Nepal. Furthermore, he agreed that the U.S. choosing to expand its initiative and China opting for the alternatives to the BRI are the best possible choices for both players, as opting away from these initiatives would be a loss. Furthermore, Mr. Poudel admitted that in the U.S.-Nepal game, though Nepal received a notable payoff, the U.S. went a step ahead in the game, and domestically, Nepal's payoff would have been higher if the U.S.

had agreed to amend the controversial provisions on MCC. However, Mr. Poudel showed his reservation about the China-Nepal game, where the game theory concluded that delaying BRI until Nepal finds concession is the Nash equilibrium. Poudel asserted that Nepal might not have an end game, and infrastructure from BRI is an immediate need for Nepal. However, he was on the same page when discussing China being under more pressure because of the output Nepal received from the U.S.-Nepal game.

Overall, both experts agreed on the fresh insights game theory could provide by modeling the real-life cooperation between different players in Nepal. Though inundated with limitations, they admitted that the conceptual significance of such research could help policymakers, diplomats, and politicians in prudent decision-making.

References

After Mcc, Us to provide $659 million to Nepal under Usaid amid growing rivalry

with China. (2022, April 16). *South Asia Monitor*. Retrieved December 29,

2022, from<u>https://www.southasiamonitor.org/nepal-economy-business/after-mcc-</u>

<u>us-provide-659-</u>million-nepal-under-usaid-amid-growing-rivalry.

Alzawahreh, A. S. (2021). Prisoner's Dilemma Theory in International Relations:

A Theoretical and Practical Study on Saudi-Iranian Relations. *Canadian*

Social Science, *17*(5), 30-34.

Beijing says it commends Nepal's decision not to move ahead with America's Spp.

(2022, June 23). *The Kathmandu Post*. Retrieved July 15, 2022, from

<u>https://kathmandupost.com/national/2022/06/23/beijing-says-it-commends-nepal-</u>

<u>s-</u>decision-not-to-move-ahead-with-america-s-spp.

Brulé, D., & Mintz, A. (2017). Foreign policy decision making: Evolution,

models, and methods. *Oxford Research Encyclopedia of International Studies*.

<u>https://doi.org/10.1093/acrefore/9780190846626.013.185</u>

Budihal, R. M. (2015). GAME THEORY – NASH EQUILIBRIUM AND ITS

APPLICATIONS. *Journal of Emerging Technologies and Innovative*

Research, 2(5). Retrieved December 20, 2022, from

<u>https://www.jetir.org/papers/JETIR1701220.pdf</u>.

Bueno de Mesquita, B., & Lalman, D. (1986). Reason and War. *In American Political*

Science Review (Vol. 80, Issue 4, pp. 1113–1129). Cambridge University Press

(CUP). https://doi.org/10.2307/1960859

Cho, H. S. (2018). *Understanding Institutional Power Politics: Theory, Method*

and a case of US-China Competition(Doctoral dissertation, Columbia

University).

Choi, T.-M., Taleizadeh, A. A., & Yue, X. (2019). Game theory applications in

productionresearch in the sharing and Circular Economy Era. *International Journal of Production Research*, *58*(1), 118–127. https://doi.org/10.1080/00207543.2019.1681137

China says it has noted aid passage and 'interpretive declaration'. (2022, March 1). *The Kathmandu Post*. Retrieved December 18, 2022, from https://kathmandupost.com/national/2022/03/01/china-says-it-has-noted-aid-passage-and-interpretive-declaration.

China's Bri will lead Nepal to debt trap besides undermining sovereignty, experts warn. (2022, July 29). *KhabarHub*. Retrieved December 21, 2022, from https://english.khabarhub.com/2022/29/265280/.

Correa, H. (2001). Game theory as an instrument for the analysis of international relations. *Ritsumeikan Annual Review of International Studies*, *14*(2), 187 208.

