44th EBES CONFERENCE - ISTANBUL

PROCEEDINGS - VOLUME I

ISTANBUL, TÜRKİYE

JULY 6-8, 2023

(HYBRID with both in-person and online paper presentation)

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EBES aims to bring worldwide researchers and professionals together through organizing conferences and publishing academic journals and increase economics, finance, and business knowledge through academic discussions. Any scholar or professional interested in economics, finance, and business is welcome to attend EBES conferences. Since our first conference in 2009, around *16,999* colleagues from *102* countries have joined our conferences and *9,231* academic papers have been presented. *EBES has reached 2,971 members from 87 countries.*

Since 2011, EBES has been publishing two journals. One of those journals, ***Eurasian Business Review*** - *EABR*, is in the fields of industrial organization, innovation and management science, and the other one, ***Eurasian Economic Review*** - *EAER*, is in the fields of applied macroeconomics and finance. Both journals are published quarterly by ***Springer*** and indexed in ***Scopus***. In addition, EAER is indexed in the ***Emerging Sources Citation Index*** (*Clarivate Analytics*) and EABR is indexed in the ***Social Science Citation Index (SSCI)***. EABR's 2022 CiteScore is 5.8 (Q1) & 2022 JCR IF 2022 is 3.5. It is ranked #104/380 & Q2 in the Economics category. EAER's 2022 CiteScore is 5.5 (Q1) & 2022 JCR IF 2022 is 3.4. It is ranked #105/581 & Q1 in the Economics category.

Furthermore, since 2014 Springer has started to publish a new conference proceedings series (***Eurasian Studies in Business and Economics***) which includes selected papers from the EBES conferences. The series has been recently indexed by **SCOPUS**. In addition, the 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th (Vol. 1) and 30th EBES Conference Proceedings have already been accepted for inclusion in the ***Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH).*** Other conference proceedings are in progress.

On behalf of all EBES officers, I sincerely thank you for all your support in the past. We look forward to seeing you at our forthcoming conferences. We very much welcome your comments and suggestions in order to improve our future events. Our success is only possible with your valuable feedback and support!

I hope you enjoy the conference!

With my very best wishes,

Klaus F. ZIMMERMANN
President

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Welcome to the 44th EBES Conference

We are excited to organize our *44th EBES conference which will take place on July 6th, 7th, and 8th, 2023 in Istanbul, Turkey. The conference will be hosted by Istanbul Bilgi University with the support of the Istanbul Economic Research Association. The conference will be hybrid which will give participants the opportunity to join the conference either in person or virtually.*

We are honored to have received top-tier papers from distinguished scholars from all over the world. We regret that we were unable to accept more papers. In the conference, *133* papers will be presented and *311* colleagues from 50 countries will attend the conference. We are pleased to announce that distinguished colleagues **Klaus F. Zimmermann** from *GLO* (Germany), **Dorothea Schäfer** from *DIW Berlin* (Germany), **Keun Lee** from *Seul National University* (South Korea), and **Marco Vivarelli** from *Università Cattolica del Sacro Cuore* (Italy) will join the conference as invited keynote speakers.

Throughout the years, EBES conferences have been an intellectual hub for academic discussion. Participants have found an excellent opportunity for presenting new research, exchanging information and discussing current issues. We believe that our future conferences will improve further the development of knowledge in our fields. In addition, based on the contribution of the paper to the field, the *EBES Award Committee* has selected one of the papers for the *Best Paper Award*. The *Best Paper Award* winner will be announced during the conference.

On behalf of EBES, I would like to thank to all presenters, participants, board members, and keynote speakers. I am looking forward to meeting you in the conference and seeing you all again at the upcoming EBES conferences. *We appreciate your patience, partnership, support and understanding during these extraordinary times.*

Stay safe and healthy!

Best regards,

Ender Demir, PhD
Conference Coordinator

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VOLUME I - CONTENTS

Improving Public Investment in Kazakh PPPs from a Portfolio Perspective: A System Dynamics Approach

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ABSTRACT

Governments worldwide have implemented Public-Private Partnership (PPP) programs for developing public infrastructure easing fiscal pressure in the short term through leveraging capital investments from the private sector. Nevertheless, the length and complexity of these megaprojects jeopardize the long-term sustainability of this program due to economic and social challenges. In this study, we analyze the long-term social and financial implications of the Kazakh PPP program through a portfolio lens and using a System Dynamics modeling. To offer valuable insights for PPP decision-makers, the proposed model exposes the relationships between financial constraints, societal concerns, and PPP development. A causal-loop diagram unravels the underlying feedback relationships for proposing suitable policies to enhance the outcomes of the PPP programs. The model simulation identified two major drawbacks: the lack of accountability and transparency and the increasing long-term public subsidies required due to the profitability of special-purpose vehicles. Conducted policy analysis evaluates potential short- and long-term government strategies and provides the stakeholders with strategies for improving PPP program outcomes and addressing weaknesses.

