Politecnico di Torino

MSCs in Engineering and Management

MSCs Thesis

"Private Public Partnership Programs in Eastern Europe and Central Asia"

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Abstract

Public-Private Partnership (PPP) infrastructure initiatives have been hailed as a formula for driving the socio-economic progress of developing nations. These national PPP programs prioritize efficiency by capitalizing on the private sector's abilities to plan, fund, construct, and oversee the ongoing operation of public facilities from a long-term perspective. However, despite the comprehensive trend of bolstering PPP programs in developing countries, there exists substantial heterogeneity in the development of these programs, even among neighboring nations. Furthermore, PPP programs are enveloped with complexities at various levels, making them increasingly challenging. To elucidate the diverse performance of national PPP programs, the thesis is aimed to examine the PPP programs of Eastern European and Central Asian countries, drawing from the projects that have been procured thus far. To accomplish this, the thesis will commence by gathering raw data sets from authoritative sources to facilitate comparative analysis across key parameters. The result is to drive a conclusion of the said regions and their respective countries for a better understanding of the adverse effects of the analyzed parameters.

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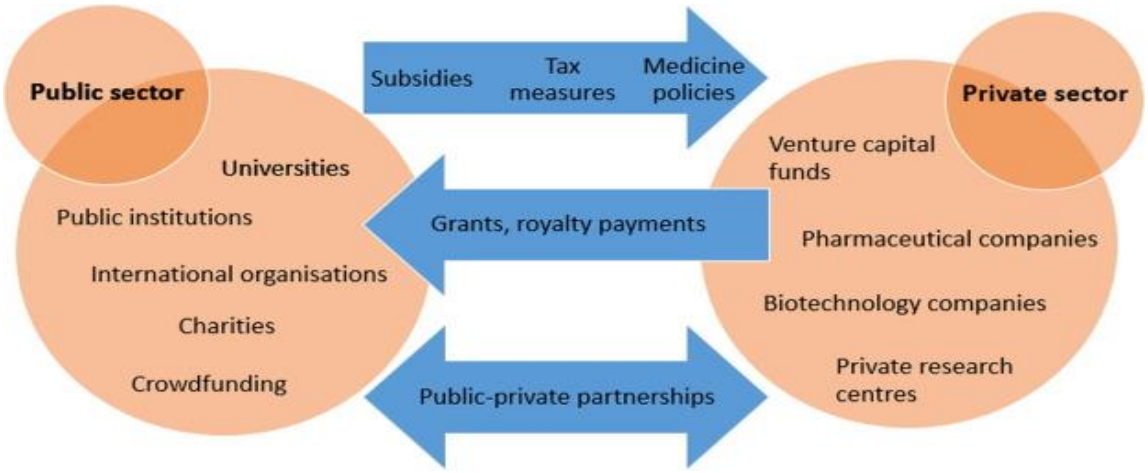
1. Introduction

Public-Private Partnerships (PPPs) execute projects as a collaborative arrangement between the public and private sectors (Hodge & Greve ,2007). The partnerships' surge in popularity in recent times is due to their potential to address diverse economic and social challenges (Popa ,2018). Consequently, PPPs have gained increasing prominence as a means of tackling the intricate issues associated with the development, funding, and provision of public infrastructure and services.

PPPs have achieved global recognition thanks to their ability to enhance efficiency, innovation, and elevate service quality within the public sector (Hodge & Greve ,2007). These cooperations have been applied across various sectors, including but not limited to infrastructure development, healthcare, education, and public service delivery (Hodge & Greve, 2007; Popa, 2018).

One of the primary advantages of PPPs is the equitable distribution of responsibilities and risks between the public and private stakeholders involved (Popa , 2018). This arrangement enables the harnessing of private sector expertise, resources, and innovation while simultaneously ensuring public oversight and accountability. Moreover, PPPs offer a solution to the constraints often faced by governments, such as financial limitations, lack of specialized knowledge, and operational inefficiencies. They do so by permitting the private sector to assume a more substantial role in project development, financing, and operation, thus leveraging their expertise and resources to yield superior outcomes.

Furthermore, PPPs have demonstrated their capacity to attract private investments and generate additional financial resources for public infrastructure initiatives. Involving private investors not only injects capital but also introduces a risk-sharing mechanism, which alleviates the financial burden on public budgets. This is particularly significant in developing nations where governments frequently grapple with resource constraints and limited access to financing.



Source 1. How much do the public sector and the private sector contribute to biopharmaceutical R&D? by Steven Simoens, Isabelle Huys

In addition to their financial advantages, Public-Private Partnerships (PPPs) possess the capacity to foster innovation and enhance service quality. The profit-driven nature of the private sector serves as a strong incentive for the introduction of novel technologies, efficient management practices, and operational improvements. This, in turn, has the potential to result in superior service delivery, cost reduction, and heightened user satisfaction.

Nevertheless, PPPs are not devoid of challenges. Their success hinges on a multitude of factors, including the parties involved, the source of financial resources, contract duration, and established conventions, (Popa , 2018). The intricate nature of PPP projects and the requirement for enduring commitments can pose difficulties in terms of project management and coordination (Popa, 2018). Furthermore, the establishment of clear legal and regulatory frameworks is imperative for the governance of PPPs, ensuring transparency, accountability, and equity (Hodge & Greve ,2007).

Decentralization can play a pivotal role in facilitating PPPs and enhancing access to poverty-related services (Caldeira et al. ,2012). In the context of Benin, decentralization has been observed to exert an overall positive impact on the accessibility of fundamental services, albeit with variations contingent upon the financial capacity of local governments (Caldeira et al., 2012). Decentralization affords the opportunity to prioritize essential services in accordance with local needs and available resources (Caldeira et al., 2012).

To fully harness the potential of PPPs, the development of a robust legal and regulatory framework is imperative. This framework should offer clarity, transparency, and accountability to all stakeholders participating in PPP endeavors. Furthermore, it should address matters related to risk distribution, dispute resolution, and the long-term sustainability of such partnerships.

1.1 PPPs In Various Sectors

Within the realm of transportation, Public-Private Partnerships (PPPs) have been employed to advance and enhance transportation infrastructure, encompassing projects such as roads, bridges, and airports (Hodge & Greve, 2007). These collaborations have proven adept at attracting private investment, streamlining project delivery, and elevating the caliber of transportation services (Hodge & Greve, 2007). However, it is imperative to meticulously design and oversee transportation PPPs to ensure they align with public interests, address social and environmental considerations, and guarantee equitable access to transportation services (Hodge & Greve, 2007).

In the sphere of waste management, PPPs have been implemented to bolster the efficiency and efficacy of waste collection, treatment, and disposal (Yandra et al., 2020). These ventures in waste management have yielded enhancements in service quality, cost reduction, and the promotion of innovative waste management practices (Yandra et al., 2020). Nevertheless,

challenges stemming from conflicting interests between the public and private sectors, inadequate regulatory frameworks, and the need for robust monitoring and enforcement mechanisms must be addressed to ensure the success of waste management PPPs (Yandra et al., 2020).

Infrastructure development has notably felt the impact of PPPs, as these partnerships have been employed to finance, construct, and operate various infrastructure types, including energy, telecommunications, and public buildings (Vining & Boardman, 2008). Infrastructure PPPs have demonstrated their ability to attract private investments, enhance project delivery, and elevate the quality and accessibility of infrastructure services (Vining & Boardman, 2008). Yet, a thorough assessment of financial viability, risk allocation, and long-term sustainability is crucial to ensure the prosperity of infrastructure PPPs (Vining & Boardman, 2008).

Water and sewage treatment facilities have similarly seen the influence of PPPs. These partnerships have been instrumental in augmenting service delivery, improving operational efficiency, and fostering sustainable water management practices (Cheng et al., 2023). They have succeeded in attracting private sector expertise and investments, elevating infrastructure maintenance, and enhancing the caliber of water and sewage treatment services (Cheng et al., 2023). Nevertheless, the establishment of lucid regulatory frameworks, along with an emphasis on transparency, accountability, and the resolution of social and environmental concerns, is imperative to maximize the advantages of water and sewage treatment PPPs (Cheng et al., 2023).

In the realm of energy distribution and electricity, PPPs have facilitated the promotion of cleaner technologies and advancements in energy efficiency. Through these partnerships, governments collaborate with private sector entities to develop and implement projects that incorporate sustainable and clean energy solutions (Cruz et al., 2022). This encompasses the development of renewable energy sources like solar, wind, and hydroelectric power, contributing to the reduction of greenhouse gas emissions and efforts to combat climate change (Cruz et al., 2022). PPPs also play a role in driving the adoption of energy-efficient technologies and practices, resulting in reduced energy consumption and increased savings (Cruz et al., 2022).