Dahal, S. (2023, February 16). Belt and road to nowhere. *The Kathmandu Post*.

de Vries, M. S. (1990). Interdependence, Cooperation and Conflict: An Empirical Analysis. *Journal of Peace Research*, *27*(4), 429–444. http://www.jstor.org/stable/424266

Donnelly, J. (2000). Realism and international relations. https://doi.org/10.1017/cbo9780511612510

Gambhir, M. (2022, March 17). American Mcc in Nepal: Setback for China and Implications for India. *CLAWS*. Retrieved January 12, 2023, from https://www.claws.in/american-mcc-in-nepal-setback-for-china-and-implications-for-india/.

Gaviotis, I. (2015). Prisoner's Dilemma: A Case Study. Unpublished. https://doi.org/10.13140/RG.2.1.2406.8007

Giri, A. (2022, March 27). Wang visit: Nepal, China sign nine agreements, none

on Bri. *The Kathmandu Post*. Retrieved December 28, 2022, from

https://kathmandupost.com/national/2022/03/27/wang-visit-nepal-chinasign-nine-

agreements-none-on-bri.

Goldstein, A. (2020). US–China rivalry in the twenty-first century: Déjà Vu and

Cold War II. *China International Strategy Review*, *2*(1), 48–62.

https://doi.org/10.1007/s42533-020-00036-w

Gupta, R. (2022, July 27). The Us-China contest in Nepal. *ThinkChina*. Retrieved

December 26, 2022, from https://www.thinkchina.sg/us-china-contest-nepal.

Heuer, L., & Orland, A. (2019). Cooperation in the prisoner's dilemma: An

experimental comparison between pure and mixed strategies. *Royal Society*

Open Science, *6*(7), 182142. https://doi.org/10.1098/rsos.182142

Hurley, J., Morris, S., & Portelance, G. (2019). Examining the debt implications

of the Belt and Road Initiative from a policy perspective. *Journal of*

Infrastructure, Policy and Development, 3(1), 139-175.

Jervis, R. (1988). Realism, game theory, and cooperation. *World politics*, *40*(3),

317-349.

Jha, H. B. (2021, October 14). Nepal in Turmoil over Ratifying the American

Mcc. *Observer Research Foundation*. Retrieved December 12, 2022, from

https://www.orfonline.org/expert-speak/nepal-in-turmoil-over-ratifying-the-

american-mcc/.

Jha, H. B. (2022, March 23). Nepal's response to the Ukrainian Crisis. *Observer*

Research Foundation. Retrieved December 25, 2022, from

https://www.orfonline.org/expert-speak/nepals-response-to-the-ukrainian-crisis/.

Jiang, Z., Gong, X., & Cheng, H. (2020). Research on trading friction between

China and the US from game theory perspective. *American Journal of*

Industrial and Business Management, *10*(01), 19–29. https://doi.org/10.4236/ajibm.2020.101002

Karim, M. A. (2012). Strategic Visions of China and the United States in South Asia and Beyond. *Korean Journal of Defense Analysis*, *24*, 175-191.

Lamichhane, D. (2022, April 11). Bri and Mcc: Implications for Nepal. *My Republica*. Retrieved December 16, 2022, from https://myrepublica.nagariknetwork.com/news/bri-and-mcc-implications-for-nepal/.

Liao, J. C. (2021, October 27). How Bri Debt Puts China at Risk. *The Diplomat*. Retrieved December 15, 2022, from https://thediplomat.com/2021/10/how-bri-debt-puts-china-at-risk/.

Mcc ratified by House of Representatives, at last. (2022, February 27). *The Himalayan Times*. Retrieved December 17, 2022, from https://thehimalayantimes.com/nepal/mcc-ratified-by-house-of-representatives-at-last.

Moorthy, K. S. (1985). Using game theory to model competition. *Journal of Marketing Research*, *22*(3), 262-282.

Morris, S., Parks, B., Gardner, A., & Parks, B. (2020). Chinese and World Bank lending terms: A systematic comparison across 157 countries and 15 years. *Washington, DC: Center for Global Development.*

N. R. Bank (2023). Current macroeconomic and financial situation of Nepal (Based on Six Months‟ Data of 2022/23). Kathmandu: Research Department.