KEYWORDS

Public-Private Partnership; System Dynamics; Kazakhstan; PPP Program, Stakeholders, Influencing Factors.

Introduction

The use of Public-Private Partnerships (PPPs) has been on the rise in Kazakhstan since the procurement of the first project in 1998. This PPP program also spread due to the delivery method's benefits to the public sector such as reducing the financial burden and using the private sector's expertise and financing. However, PPPs do not come without their difficulties due to the multitude of stakeholders and their differing interests (Biziorek, De Marco, et al., 2023; Marcellino et al., 2023) and the recurrent underperformance in megaprojects (Castelblanco, Demagistris, et al., 2023; De Marco & Narbaev, 2021). For example, the public sector focuses on factors such as value-for-money, retained risks, and future revenue streams (Biziorek, Castelblanco, et al., 2023; Castelblanco, Fenoaltea, et al., 2023; Rojas et al., 2023). On the other hand, the private sector mainly focuses on the risks they are responsible for and the revenue generated to recoup their investment (Osei-Kyei et al., 2022; Salazar et al., 2024). These dynamics also manifest at a national scale since many stakeholders are involved and are exacerbated during global crisis periods

(Castelblanco, Guevara, et al., 2023; Castelblanco & Guevara, 2022). Hence, understanding the performance of a national system of PPPs in developing countries with likely budgetary constraints and ineffective public procurement is an important task (Narbaev, 2022; Pagoni & Patroklos, 2019). This paper proposes a system dynamics (SD) model for a national PPP portfolio with a focus on Kazakhstan. It aims to provide a tool for practitioners and policymakers to study the entire national PPP portfolio as a system and the factors affecting it.

System Dynamics in PPP Research

SD is a popular modeling and simulation technique for complex problems. It considers the dynamics relationship between complex and continuously changing systems and enables an understanding of their performance over a period of time (Castelblanco, Ottaviani, et al., 2023). It is driven by circular causality, which shows up in the form of stocks, flows, and feedback loops. Previous literature has utilized SD in studying PPPs either for qualitative or quantitative measures. According to Pagoni and Georgiadis (2019), research on SD for PPPs can be classified into several topics, which are demand forecast (Alasad & Motawa, 2016); construction risks (De Marco et al., 2016) concession period (Khanzadi et al., 2012); allocation of construction risks (Nasirzadeh et al., 2013); concession price (Xu et al., 2012); infrastructure performance (Páez-Pérez & Sánchez-Silva, 2016); financial assessment (Castelblanco et al., 2022); and construction price (Leon et al., 2018).

Pagoni and Georgiadis (2019) proposed a SD model to assess national PPP projects in terms of social and financial sustainability. Xu et al. (2012) developed a SD model to determine the concession price for highway projects. Khanzadi et al. (2012) and Kamel et al. (2017) used SD to determine the concession period for BOT projects. Alasad & Motawa (2016) created an SD model for demand forecasting in toll road projects. Li (2007) proposed a SD model to assess the applicability of financing schemes while considering the benefits for the public, private, and society. It can be observed that the majority of the literature has focused on the concession duration, risks, or financing aspects of a specific PPP project or PPP type. Therefore, this paper provides a unique viewpoint on PPPs at a national level to observe the underlying dynamics between the factors involved. The following section describes the methodology followed in this paper.

Methodology

This paper proposes a SD model for understanding the behavior of complex relationships within the national PPP program portfolio in Kazakhstan. It includes the entire framework of endogenous and exogenous variables in the system in order to depict its behavior. Several factors were obtained from the literature that affects PPP at the national level. Based on this, the feedback loops were identified and subsequent quantitative simulations were performed to explain the complex behavior of the PPP program.

The development of the Causal Loop Diagram (CLD) for the Kazakhstan PPP program began with a review of the literature on PPPs and infrastructure development. Based on the literature review, the initial version of the CLD was developed. This version was then refined through real data collected from the PPP program. To understand the behavior of the PPP program, quantitative simulations were conducted using Vensim software. The simulations focused on four key variables: the number of PPP projects developed, the capital value invested by the private sector, the revenues paid by the public sector and users, and the cumulative public budget required

for paying the revenues to the PPPs in the long term. The simulations were conducted separately for each infrastructure sector to identify their individual contributions to the whole program.