Within the Information and Communication Technology (ICT) sector, PPPs have played a pivotal role in expanding access to digital services and bridging the digital divide. Research has indicated that the proliferation of communication technologies tends to reduce electricity intensity, while the diffusion of computer and software technologies tends to increase it (Saidi et al., 2015). ICT sector PPPs have facilitated the development of high-speed internet connectivity projects, such as Australia's National Broadband Network (NBN), which has spurred economic growth and social development (Stephens & Rains, 2010).

In the electricity sector, PPPs have been instrumental in propelling renewable energy projects and advancing energy infrastructure. Research has demonstrated a positive and statistically significant correlation between ICT and electricity consumption, particularly in the context of internet connections and mobile phones (Saidi et al., 2015). PPPs have enabled the development of renewable energy initiatives, contributing to the transition towards a more sustainable energy mix (Saidi et al., 2015).

Similarly, in the natural gas sector, PPPs have played a crucial role in expanding access to clean and affordable energy sources. These collaborations have facilitated the construction of natural gas infrastructure, including pipelines and distribution networks, enabling the efficient delivery of natural gas to consumers. Additionally, PPPs have contributed to the development of liquefied natural gas (LNG) terminals, enhancing the availability and accessibility of natural gas as a cleaner alternative to traditional fossil fuels.

In the healthcare domain, PPPs offer the potential to enhance value for money and optimize resource allocation. By leveraging private sector expertise and resources, PPPs can improve the efficiency and effectiveness of healthcare services. For instance, the implementation of PPPs in the construction and operation of hospitals and healthcare facilities has led to improved infrastructure, increased capacity, and enhanced service delivery (Eulerich et al., 2019).

PPPs have also played a pivotal role in stimulating innovation in healthcare. Through collaborations between the public and private sectors, research and development initiatives have been undertaken to address public health challenges. These efforts encompass the development of vaccines and drugs for communicable diseases, personalized medicine, and advancements in healthcare infrastructure (Al-Hanawi et al., 2020).

1.2 Impact of PPPs in developing countries, Eastern Europe, and Central Asia

Public-Private Partnership (PPP) initiatives in developing nations play a pivotal role in catalyzing economic growth and enhancing regional connectivity. These programs channel investments into critical infrastructure domains such as transportation networks, energy systems, telecommunications, and public facilities (Khallaf et al., 2024). Infrastructure projects not only attract foreign direct investment but also foster job creation and bolster trade and commerce. The development and upgrading of infrastructure emerge as essential drivers of economic progress, both in urban centers and rural areas.

In the context of developing countries, especially in Eastern Europe and Central Asia, PPPs offer a promising avenue to address the infrastructure deficit and mitigate government debts. PPPs can inject supplementary funding into infrastructure projects, thereby catalyzing economic growth and development in the region (Chu and Muneeza ,2019).

These partnerships serve as a response to fiscal shortfalls and government indebtedness, enabling governments to harness private sector investments and expertise for the financing and management of infrastructure projects (Tan and Zhao , 2019).

Many Eastern European countries grapple with infrastructure deficits due to historical legacies, economic transitions, or limitations in public resources. PPP programs emerge as a pragmatic solution to bridge this gap by attracting private sector investments. Through PPPs, governments can tackle infrastructure shortcomings, modernize existing systems, and deliver top-tier services to their citizens. This holds particular significance for sectors such as transportation, energy, water, and healthcare.

A noteworthy exemplar of PPP utilization can be found in the Belt and Road Initiative (BRI), where PPPs have been actively promoted to fund infrastructure endeavors along the BRI route in Central Asia. The BRI has witnessed the implementation of numerous PPP projects accompanied by substantial investments (Chu & Muneeza, 2019). These projects bear the potential to transform the underdeveloped BRI region into a burgeoning economic hub and contribute valuable insights to economic policy discussions, drawing from the successes of emerging market economies (Chu & Muneeza, 2019).

Given the evident advantages and pertinence of PPP programs for developing nations, this study endeavors to scrutinize PPP initiatives in Eastern European and Central Asian developing countries. The research aims to discern the trends and patterns characterizing PPP programs in the region since 1998.

2. Methodology

One approach to evaluating the performance of Public-Private Partnerships (PPPs) involves the use of a ranking system that considers various factors, including the quality of the institutional environment, the experience in implementing projects, and the readiness of the state, private organizations, and society for effective PPP implementation (Berezin et al. , 2018). This method offers a comprehensive assessment of the elements that contribute to the success of PPP projects and facilitates comparisons across different countries.

Another critical aspect of studying PPPs revolves around gaining insights into the nature of equity transactions within these partnerships. The emergence of equity markets in PPPs has introduced a new area of research that challenges the conventional justifications for PPP policies, (Whitfield & Smyth , 2018). The methodology for collecting data on equity transactions in PPPs is a specialized approach that will be elaborated upon in detail within the methodology section.

In addition to performance assessment and equity transactions, it is essential to evaluate the preparedness of stakeholders for the adoption of PPPs. Readiness assessment empowers stakeholders to gauge their capacity and current standing in implementing PPPs, as discussed by Edwards & Kavishe (2020). This assessment entails the identification of key areas requiring attention to enhance the performance of PPP implementation. These areas encompass aspects like familiarity and utilization of PPP framework models, the knowledge and competencies of practitioners, capacity development, engagement of experts, and the selection processes of private partners (Edwards & Kavishe, 2020).

To ensure a comprehensive methodology for the study of PPPs, it is imperative to consider existing methodologies and theories developed in related fields. For instance, the Innovation Diffusion Theory (IDT) can offer theoretical insights into the readiness assessment process and the promotion of innovation in PPP implementation (Edwards & Kavishe, 2020). Furthermore, drawing connections between Zull's model of learning and the language teaching methodology known as Presentation, Practice, and Production (PPP) can provide valuable insights into the synergistic relationships within the human brain and their potential application in the context of PPPs, as highlighted by Rodriguez (2020).

As all the past tests have already been deployed to reach a result from PPPs this paper will focus on analyzing 3 critical pillars (PPI , Macro and WEF indicators) to drive out a result. By thoroughly studying the proportions, relations, and influence of the variables with respect to the regions the aim is to provide an assessment and recommendation for the findings. Aside from tables, graphs stressing the distribution of these variables, a regression test highlighting correlation and significance is presented.

2.1. Data Gathering

Data concerning PPP programs in the form of Public private investment (PPI) indicators for East Europe and Central Asia has been collected for the world bank data query that encompasses over 8000 projects collectively for most PPPs around parts of the world. The data for both was collected since 1998 within a range of sectors (Energy, Electricity, Natural Gas, ICT, Transport, Water and Sewage, Treatment plants, Integrated MSW...). The data focuses on PPI factors from project number to total investments, concession periods, income groups, unsolicited proposals, number of bids… East Europe consisted of Caucasus states (Armenia, Azerbaijan, and Georgia), Post-Soviet European republics (Belarus, Moldova, Ukraine), and Southeastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Montenegro, North Macedonia, Serbia, and Kosovo). Central Asian countries considered are Kazakhstan , Kyrgyz Republic, Tajikistan, and Uzbekistan.

Macro-economic indicators for said regions are gathered for the world bank data query as well to support the study. A series for the world development indicators database was chosen. Series considered were GDP (current US$), GDP growth (annual %),Inflation, consumer prices (annual

%),Political Stability and Absence of Violence/Terrorism: Percentile Rank, GDP per capita PPP (current international $), Population density (people per sq. km of land area) Population growth (annual %), Official exchange rate (LCU per US$, period average), Surface area (sq. km). The series was taken from 1998 to 2022 with respect to the availability of data in the database.

In addition, WEF(world economic forum) indictors were used to aid the analysis. The data picked from the economic profiles of the relevant countries reflect “The Global Competitiveness Index 4.0 2019 Rankings”. Indicators include: Overall Security, organized Crime, Homicide Rate per 100k population, Terrorism Incidence, Reliability of police services, Overall Social Capital, social capital, Overall Checks and Balance, Budget Transparency, Judicial independence, Efficiency of legal framework in challenging regulations, Freedom of the press, Overall Public-Sector Performance, Burden of government regulation, Efficiency of legal framework in setting disputes, E-Participation, Overall Transparency, Incidence of corruption, Overall Property rights, property rights, Intellectual property protection, Quality of land administration.

It is to be noted that although there is a plethora of gathered data and indicators however not every single on is spoken about in the paper. The huge database added value to the analysis but also lead to mentioning the most relevant and sequential ones for the sake of the paper.