Nash, J. (1951). Non-cooperative Games. *The Annals of Mathematics*, *54*(2), 286.

https://doi.org/10.2307/1969529

Nash, J. F. (2002). Non-cooperative Games. *The Essential John Nash*, 51–84.

https://doi.org/10.1515/9781400884087-008

Neumann, J. von, & Morgenstern, O. (2007). *Theory of games and Economic*

Behavior. Princeton University Press.

Poudel, S. S. (2023, February 13). Us Steps Up Its Courting of Nepal. *The*

Diplomat. Retrieved February 18, 2023, from https://thediplomat.com/2023/02/us-

steps-up-its-courting-of-nepal/.

Poudyal, B. (2019). Economic Prospect of Belt and Road Initiatives in

Nepal. *KMC Research Journal*, *3*(3), 35-44.

Poudyal, B. (2022). Why nepal matters in the geopolitical chessboard. *Unity*

Journal, *3*(01), 13–26. https://doi.org/10.3126/unityj.v3i01.43310

Pradhan, S. B. (2022, February 11). Us says will review ties with Nepal if it failed

to ratify Mcc pact by Feb 28 deadline. *The Print*. Retrieved December 16,

2022, from https://theprint.in/world/us-says-will-review-ties-with-nepal-if-it-

failed-to-ratify-mcc-

pact-by-feb-28-deadline/828391/.

Press Release on Bilateral Talks between the Foreign Ministers of Nepal and

China. (2022, March 26). *Ministry of Foreign Affairs*. Retrieved December

29, 2022, from https://mofa.gov.np/press-release-on-bilateral-talks-between-the-

foreign-ministers-of-nepal-and-china/.

Ranjan, A. (2022). Wang Yi's Visit to Nepal: A Boost to Bilateral Ties. *Institute*

of South Asian Studies. https://doi.org/10.48561/V7F0-8SSY

Ross, R. S. (2020). It's not a Cold War: Competition and Cooperation in US–

China relations. *China International Strategy Review*, *2*(1), 63–72.

https://doi.org/10.1007/s42533-020-00038-8

Roungas, B., Bekius, F., & Meijer, S. (2019). The game between game theory and gaming simulations: Design choices. *Simulation & Gaming*, *50*(2), 180–201. https://doi.org/10.1177/1046878119827625

Saloner, G. (1991). Modeling, game theory, and strategic management. *Strategic management journal,* 12(S2), 119-136.

Shinder, R. J. (2022, February 1). China and the 'prisoner's dilemma'. *The Hill*. Retrieved February 2, 2023, from https://thehill.com/opinion/international/587797-china-and-the-prisoners-dilemma/.

Shrestha, H. (2021, December 2). Bri: A Momentum Towards Development or A Debt Trap for Nepal? *AIDASIA*. Retrieved December 20, 2022, from https://www.aidiaasia.org/research-article/bri-a-momentum-towards-development-or-a-debt-trap-for-nepal.

Simpson, E. (2016). The Contributions of Anatol Rapoport to Game Theory. *Political Science Publications*. Retrieved January 2, 2023, from https://ir.lib.uwo.ca/politicalsciencepub/135.

Snidal, D. (1985). The game theory of international politics. *World Politics*, *38*(1), 25–57. https://doi.org/10.2307/2010350

Thapa, S. B. (n.d.). Politics on Millennium Challenge Corporation in Nepal: An Analytical Study. *Journal of Political Sciences & Public Affairs*, *10*(3). https://doi.org/10.35248/2332-0761.22.10.004.

Vater, J. J. (2020). The Great Game in Nepal: A Himalayan State's Search for Higher Ground. *ISAS*. https://doi.org/10.48561/dq08-2egj

Wooley, A. (2021, September 29). AidData's new dataset of 13,427 Chinese development projects worth $843 billion reveals major increase in 'hidden

debt' and Belt and Road Initiative implementation problems. *AIDDATA*.

Retrieved December 20, 2022, from https://www.aiddata.org/blog/aiddatas-new-

dataset-of-13-427-chinese-development-projects-worth-843-billion-revealsmajor-

increase-in-hidden-debt-and-belt-and-road-

initiative-implementation-problems.