Findings and Discussion

To enhance the PPP policymakers' understanding of the intricate dynamics of Kazakhstan's PPP program, a CLD was constructed. This diagram aimed to shed light on the relationships between PPP procurement, their social acceptability, economic growth, and the infrastructure gap. Figure 1 shows four causal loops within the system. The B1 (B standing for balancing) and R1 (R standing for reinforcing) loops demonstrate the efficient closure of infrastructure gaps through PPPs, resulting in a reinforcing cycle of increased GDP and heightened PPP procurement. On the other hand, the R2 and B2 loops showcase the influence of the number of PPP projects and their financial burden on social acceptability. Gaining a comprehensive understanding of these loops is crucial for policymakers and investors as they navigate the design and implementation of effective strategies for infrastructure development that strike a balance between social acceptability and economic growth.

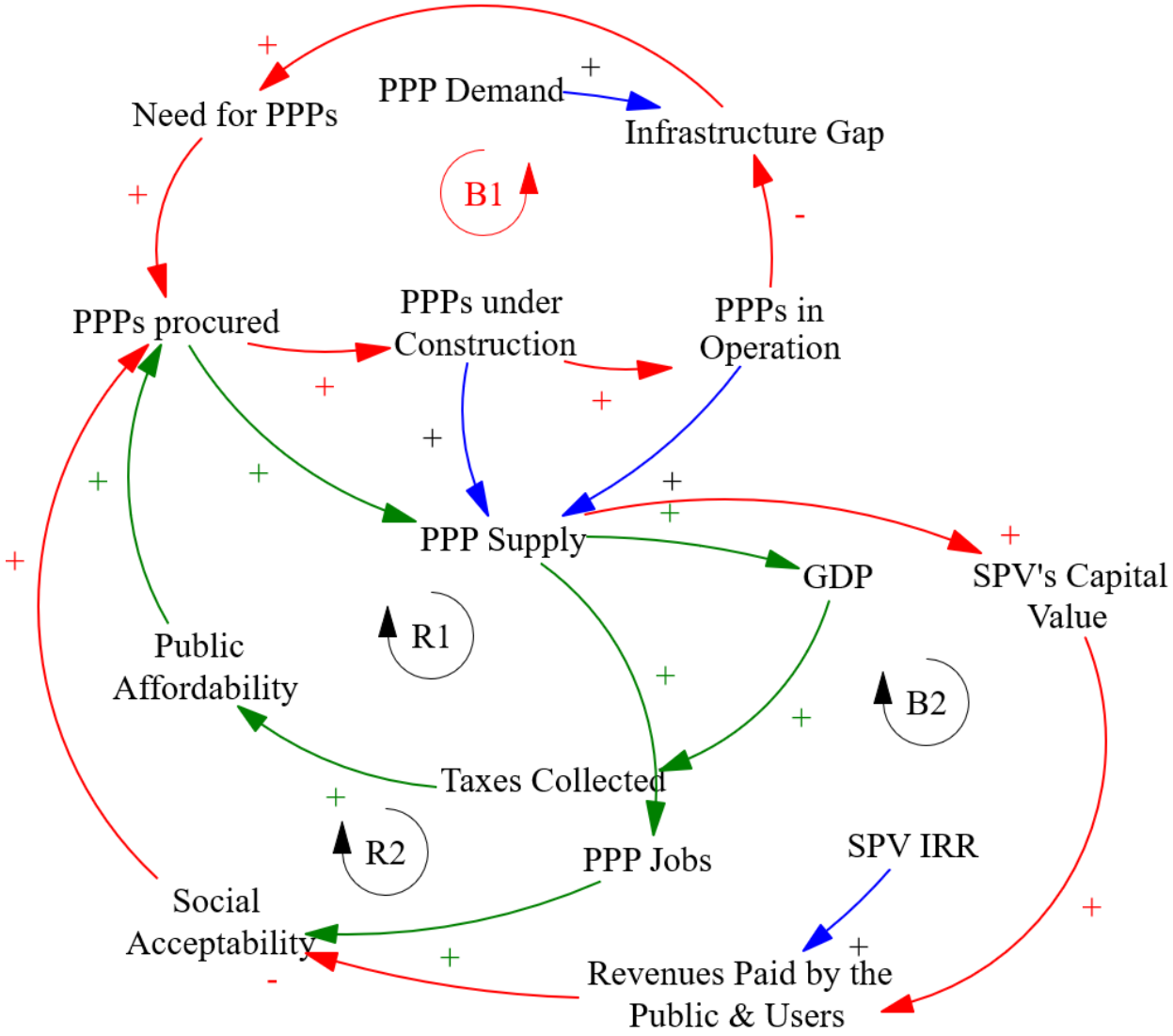

Figure 1. Causal Loop Diagram

The first reinforcing loop (R1) represents a virtuous cycle where increasing the PPPs' procurement leads to greater Gross Domestic Product (GDP) and more tax collections, which then enables more PPP procurement. The more PPPs that are procured, the greater the multiplier effect of infrastructure investment, which leads to higher GDP per capita. This, in turn, results in higher tax collections, which increases the public sector's ability to procure more PPPs thus closing the infrastructure gap. The first balancing loop (B1) creates a stable equilibrium where PPPs are procured to close the infrastructure gap. The greater the infrastructure gap, the greater the need for PPPs to close it. However, as more PPP projects are procured to address the gap, the gap shrinks, leading to reduced demand for PPPs.

The remaining two loops (B2 and R2) relate to the coexistence of opposite behaviors in the social acceptability of PPPs. B2 creates a stable equilibrium where the social acceptability of PPPs is balanced against the financial burden on users and the public sector. As the social acceptability of PPPs increases, more projects are developed. However, as more PPPs are developed, the financial burden increases on users and the public sector, eroding social acceptability. This, in turn, leads to a decrease in the development of new PPP projects. Simultaneously, in R2, the more PPPs that are supplied, the more jobs are created, leading to increased social acceptability. This, in turn, incentivizes the development of more PPPs and the greater capital value invested by the private sector, leading to higher revenues in the long term that must be paid by the public sector and users. This erosion of social acceptability creates a disincentive for the procurement of new PPPs.