2.2. Preliminary Analysis

The PPI data extracted was cleaned by eliminating redundancies regarding duplicate project names occupying the same sector. The number of projects finely cleaned resulted in well over 300 projects.

To ensure precision and prevent potential confusion and disputes regarding the categorization of certain nations as either Asian or European, a meticulous evaluation process was established with the aim of excluding Public-Private Partnership (PPP) initiatives originating from countries that straddle both continents. As a result, Russia and Turkey were omitted from the examination due to their dual-continental geographical positioning.

Russia, renowned as the largest country globally, possesses an extensive expanse that spans both Asia and Europe. Although a considerable portion of its landmass is situated in Asia, including its expansive eastern territories, prominent population centers such as Moscow and St. Petersburg are located in Eastern Europe. Traditionally, the Ural Mountains have functioned as a geographical boundary demarcating these two continents. Nevertheless, the precise categorization of Russia as either Asian or European remains a subject of ongoing discourse (Castelblanco, De Marco & Narbaev, 2023).

Likewise, Turkey occupies a distinctive position, effectively acting as a bridge between Europe and Asia. Although a substantial portion of its landmass lies in Western Asia, referred to as Anatolia, a small segment of its territory, encompassing Istanbul, extends into Southeastern

Europe. This transcontinental geography has engendered varying viewpoints on Turkey's identity and its classification as either an Asian or European nation.

The classification of Russia and Turkey as either Asian or European is not solely determined by their geographical placement but is also influenced by a multifaceted interplay of historical, cultural, political, and economic factors. Different organizations and contexts may assign them to one continent or the other, leading to ongoing debates and diverse interpretations. Ultimately, the categorization of these countries frequently hinges on the specific context or perspective being considered.

As the PPI data was solely extracted from the world bank and no other source are to refer to preserve coherence the country of Turkmenistan was left out of the study. Any relevant data on Turkmenistan is not present in the world bank database. In the case of both Belarus, Kosovo, and Uzbekistan no data was registered in the World Economic Forum and thus they are left empty.

3. Past Examinations in PPPs concerning Eastern Europe and Central Asia Region

3.1. Eastern Europe’s PPPs Developments

Public-private partnerships (PPPs) have emerged as a significant strategy for delivering public infrastructure projects in Eastern Europe. Numerous research endeavors have delved into the ramifications of PPPs on regional progress, the appeal of investments, sustainability achievements, and disparities in development within the region.

In 2019, Godlewska conducted a comprehensive examination, aiming to unravel the connection between PPPs and the advancement of regions in Central and Eastern European Countries (CEECs), particularly in terms of their allure for investments. This investigation hinged on a case study encompassing 90 PPP projects and a thorough literature review, scrutinizing the impacts of PPP undertakings on the investment desirability of CEE regions. The study brought attention to the challenges faced by CEECs, notably their deficient infrastructure and the high levels of local government indebtedness.

Siemiatycki's work in 2011 centered on PPPs in urban transportation and their influence on uneven development. The study underscored the advantages of PPPs, including private financing, comprehensive life-cycle costing, risk transference, and adaptability for incorporating innovative technologies. The author posited that PPPs can endorse a balanced transportation

strategy, encompassing both road and rail-centric projects. The investigation also underscored the significance of metropolitan planning and community engagement in shaping regional investment priorities.

Shen et al.'s 2016 research delved into the sustainability performance of PPP ventures for infrastructure development. The study emphasized that the allocation of contributions between the private and public sectors constitutes a pivotal variable influencing sustainability outcomes. The authors laid stress on the imperative of enhancing sustainability in infrastructure initiatives to pursue objectives aligned with sustainable development.

In 2015, Metaxas & Preza honed their focus on PPPs within Southeastern Europe, with a particular spotlight on Croatia. The research aimed at characterizing PPPs as a prominent method for executing public infrastructure projects and dissecting the accomplishments in Croatia. The authors also discussed governmental endeavors to advocate for PPPs as alternative funding mechanisms and underscored the formulation of the theoretical foundation for PPP.

Collectively, these studies furnish valuable insights into the effects of PPPs on regional progress, the allure of investments, sustainability accomplishments, and disparities in development in Eastern Europe. They accentuate the merits of PPPs concerning financing, cost-effectiveness, risk management, and adaptability. Nonetheless, it remains essential to consider the unique contexts and challenges encountered by each country when implementing PPP initiatives.

PPPs Developments in Ukraine

In recent years, there has been a notable focus on the examination and research of public-private initiatives in Ukraine. One research endeavor, conducted by Kvitka et al. in 2019, concentrated on enhancing the marketing strategies of Ukrainian higher educational institutions by leveraging webometrics ranking modeling. The authors devised a comprehensive strategy and managerial framework aimed at elevating the global visibility and academic presence of Ukrainian universities on the internet. Their study employed statistical analysis and mathematical modeling techniques to scrutinize webometric indicators and predict the prospective developments within the educational services market in Ukraine.

In a separate investigation carried out by Rudenko et al. in 2018, the focus was on the administration of international educational collaborations between universities in Poland and Ukraine. The authors advocated for the establishment of autonomous management structures and financial arrangements for joint educational and research centers, which would encompass both governmental and non-governmental scientific and educational entities. This approach was designed to foster enhanced cooperation and optimize the oversight of international projects in the realm of higher education and scientific research.

Within the domain of healthcare, Dobrova et al. undertook a study in 2021 that delved into the formulation of an evidence-based framework for substituting original medications with generic equivalents in Ukraine. The research methodology encompassed logical analysis, SWOT analysis, statistical assessment, and the utilization of the Policy Streams Approach to craft a conceptual framework for evidence-based medication substitution. The study encompassed an examination of public procurement programs for pharmaceuticals and the identification of drugs featured in the newly established roster under the "Dostupny Liky" (Affordable Medicines) initiative.

In summary, these research studies underscore the critical importance of scrutinizing and appraising public-private initiatives in Ukraine, whether in the realms of higher education or healthcare. The discoveries emanating from these investigations offer valuable insights and recommendations aimed at augmenting the quality and efficacy of these initiatives, with the overarching goal of enhancing international recognition, academic representation, and healthcare outcomes within Ukraine.

PPPs Development in Armenia

Numerous public-private initiatives have been employed to tackle diverse challenges, including tuberculosis control, corruption mitigation, poverty alleviation, and social welfare enhancement.

Concerning tuberculosis control, specific programs have been implemented in the northern region of Iran, adjacent to Armenia. These endeavors yielded a modest reduction in the tuberculosis incidence rate, declining from 84 to 79 cases per 100,000 individuals between 1999 and 2001 (Tavakoli, 2017). Nonetheless, recent years have witnessed an upswing in the incidence rate, surging to 70 cases per 100,000 people in 2016 (Vasilyan, 2016).

In the realm of corruption, the European Union has allocated funds to initiatives within Armenia, primarily focusing on democratic governance, public administration reform, rule of law, and good governance (Börzel & Hüllen, 2014). These endeavors are geared toward combatting corruption by advocating for transparency, accountability, and the overhaul of institutions and legislation pertaining to public administration and financial management (Börzel & Hüllen, 2014).

Regarding poverty reduction, the fiscal policies in Armenia have yielded mixed outcomes. At a poverty threshold of US$2.50 per day, these policies have marginally decreased the poverty headcount by 0.084 (Younger & Khachatryan, 2017). However, at a higher poverty threshold of US$4.00 per day, the fiscal measures have only marginally increased the poverty headcount by 0.019 (Younger & Khachatryan, 2017). Notably, while transfers are effectively targeted at poor households, taxes, especially indirect levies, tend to impact these households, mitigating the poverty-reducing impact of public expenditures (Younger & Khachatryan, 2017).

In terms of social welfare initiatives, the Family Benefit program in Armenia stands out as a well-targeted expenditure for impoverished segments of the population (Younger & Khachatryan, 2017). This program operates on explicit need-based criteria and has demonstrated its effectiveness in accurately reaching those in need (Younger & Khachatryan, 2017).

In summary, the private-public programs in Armenia have exhibited varying levels of success in addressing diverse challenges. While some initiatives have yielded positive outcomes, such as the modest reduction in tuberculosis incidence and the precise targeting of the Family Benefit program, persistent challenges remain, particularly in areas like corruption mitigation and poverty reduction. Ongoing efforts and rigorous assessments are imperative to enhance the efficacy of these programs and attain more favorable outcomes for the Armenian populace.

3.2. Central Asia's PPPs Developments

Public-private partnerships (PPPs) have been widely advocated as a framework for expanding crucial urban transportation infrastructure across diverse regions, Central Asia included (Siemiatycki, 2011). PPPs are viewed to mobilize capital for essential investments, mitigate project risks, and foster economic growth and sustainable development (Siemiatycki, 2011). In the context of Central Asia, where transportation infrastructure has historically lagged in development, PPPs have been deemed a pivotal instrument for the delivery of urban infrastructure (Siemiatycki, 2011).