Table 1 provides an overview of the PPP infrastructure projects developed in Kazakhstan, along with various key metrics and implications. The table categorizes the projects into different infrastructure types, including airports, energy, roads, railways, and waste & water treatment. This indicates the diverse sectors in which PPP projects have been implemented in Kazakhstan, highlighting the government's focus on improving various aspects of infrastructure. However, there is heterogenous representativeness across those infrastructure sectors, which highlights that there is significant room for improvement within the Kazakh PPP Program. Notably, the capital values differ significantly among infrastructure types. For instance, roads have the highest average capital value at 585 million USD, while waste & water treatment has the lowest (only 14 million USD). Simultaneously, the average concession period ranges from 16 to 25 years across different infrastructure types. This indicates the varying scales and complexities of the different types of infrastructure projects.

Overall, the Kazakhstan PPP program has gathered a total capital value of 2.4 billion USD, which is comparatively low compared to other developing countries in Asia, with even lower populations that have implemented proportionally larger size PPP programs. For example, Jordan's and Lao's PPP programs reached total capital values of 10.6 and 23.4 billion USD, respectively, while their population is only 10.2 and 7.3 million people (World Bank, 2023). This investment gap reflects the potential for growth of the PPP programs according to the public needs in the following years.

Interestingly, Table 1 also shows that the Kazakhstan PPP program extensively relies on Unsolicited Proposals (USPs) for all the infrastructure types. USPs involve private companies submitting project proposals to the government without a prior request, typically aiming to address the lack of innovation and institutional capacity within the public sector. While USPs have the potential to bring innovation, they also present significant drawbacks, such as less competition in the tendering process. Less competitive tendering processes in USP PPPs lead to a lack of benchmarks for quality and price, which can result in suboptimal accountability, transparency, and value for money. Moreover, conflicts of interest may arise due to pre-existing relationships

between government officials responsible for evaluating the proposals and the private companies submitting them. This can compromise fairness and transparency, as officials may be inclined to approve proposals based on personal connections rather than their merits.

Furthermore, unsolicited proposals may not align with the government's priorities, as they primarily focus on maximizing returns for the private sector. In fact, the World Bank has pointed out that there are no legal provisions in place in Kazakhstan that guarantee the alignment of USPs with government priorities (PPIAF, 2017). This misalignment can lead to a misallocation of resources and suboptimal outcomes for the public sector, which ultimately funds the PPP projects. Evaluating and processing unsolicited proposals also requires significant time and resources from the public sector, potentially diverting attention and resources from other crucial areas and causing delays in implementing essential infrastructure projects.

Table 1. Kazakhstan PPP Program - General Information

Infrastructure Type	Average Concession Period (Years)	Average Capital Value (million USD)	Percentage of USPs	Total Capital Value (million USD)
Airports	20	166	100%	331
Energy	16	92	72%	1,199
Roads	20	585	100%	585
Railways	23	231	100%	231
Waste & Water Treatment	25	14.18	50%	14
TOTAL	**18**	**128.15**	**76%**	**2,360**

Figure 2 shows the simulation results from the SD simulation of the Kazakhstan PPP program in terms of projects. The program experienced two significant peaks of development of PPP projects since its beginning in 1998 (year 1 in the model). The first (and the most significant) peak was during the first two years of the program, with the procurement of more than 20 projects. The second one was in the pre-and early COVID-19 period (2019 and 2020), in which more than 10 projects were procured. Both peaks were largely driven by energy PPPs, which constitute the most representative infrastructure type in terms of the number of projects. This trend highlights the private sector's potential for investment in Kazakhstan's energy sector and underscores the significance of energy infrastructure in the country's overall development.

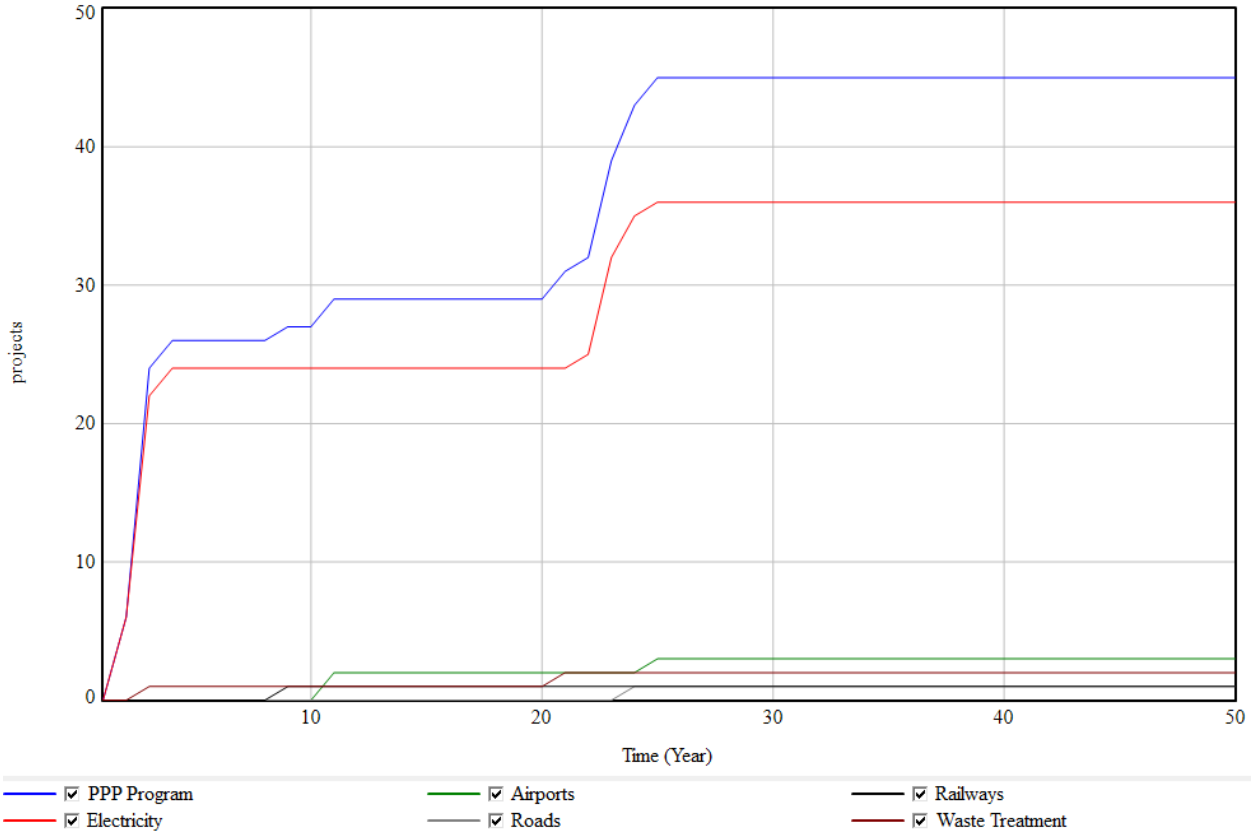

Figure 2. PPPs procured

The analysis of the private sector's capital value invested for PPP development shows noteworthy trends. The peaks previously noticed in the analysis of the number of projects are also reflected in the investment. However, Figure 3 shows that roads emerged as a second meaningful infrastructure sector, almost surpassing even electricity projects when attracting capital investment from the private sector during the second peak (refer to Figure 3). This trend contrasts with the number of projects, as roads have the least representation in terms of participation. Complementary, airport PPPs ranked as the third most significant infrastructure sector in terms of the private sector's capital value, showcasing significant development in the mid-2000s and (interestingly) during the COVID-19 pandemic, which stands in contrast to many other infrastructure sectors. Overall, the 2020's decade is showing an increasing interest in the Kazakhstan government in transportation PPPs.