To gain insight into the historical examinations and outcomes of PPP ventures and investments in Central Asia, it is imperative to consider the motivations and perspectives of both the public and private sectors involved in these collaborations. A study conducted in Ghana and Hong Kong delved into the public sector's standpoint on implementing PPP policies (Osei-Kyei & Chan, 2018). The findings from this research indicated that expeditious delivery of public projects and efficiency within the private sector were fundamental considerations when engaging in PPPs (Osei-Kyei & Chan, 2018). This implies that the public sector in Central Asia may also prioritize these aspects when contemplating PPP initiatives.

Furthermore, the advantages of PPPs within the transportation sector encompass the attraction of private financing to accelerate project completion, the mitigation of environmental impacts through comprehensive life-cycle costing, the transfer of project risks, and the integration of pioneering technologies (Siemiatycki, 2011). These benefits align with the objectives of numerous PPP undertakings in Central Asia, as they aspire to enhance transportation infrastructure and advance sustainable development.

It is essential to acknowledge that the outcomes of PPP projects and investments in Central Asia may fluctuate due to factors such as political and economic conditions, institutional arrangements, and legal frameworks (Siemiatycki, 2011). Consequently, conducting distinct

assessments and appraisals of PPP initiatives in Central Asia becomes imperative to gauge their efficacy and influence.

In conclusion, past examinations and results pertaining to PPP projects and investments in Central Asia underscore the promotion of PPPs as a framework to expand transportation infrastructure and bolster economic growth and sustainable development. Motivations for engaging in PPPs encompass prompt project delivery and private sector efficiency. The benefits of PPPs within the transportation sector encompass attracting private funding, curbing environmental impacts, transferring project risks, and embracing innovative technologies. Nevertheless, the triumph of PPP projects in Central Asia may hinge on diverse factors, necessitating further scrutiny and evaluation to gauge their effectiveness and ramifications.

PPPs Development in Kazakhstan

Public-private partnerships (PPPs) have garnered attention in Kazakhstan, and the government has undertaken efforts to expand their utilization (Mouraviev & Kakabadse, 2015). Nevertheless, the country faces legal and regulatory obstacles that hinder the effective governance of PPPs (Mouraviev & Kakabadse, 2015). These hindrances have been discerned through in-depth interviews conducted with stakeholders engaged in PPP projects in Kazakhstan, as well as interactions with national and regional PPP centers (Mouraviev & Kakabadse, 2015). The study conducted by Mouraviev & Kakabadse (2015) underscores the paucity of interest from private investors and the limited proliferation of partnerships within Kazakhstan (Mouraviev & Kakabadse, 2015). This implies that impediments exist when it comes to the swift implementation of PPPs in the nation (Mouraviev & Kakabadse, 2015).

Additionally, a study by Sakuov (2023) scrutinizes the evolution of PPPs in Kazakhstan and characterizes the status of public-private partnerships within the country (Sakuov, 2023). This study employs an analytical approach grounded in processed statistical and theoretical data to elucidate the trends and extant challenges in the development of PPPs in Kazakhstan (Sakuov, 2023). The findings indicate that while there are positive trends in the initiation of new projects and their effectiveness, the maturation of PPPs in Kazakhstan is still in its nascent stages (Sakuov, 2023). The research also pinpoints pressing issues such as the scarcity of highly qualified personnel involved in PPP development, the presence of an extensive regulatory framework, and the frequent inadequacy of funding for ongoing projects (Sakuov, 2023).

To tackle these challenges and stimulate the growth of PPPs in Kazakhstan, Achatay & Nurtazina (2022) advocate for expanding the capabilities of the country's PPP sectors in alignment with global development practices (Achatay & Nurtazina, 2022). By gleaning insights from the experiences of more developed nations and leveraging statistical data from the Infrapppworld Information Center for Public-Private Partnerships, Kazakhstan can elevate the effectiveness of its PPP initiatives (Achatay & Nurtazina, 2022).

In summary, the analysis of public-private partnerships in Kazakhstan underscores the presence of legal and regulatory impediments that hinder the effective management of PPPs. These barriers contribute to the restricted proliferation of partnerships and the lack of interest from private investors. Nevertheless, there are positive indications regarding the initiation of new projects and their efficacy. Pressing challenges encompass the scarcity of highly skilled personnel, the complexity of the regulatory framework, and financial constraints. To surmount these obstacles, Kazakhstan can draw lessons from more developed nations and align its PPP sectors with global development trends.

PPPs Development in Uzbekistan

Public-private partnerships (PPPs) have been acknowledged as a significant tool for advancing and funding infrastructure projects within Uzbekistan (Yakubova et al., 2021). These collaborative arrangements have been ascertained to yield benefits across multiple domains, including the economy, national governance, the private sector, and the general populace (Yakubova et al., 2021). Research has delved into the inception and progression of PPPs within Uzbekistan, with particular emphasis on their role in propelling innovative developments within the national economy (Yakubova et al., 2021). Furthermore, the mechanism of PPPs within the agricultural sector has been explored, underscoring its significance in augmenting the resource base and fostering stable growth within this sector (Dustmurodov et al., 2020).

In the Republic of Uzbekistan, concerted efforts have been undertaken to delineate and regulate PPPs. An examination of the interplay between PPPs, civil law contracts, and administrative law has led to the conclusion that PPP agreements are categorized as unnamed contracts under the Civil Code of Uzbekistan (Kayumov, 2021). The imperative of establishing and nurturing PPPs within the country's transportation system has also been underscored (Tuychiev, 2021). The railway sector has been identified as a promising arena for the advancement of PPPs, encompassing initiatives like the construction, refurbishment, and modernization of railway stations (Mahmudovna, 2020).

PPPs have been acknowledged as a pivotal factor for the Uzbekistan economy (Xolov, 2020). Their role in financing infrastructure projects has been meticulously examined, with a focus on their present status and their position within the Uzbekistan economy (Yakubova et al., 2021). The exploration of PPPs within Uzbekistan has aimed to elucidate their essence and evaluate their role in the broader economic context (Yakubova et al., 2021).

It is noteworthy that PPPs can encounter challenges and potential interference from industry stakeholders. In the realm of tobacco control policies, for instance, the tobacco industry has

been observed to engage in political activities aimed at weakening public health agencies and influencing policy decisions (Ulucanlar et al., 2016). Understanding and addressing industry interference in the formulation of public health policies is imperative for the effective implementation of evidence-based measures aimed at curtailing tobacco use (Ulucanlar et al., 2016).

In conclusion, public-private partnerships have been recognized as a pivotal instrument for the development and financing of infrastructure projects in Uzbekistan, with the potential to confer benefits upon the economy, governance, the private sector, and the population. Robust efforts have been dedicated to defining and regulating PPPs in Uzbekistan, with specific sectors like agriculture and transportation identified for their expansion. However, it is crucial to remain cognizant of potential hurdles and industry interventions in PPPs, particularly in the realm of public health policies.

4. Discussions and findings

The following findings delivered a dive into the data collected. They explain the trends of PPPs over two major perspectives (Regional and national) in Eastern European territories and Central Asian ones . Furthermore, they give an insight into the distribution of proportionality of these indicators respectively.

4.1. Regional Perspective

First, the analysis will compare the PPP programs in Eastern Europe and Central Asia on a wider regional level and thereafter at a more in-depth national level, specifically focusing on three sub-regions: Southeastern Europe, Caucasus states, and Post-Soviet European republics while keeping the central Asian level unchanged. By analyzing the data presented, patterns and trends can be identified to shed light on the leading regions within each category. Furthermore, to highlight the differential distribution of the indicators used in comparison to the different regions.

Figure 1. number of projects for regional areas demonstrates the shares of a number of projects distributed among the eastern European and central Asian regions respectively. East Europe, which occupies a surface area of 1.3 million km squared considering for this study 13 countries have a total of 306 PPP projects. Central Asia, which takes up 3.5 million squared has a total of 46 projects. Thus, Eastern Europe takes 87% of total projects with respect to Central Asia at 13% with a disproportionate relation to the surface areas of both.

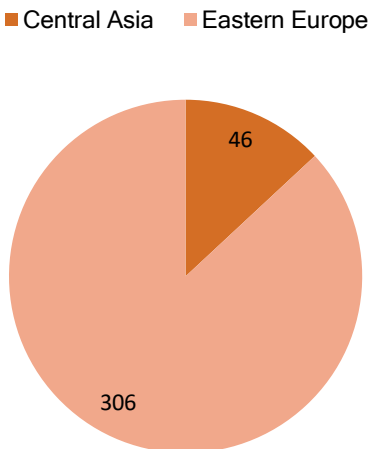


Figure 1. number of projects for regional areas

Figure 2. Total investment (m$) for regional areas shows the distribution of total investment in millions of dollars for PPP projects for the regions respectively. The proportion of the split of the investments supports the split of a number of projects in figure 1. Central Asia contributes 7.26

billion dollars making up 16% of total investments while that of Eastern Europe amounts to 37.23 billion dollars with 84% of total investments.

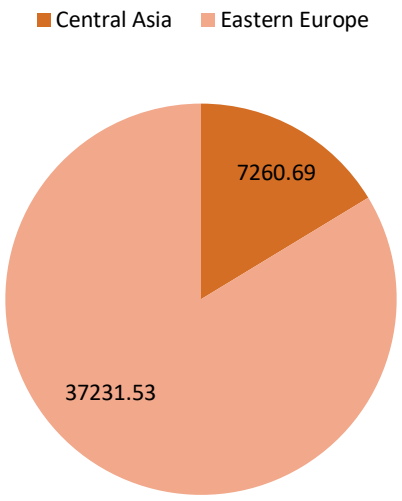


Figure 2. Total investment (m$) for regional areas

As for Figure 3. Average GDP for regional areas which stresses the variation of the Average GDP proportions between Central Asia and Eastern Europe. It is found that Central Asia contains an average GDP of approx. 166 billion dollars where that of Eastern Europe rests at approx. 356 billion dollars. This raises the assumption that countries with higher GDPs may have more favorable conditions for attracting PPP projects and investments. As for Central Asia having both lower total investments (Figure 2) and a lower number of projects (Figure 1) the Average GDP is lower in comparison to that of Eastern Europe.

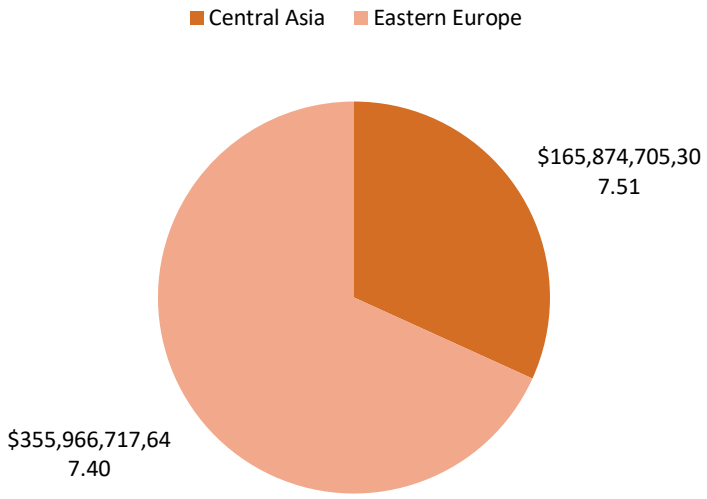


Figure 3. Average GDP for regional areas

Indeed, a study conducted by Estache & Fay (2007) delved into the ongoing discourse surrounding infrastructure policy and underscored the significance of Gross Domestic Product (GDP) as a catalyst for enticing private investments into infrastructure ventures. The authors posited that elevated GDP levels typically correlate with heightened investment prospects and an increased capacity to fund infrastructure initiatives through Public-Private Partnerships (PPPs) (Estache & Fay, 2007). Furthermore, the research accentuated the role of economic expansion in invigorating infrastructure development and enticing participation from the private sector. As GDP experiences growth, there typically emerges a heightened demand for infrastructure services encompassing areas like transportation, energy, and telecommunications. This augmented demand can engender opportunities for PPP undertakings and allure private investments aimed at fulfilling the infrastructure requisites of a burgeoning economy (Estache & Fay, 2007).

Another study by Alghamdi et al. (2022) harnessed a socio-economic system dynamics methodology to enhance the decision-making process concerning PPP infrastructure projects. Within this study, an assessment was conducted to ascertain and appraise the suitable concession duration, concession fee, government subsidy, and capital framework. The findings elucidated the intricate interplay among concession variables and illuminated how the concession fee impacts the effectiveness of PPPs.

Since the examined PPP programs depend predominantly on user fees for their revenue, the average concession duration holds significant importance in assessing the potential for users to meet their financial obligations over an extended period. An extended concession period corresponds to reduced user fees. Notably, the overall concession duration in Central Asia closely aligns with that of Eastern Europe, with observed values of 21.2 years and 22.2 years,

respectively. The one-year variance between these two regions can be attributed to the allocation of greater investments and projects to the latter.

Nonetheless, when examining the nearly identical figures, it becomes apparent that there are certain resemblances in the payment structure and project types. For example, it is evident that a critical factor is to consider the trade-offs between risk and return, ensuring that the concession duration is sufficiently extended to generate financial returns capable of mitigating associated risks. This perspective finds support in a study conducted by Tang et al. (2010), which investigated how risks and uncertainties influenced the determination of the concession period.

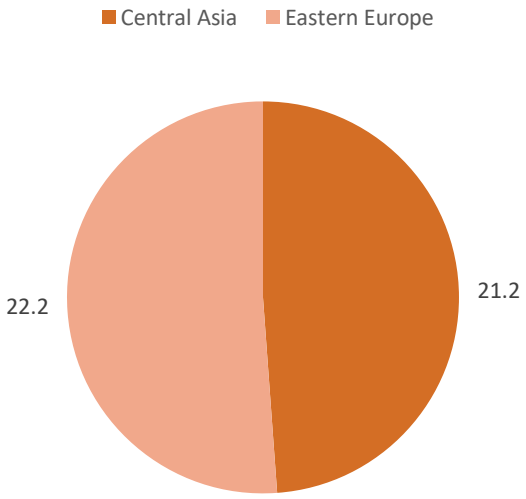


Figure 4. Concession period (years) for regional areas

One drawback associated with linking unsolicited proposals to Public-Private Partnerships (PPPs) is the potential dearth of competition during the procurement phase. This can culminate in inflated costs and subpar infrastructure quality, thereby impeding the attainment of sustainable procurement objectives (Zawawi et al., 2016). Unsolicited proposals can also be perceived as a global practice that runs counter to competition principles within PPPs, as they afford the private sector the opportunity to submit fresh concepts or initiatives in exchange for exclusive awards, discreetly granted by the contracting authority (Zawawi et al., 2016). This lack of transparency and competition can erode the integrity and impartiality of the procurement process.

Another drawback pertains to the likelihood of unfavorable public perceptions regarding PPP transactions. Nevertheless, it's important to note that this presents a relatively minor challenge within the realm of PPPs (Osei-Kyei & Chan, 2017). Additionally, the frequent use of unsolicited proposals can be viewed as a hurdle in PPP implementation (Osei-Kyei & Chan, 2017). The prevalence of unsolicited proposals may raise queries concerning the fairness and neutrality of the selection process, as well as potential concerns about preferential treatment or corruption.

In a more optimistic light, an important advantage linked to the inclusion of unsolicited proposals in Public-Private Partnerships (PPPs) lies in their ability to stimulate innovation and creativity. Unsolicited proposals enable the private sector to bring forth new ideas and projects that might not have been considered through conventional procurement approaches (Osei-Kyei et al. ,2018). This has the potential to result in the creation of inventive solutions and the provision of exceptional services or infrastructure.

Figure 5. % USP for regional areas breaks down the distribution of unsolicited proposals marking 63% of all PPP projects in central Asia to that of 61% of Eastern Europe.