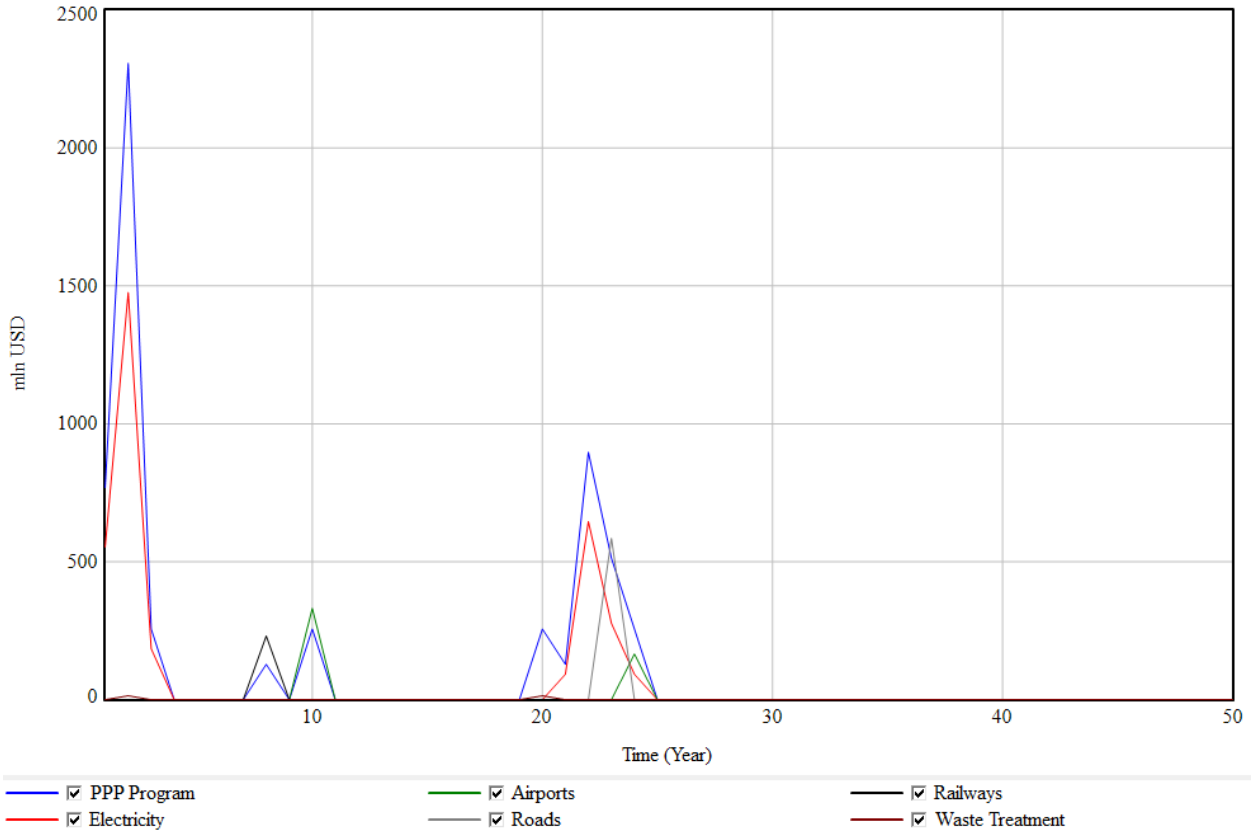

Figure 3. PPPs Capital Value

The simulation results shown in Figure 4, illustrates the long-term revenues paid by the public sector for each infrastructure type in the PPP program based on the projects procured until 2022. Notably, due to the significance of energy projects procured in the late 1990s and early-2020s, there is a sharp increase in PPP program revenues between years 5 and 15, so as between years 25 and 35, coinciding with the operational phase initiation of these projects. Subsequently, the revenues gradually decline over time. This particular pattern poses a challenge for the public sector as it creates fiscal pressure within a condensed timeframe, contrasting with the revenue distribution behavior observed in other infrastructure types, such as airports and railways, that effectively spread out the revenues over the long term.