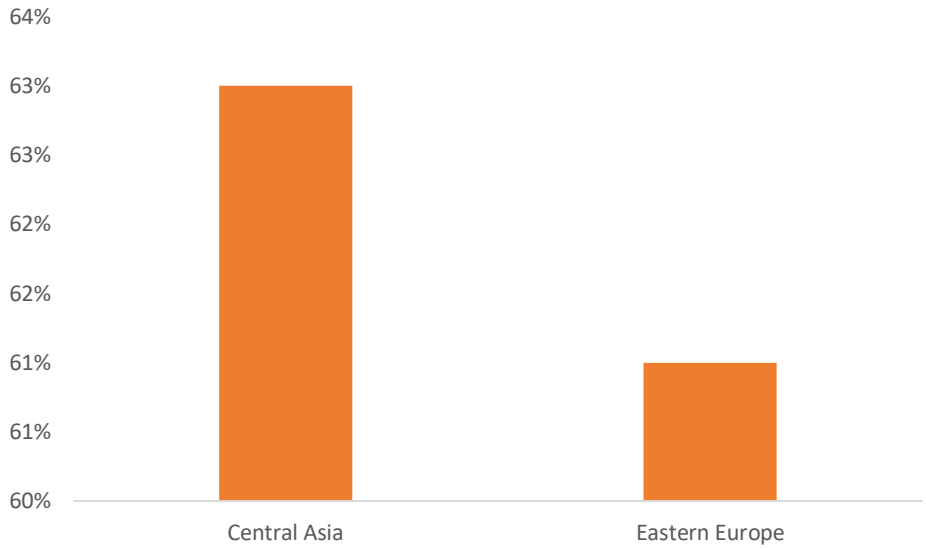


Figure 5. % USP for regional areas

Taking a deeper dive into the sub-regional division of Eastern Europe, while leaving the regional area of Central Asia unchanged a ratio of two indicators is conducted to better outline the diverse allocations between the respective regions. The investment to GDP (INV/GDP) is calculated by assuming the average of all investments in a specific region over the GDP of said regions considering the year upon which both the investments started to account for the initial start point of the GDP of the regions respectively. Figure 6. INV/GDP for regional areas supports the findings of both Figure 2. Total investment (m$) for regional areas and Figure 3. Average GDP for regional areas. The INV/GDP of central Asia is 0.0016% which is lower than the least of all 3 sub-regions in Eastern Europe which are the Post-Soviet European republics at 0.0066%. Caucasus States with 0.011 % is led by southeastern Europe at 0.017%. The disproportionality which is evidently clear in Asian Europe raises questions regarding the unappealing factors in play and the reasons behind them. One factor may be high contractual fees or perhaps a rigid regulatory framework hindering the smooth sailing of PPPs.

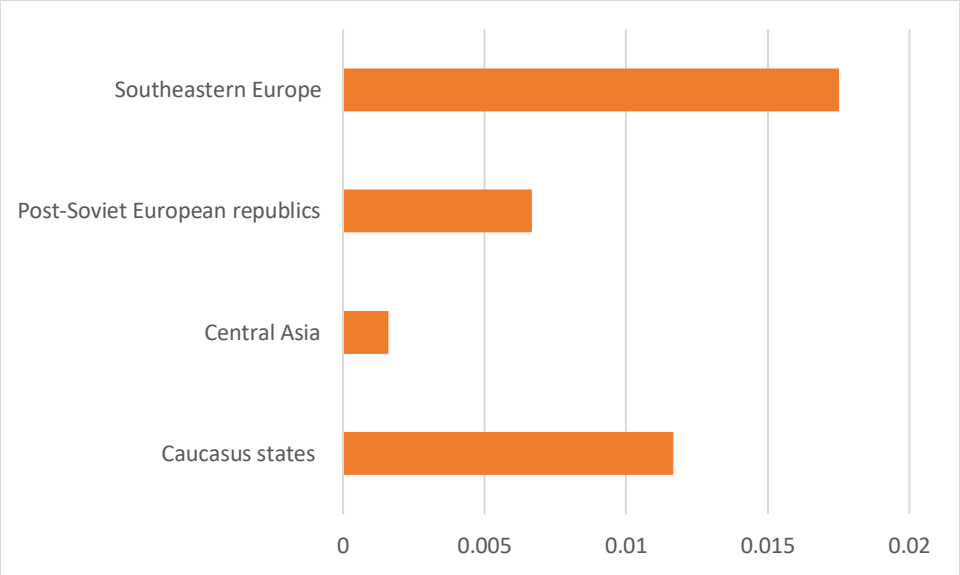


Figure 6. INV/GDP for regional areas

More probable is the political stability which is considered in Figure 7 for Central Asia registered 38% in comparison to lowest 28.4% to Caucasus states (Armenia , Azerbaijan , Georgia) that have faced turbulent political and territorial unrest in recent years. Post-Soviet European republics scored 38.3% in comparison to the highest in Southeastern Europe with 41.4%. The fact that INV/GDP in Figure 6. INV/GDP for regional areas is heavily weighted to the Eastern European sub-regions in regards to the close political stability percentages with respect to central Asia showcases the relative success of the initial in regulatory upholds despite the uncertainty.

A stable political milieu creates an enabling environment conducive to private sector engagement and investment in Public-Private Partnership (PPP) endeavors. As elucidated by Estache & Fay (2007), political stability assumes a pivotal role in drawing private investors and securing the enduring viability of PPPs (Estache & Fay, 2007).

Political stability engenders investor confidence by mitigating the risks associated with alterations in policies, regulatory ambiguities, and political upheavals. It furnishes a foreseeable and unwavering framework for PPP undertakings, affording private collaborators the capacity to make well-informed investment choices and strategize for the long term (Estache & Fay, 2007). Furthermore, political stability nurtures a sense of trust between the public and private sectors, thereby facilitating effective collaboration and cooperation in the initiation and management of PPPs.

Illustratively, the relationship between political stability and PPPs is exemplified in the case of Chile. Chile has garnered recognition as one of the most successful nations in the execution of PPP initiatives, primarily attributable to its stable political landscape (Malik & Kaur, 2022). The country boasts an extensive history of political steadiness, serving as a robust foundation for

attracting private investments in infrastructure development via PPPs. The government has implemented lucid and transparent regulations, erected resilient institutions, and upheld a stable legal framework, all of which have collectively contributed to the triumph of PPPs in Chile (Malik & Kaur, 2022).

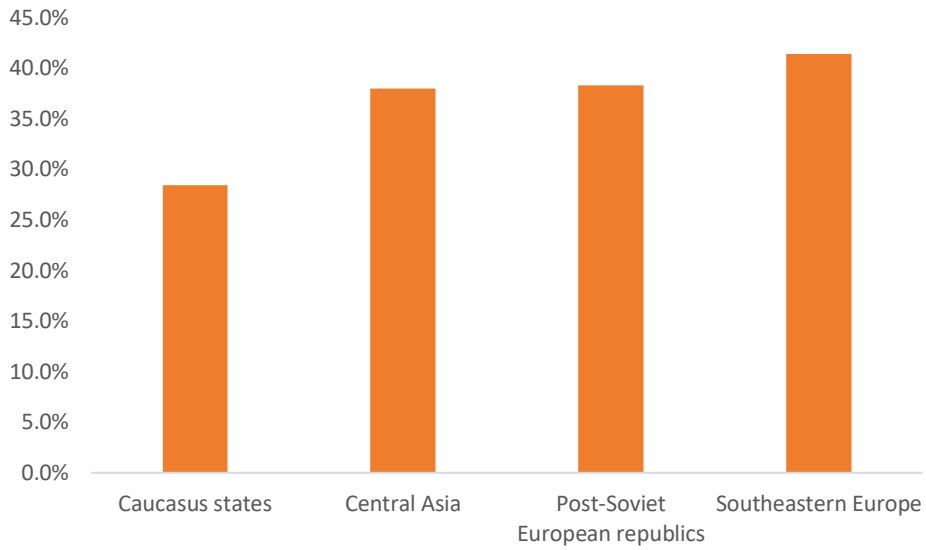


Figure 7. Average political stability for regional areas

Transitioning from the regional analysis to a national-level examination, it is crucial to broaden the scope and delve into a broader context. While the regional analysis provided valuable insights into the intricacies and dynamics of Public-Private Partnerships (PPPs) within a specific area, expanding the focus to a national scale allows for a comprehensive understanding of the larger landscape. By shifting our attention to the national level, we can capture a more holistic view of PPPs, considering diverse socio-economic factors, policy frameworks, and the varying nuances that shape the implementation and outcomes of these partnerships. This transition enables us to explore the broader implications and potential implications of PPPs within the country, paving the way for a deeper analysis and a more informed perspective.

4.2. National Perspective

In order to have a clearer idea of the in-region parities and disparities it is essential to consider both the INV/GDP and Political stability of the nations involved. As observed in

Table 1. General Outcomes on country level for *PPPs* , the worst political stability distributions are recorded in two Asian countries that are Kyrgyz Republic at 14% and Uzbekistan at 12%. That is translated into the INV/GDP proportion where they share 0.55% and 0.04% respectively marking them at the bottom with respect to other countries.

However, it is important to note that Tajikistan has 74% average political stability as well and Kazakhstan ranks third with 53%. Kazakhstan achieved the mid-range INV/GDP (0.539%) while Tajikistan is in the near bottom group (0.191%). Although higher political stability attracts higher INV for PPPs in those countries, the case highlights a lack of infrastructure policy in attracting less investments.