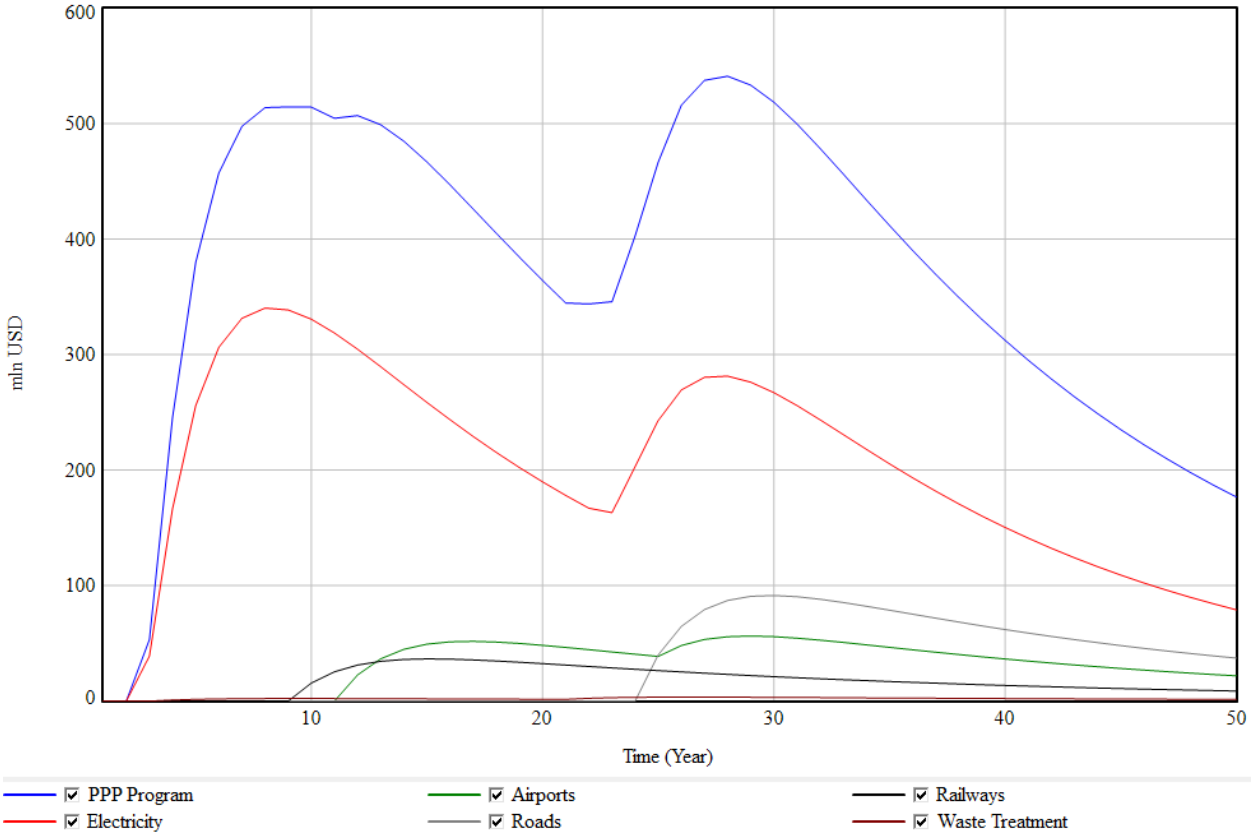

Figure 4. PPP Program Revenues

Based on the simulation results shown in Figure 5, the net PPP payments for compensating the special purpose vehicle show an increasing trend. This indicator estimates the cumulated monetary value resulting from subtracting the private sector's capital value invested at the early stages of the PPP projects for the CAPEX and adding the long-term revenues paid as compensation to the special purpose vehicle. This increasing trend is largely driven by energy projects, which shows the long-term effects of the private sector's returns.