Table 1. General Outcomes on country level for PPPs

REGIONS	COUNTRIES	INV/GDP	AVERAGE POLITICAL STABILITY
CAUCASUS STATES	Armenia	1.376%	37%
CAUCASUS STATES	Azerbaijan	2.053%	23%
CAUCASUS STATES	Georgia	0.444%	24%
CENTRAL ASIA	Kazakhstan	0.539%	53%
CENTRAL ASIA	Kyrgyz Republic	2.287%	14%
CENTRAL ASIA	Tajikistan	0.191%	73%
CENTRAL ASIA	Uzbekistan	1.001%	12%
POST-SOVIET EUROPEAN REPUBLICS	Belarus	0.001%	50%
POST-SOVIET EUROPEAN REPUBLICS	Moldova	2.372%	38%
POST-SOVIET EUROPEAN REPUBLICS	Ukraine	0.552%	27%
SOUTHEASTERN EUROPE	Albania	1.36%	43%
SOUTHEASTERN EUROPE	Bosnia and Herzegovina	3.404%	31%
SOUTHEASTERN EUROPE	Bulgaria	1.882%	56%
SOUTHEASTERN EUROPE	Kosovo	0.744%	35%
SOUTHEASTERN EUROPE	Montenegro	0.086%	56%
SOUTHEASTERN EUROPE	North Macedonia	0.104%	32%
SOUTHEASTERN EUROPE	Serbia	0.004%	35%

In Kazakhstan, a substantial impediment to enticing private investments in infrastructure projects lies in the absence of a comprehensive legal framework and explicit regulations tailored to Public-Private Partnerships (PPPs) (Mouraviev ,2021). The dearth of a supportive legal structure engenders uncertainty and amplifies the perceived risks for potential private

collaborators. Furthermore, the intricate and protracted approval procedures governing PPP projects in Kazakhstan can further dissuade prospective private investors. These factors collectively diminish the attractiveness of PPPs within the nation.

Similarly, Tajikistan confronts challenges within its infrastructure policy that impede the allure of PPP investments. The absence of a well-elaborated legal and regulatory framework specifically designed for PPPs constitutes a notable obstacle (Mouraviev, 2021). The dearth of explicit directives and protocols governing PPP projects generates uncertainty and heightens the perceived risks for private partners. Additionally, the constrained capacity and expertise in the execution and administration of PPP initiatives in Tajikistan further contribute to the disincentive for PPP investments in the country.

That aside and referring once more to INV/GDP in

Table 1. General Outcomes on country level for PPPs, Bosnia and Herzegovina (3.404%) , Moldova (2.372%), and Kyrgyz Republic (2.287%) ranked the highest among the other countries represented. Relatively inferring at a move into a more positive investment acquisition and attractiveness.

It is also detrimental to the analysis to include the indicators mentioned in Table 2. WEF indicators for PPPs in Countries. Good security conditions can enhance the appeal of PPPs, while bad security conditions can deter private sector investments. A secure and stable environment provides confidence to private investors. It reduces risks associated with political instability, social unrest, and security threats, making the country an attractive destination for PPP investments (Osei-Kyei & Chan, 2017).

A stable setting serves as a mitigating factor against the risks inherent in project execution and operation. It assures the safeguarding of project assets, personnel, and activities, thereby reducing the likelihood of potential interruptions and financial setbacks (Ahmed et al., 2022).

A secure milieu, bolstered by a robust adherence to the rule of law and the implementation of effective legal and regulatory frameworks, safeguards the rights and interests of private investors. It engenders an environment characterized by predictability and transparency, consequently bolstering the security of investments (Osei-Kyei & Chan, 2017).

On the contrary, insecure environments have the potential to precipitate delays, disruptions, and escalated expenditures in project implementation. Security vulnerabilities may necessitate the adoption of supplementary security measures, exerting an impact on project schedules and profitability (Ahmed et al., 2022).In this regard referring to Table 2. WEF indicators for PPPs in Countries where indicators are rated out of 100, Azerbaijan ranked first in security with 87.6/100 with Georgia following closely at 86.3/100.

Table 2. WEF indicators for PPPs in Countries

COUNTRY	OVERALL SECURITY	OVERALL CHECKS AND BALANCE	OVERALL PROPERTY RIGHTS
ALBANIA	74.1	40.2	41.7
ARMENIA	84.2	55.4	62
AZERBAIJAN	87.6	49.1	65.6
BELARUS	*	*	*
BOSNIA AND HERZEGOVINA	73.1	34.9	37.5
BULGARIA	73	51.8	52.3
GEORGIA	86.3	60	60.2
KAZAKHSTAN	72.5	47.8	55
KOSOVO	*	*	*
KYRGYZ REPUBLIC	67.5	47.4	54.2
MOLDOVA	73.3	43.9	56.2
MONTENEGRO	79.2	50.5	54
NORTH MACEDONIA	69.2	38	54.7
SERBIA	75.2	44.9	51
TAJIKISTAN	79.5	45.9	46.7
UKRAINE	62.6	47	42.1
UZBEKISTAN	*	*	*

Source 2. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

Ukraine (62.6/100) , Kyrgyz Republic (67.5/100) and North Macedonia (69.2/100) are the least performs in the section scoring below 70. However, no country crossed the 50 mark which a step towards a positive overall security outcome.

To aid the concept of Overall Security a breakdown of this indicator into 4 pillars: organized Crime, Homicide Rate, Terrorism Incidence, Reliability of police services .

Table 3. Overall Security indicators for PPPs in Countries (1st part)

COUNTRY	ORGANIZED CRIME 0 - 100 (BEST)	HOMICIDE RATE PER 100K POPULATION
ALBANIA	46.4	93.9
ARMENIA	76.5	93.6
AZERBAIJAN	79.6	94.9
BELARUS	*	*
BOSNIA AND HERZEGOVINA	50	97.6
BULGARIA	47.6	96.6
GEORGIA	76.7	98.3
KAZAKHSTAN	66.6	71.1
KOSOVO	*	*
KYRGYZ REPUBLIC	45.2	87.5
MOLDOVA	58	90.8
MONTENEGRO	64.3	93.6
NORTH MACEDONIA	41.1	96.6
SERBIA	51.8	98
TAJIKISTAN	62.2	96.3
UKRAINE	47.8	80.7
UZBEKISTAN	*	*

Source 3. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

Multiple Countries performed poorly in organized crime scoring below 50 or even close to that range. Top performers over 70 included Georgia, Armenia, and Azerbaijan.

The engagement of organized criminal activities, encompassing practices such as extortion, bribery, and racketeering, introduces supplementary layers of risks and uncertainties into Public-Private Partnership (PPP) endeavors. Private investors may find themselves exposed to threats concerning their investments, possible disruptions to projects, and elevated expenditures stemming from coercive demands exerted by criminal entities. Organized crime networks frequently indulge in corrupt acts, including bribery and money laundering, thereby undermining the integrity of PPP initiatives. Such practices erode the trust between public and private collaborators, impede the equitable and transparent allocation of resources, and tarnish the fair conduct of PPP projects.

Furthermore, the participation of organized crime within PPP initiatives has the potential to distort market competition by bestowing unfair advantages upon criminal networks or their

associates. This could deter legitimate enterprises from engaging in PPPs, consequently engendering inefficiencies in project implementation and operation. The presence of organized crime within PPP projects has the propensity to generate adverse public perceptions, thereby besmirching the reputation of both the projects and the entities involved. This, in turn, could foment public skepticism, provoke protests, and elicit opposition to PPP undertakings.

In essence, the involvement of organized crime in PPP projects can precipitate amplified costs and project delays. Extortion and racketeering may necessitate the payment of additional fees or protection monies, thereby escalating the financial burden borne by project stakeholders. The nexus between PPP projects and organized crime can cast aspersions upon the reputation and standing of these projects and their associated entities, potentially resulting in an adverse public perception, protests, and resistance to PPP initiatives.

Moving on to the homicide rate all countries scored seemingly low levels approximating a range of 0.0007% to 0.001% per 100k people. This is advantageous for the likelihood of PPP attraction. A study conducted by Weiss et al. (2018) delves into the correlation between perilous alcohol consumption and cross-national homicide rates. The outcomes suggest a positive linkage between hazardous consumption patterns and homicide rates (Weiss et al., 2018). This infers that countries with elevated homicide rates may concurrently exhibit heightened levels of perilous alcohol consumption, with potential repercussions for the overall investment climate and the appeal of Public-Private Partnership (PPP) projects.

Furthermore, the study identifies the quality of governance and the prevalence of alcohol consumption as moderators in the association between hazardous alcohol consumption and homicide rates (Weiss et al., 2018). This intimates that nations characterized by weaker governance structures and heightened levels of alcohol consumption may experience more pronounced effects on their homicide rates.