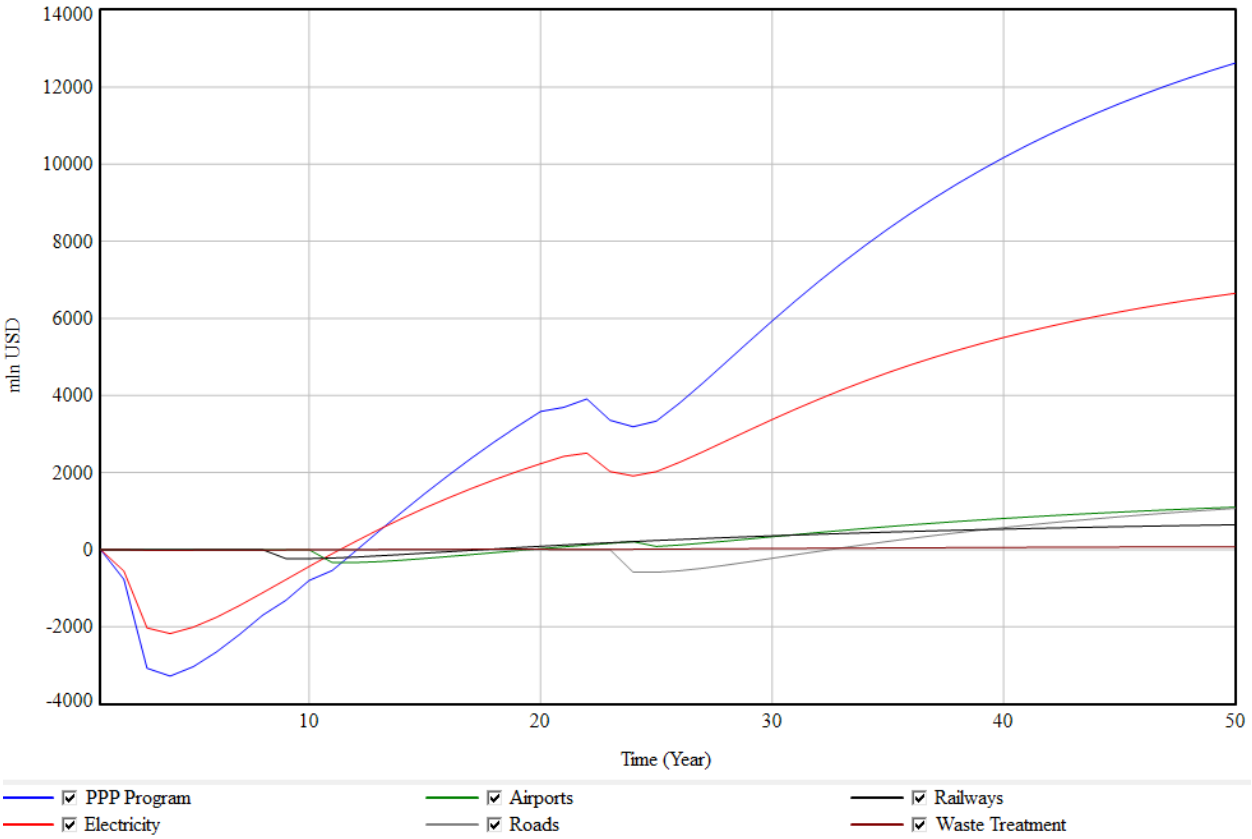

Figure 5. Net PPP Payments

Conclusions and Policy Recommendations

This study proposed a SD model to understand the interplay between PPPs, infrastructure gaps, economic growth, and social acceptability of PPPs from a national program perspective. Four causal loops were identified, representing a virtuous cycle and a stable equilibrium for PPPs to close the infrastructure gap efficiently while increasing GDP and tax collection. Two balancing loops showed how the social acceptability of PPPs is affected by the number of PPP projects developed and their financial burden.

Overall, the study showcases Kazakhstan's efforts in leveraging PPPs to address infrastructure needs across multiple sectors. The data suggests a robust infrastructure development landscape with considerable investment and long-term commitments, paving the way for sustainable economic growth and enhanced public services in the country.

Based on the findings presented in the paper, some policy recommendations are presented. Considering that the electricity sector is the most active infrastructure type in the Kazakhstan PPP program, policymakers need to increase the focus on sustainable energy in PPP projects. Policymakers should prioritize sustainable energy solutions to maximize the social benefits of these projects. This includes promoting renewable energy sources such as wind and solar power, which can provide long-term economic and environmental benefits. Moreover, future research should focus on analyzing this infrastructure sector in this PPP program.

Policymakers and investors should carefully consider the social acceptability of PPP projects, as it can significantly impact their success in balancing infrastructure development with

social acceptability. Understanding the causal loops identified in the model proposed can assist in designing and implementing effective infrastructure development strategies that balance economic growth with social acceptability.

The involved parties should also encourage competition in the tendering process to ensure that the best value for money is achieved and to increase transparency and accountability in PPP projects by critically assessing the convenience of such excessive reliance on unsolicited proposals. Policies focused on reducing the reliance on unsolicited proposals and promoting solicited proposals are highly recommended. Moreover, the public sector must enhance clear evaluation criteria and benchmarks for the price and quality of proposed projects. Policymakers could also prioritize investment in critical infrastructure projects, particularly in sectors that have been historically underfunded in the PPP program, such as ICT. This infrastructure type is critical for fostering the benefits of Industry 4.0. By implementing these policy recommendations, policymakers and investors can promote sustainable infrastructure development that balances economic growth with social acceptability, promote competition and transparency in the tendering process, and prioritize investment in critical infrastructure projects that can have a significant impact on the country's development.

Acknowledgments

This research was funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP14870295).

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