While not directly tethered to PPPs, it's worth noting that the well-established correlation between crime rates and economic development is pertinent. Elevated crime rates, including homicides, can exert adverse effects on economic growth, investment activity, and business confidence (Weiss et al., 2018). These indirect consequences can potentially reverberate within the domain of PPPs, as investors might be reluctant to partake in projects situated in countries beset by elevated crime levels.

The next part of the analysis moves to the remaining pillars of overall security. In the Terrorism section in Table 4 Overall Security indicators for PPPs in Countries (2nd part) the levels achieved by all countries seems to convert to absolutely no incidence with the exception of Ukraine attaining 75.9/100.

Table 4 Overall Security indicators for PPPs in Countries (2nd part)

COUNTRY	TERRORISM INCIDENCE 0(VERY HIGH) - 100 (NO INCIDENCE)	RELIABILITY OF POLICE SERVICES 0 - 100 (BEST)
ALBANIA	99.9	56.1
ARMENIA	99.9	66.7
AZERBAIJAN	99.7	76
BELARUS	*	*
BOSNIA AND HERZEGOVINA	99.9	45
BULGARIA	99.9	47.6
GEORGIA	99.7	70.7
KAZAKHSTAN	99.8	52.4
KOSOVO	*	*
KYRGYZ REPUBLIC	99.8	37.5
MOLDOVA	100	44.2
MONTENEGRO	100	58.9
NORTH MACEDONIA	99.9	39.1
SERBIA	99.9	51.2
TAJIKISTAN	99.7	59.9
UKRAINE	75.9	46.2
UZBEKISTAN	*	*

Source 4. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

It is quite sufficient to infer the effect of terrorism on the economic, social, and overall, wellfare of a country, thus impacting the PPPs accordingly.

Passing on to the reliability of police services in Table 4 Overall Security indicators for PPPs in Countries (2nd part) where several Countries are positioned below the 50-point mark. An investigation conducted by Gazley (2008) delves into the extent and character of informal alliances between government entities and nonprofit organizations. The study underscores the significance of trust and behavioral norms within the domain of public-private partnerships, positing that in many instances, community norms act as substitutes for formal service agreements within these partnerships. This indicates that trustworthiness and dependability in services provided by public institutions, such as law enforcement agencies, can wield considerable influence in nurturing prosperous partnerships.

In a parallel vein, research undertaken by Stanko & Bradford (2009) centers on the theme of public confidence in policing and its repercussions on the Metropolitan Police Service (MPS) in the United Kingdom. The study identifies four pivotal constituents that exert a substantial impact on public confidence in policing: perceptions of the efficacy of law enforcement, the equity of individual treatment, the degree of police engagement with the community, and apprehensions regarding local disorder. These components underscore the critical role of dependable and efficient police services in cultivating trust and confidence among the populace.

While not directly aligned with Public-Private Partnerships (PPPs), the insights gleaned from these studies proffer the notion that the reliability of police services can bear ramifications for collaborations involving the public sector. Trust and confidence in public institutions, including law enforcement agencies, constitute essential cornerstones for the establishment of thriving affiliations with the private sector.

Referring to Table 2. WEF indicators for PPPs in Countries all of them achieved below 70 with Georgia being the highest at 60/100. This might reflect negatively on PPPs. The presence of checks and balances assumes a pivotal role in shaping the efficacy and consequences of Public-Private Partnerships (PPPs), as expounded by Cepparulo (2023). While there exists, limited research dedicated explicitly to the direct interplay between checks and balances and PPPs, extant studies offer insights into the broader governance context and its ramifications on collaborative ventures.

Checks and balances encompass the mechanisms and institutions that underpin accountability, transparency, and impartiality within the decision-making framework (Cepparulo, 2023). These mechanisms may encompass the segregation of powers, an autonomous judiciary, and supervisory entities. Robust checks and balances can engender several impacts on PPPs.

Primarily, they can elevate the transparency and accountability quotient of PPP undertakings (Cepparulo, 2023). These mechanisms furnish avenues for oversight and scrutiny, thereby ensuring that determinations pertaining to PPPs transpire in an equitable and unprejudiced manner. This, in turn, can forestall instances of corruption, bias, and other forms of misconduct, consequently safeguarding the public interest.

Secondly, checks and balances can contribute to the stability and credibility of PPPs (Cepparulo, 2023). They serve as a framework for the resolution of disputes and the handling of conflicts of interest, which may arise during the implementation and operation phases of PPP projects. This engenders a sense of assurance among stakeholders, encompassing private investors,

financiers, and the public, thus fostering a more conducive milieu for the accomplishment of prosperous partnerships.

Moreover, checks and balances are instrumental in mitigating the political risks that are often intertwined with PPPs (Cepparulo, 2023). They establish an accountability system that diminishes the likelihood of arbitrary policy alterations or unwarranted interventions in PPP projects. This stability and predictability hold immense significance in attracting private investments and ensuring the enduring viability of PPPs.

As done to the overall security , the indicator in question has been broken down into 4 main components: Budget Transparency, Judicial independence, Efficiency of legal framework in challenging regulations, and Freedom of the press.

Table 5. Overall Checks and Balance indicators for PPPs in Countries (1st part)

COUNTRY	BUDGET TRANSPARENCY 0-100 (BEST)	JUDICIAL INDEPENDENCE 0-100(BEST)
ALBANIA	50	18.4
ARMENIA	53.1	49.3
AZERBAIJAN	34	60.7
BELARUS	*	*
BOSNIA AND HERZEGOVINA	35	20.4
BULGARIA	66	38
GEORGIA	82	42.5
KAZAKHSTAN	53	48.6
KOSOVO	*	*
KYRGYZ REPUBLIC	55	32.8
MOLDOVA	58	21.4
MONTENEGRO	36.3	50.9
NORTH MACEDONIA	37	23
SERBIA	43	34.1
TAJIKISTAN	30	55.6
UKRAINE	54	33
UZBEKISTAN	*	*

Source 5. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

For budget transparency in Table 5. Overall Checks and Balance indicators for PPPs in Countries (1st part) Georgia led the other countries at 82/100 with a 16-point difference from Bulgaria in second place. All other countries performed around the 50-point mark or below.

One favorable consequence of budget transparency in the realm of Public-Private Partnerships (PPPs) is the heightened level of accountability and oversight it engenders. The provision of transparent and accessible budgetary and financial data pertaining to PPP projects to the public facilitates increased scrutiny, thereby ensuring the efficient and effective utilization of public funds (Hellowell, 2019). This transparency acts as a deterrent against corruption, mismanagement, and extravagant expenditures, consequently bolstering the credibility and reliability of PPP initiatives.

Budget transparency also serves to foster equitable competition and provide equal opportunities for private sector involvement in PPPs. The ready availability of information concerning project budgets, procurement procedures, and contractual terms creates an equitable playing field for prospective private partners, diminishing the risk of favoritism or unjust practices (Reynaers & Grimmelikhuijsen, 2015). This, in turn, has the potential to attract a broader pool of competent bidders, stimulating heightened competition and, potentially, yielding superior value for money and enhanced project outcomes.

Moreover, budget transparency can elevate public confidence in and support for PPPs. When citizens gain access to information pertaining to the costs, advantages, and risks linked to PPP projects, it nurtures a sense of trust and enables informed public discourse (Prijaković, 2022). This, in turn, can culminate in heightened acceptance and backing from the public, a pivotal factor for the successful realization and long-term sustainability of PPP endeavors.

Nonetheless, there exist potential drawbacks to budget transparency within the PPP context. One concern is the prospect of revealing sensitive commercial data that could compromise the competitiveness of private partners (Reynaers & Grimmelikhuijsen, 2015). Striking a balance between the imperative for transparency and the necessity to safeguard commercially sensitive information poses a challenge that policymakers and project stakeholders must navigate adeptly.

Additionally, an excessive degree of budget transparency, devoid of appropriate safeguards, can precipitate delays and inefficiencies in the procurement process. If every minutia of the budget and financial particulars is thrust into the public domain, it may dissuade private sector participation due to apprehensions regarding confidentiality and the safeguarding of intellectual property rights (Hellowell, 2019). It becomes imperative to strike an equilibrium between transparency and confidentiality to ensure the seamless functioning of PPPs.

The countries with higher scores for budget transparency must have the right balance between the effective usage of such policy to attract investors in PPPs to the conservation of the credibility and trustworthiness of such reports.

In the context of Table 5. Overall Checks and Balance indicators for PPPs in Countries (1st part) Judicial independence plays a crucial role in the success of public-private partnership (PPP) projects and investments. Several studies have examined the relationship between judicial independence and PPP projects, highlighting its impact on investment decisions and outcomes.

A study conducted within Indonesia has discerned that control over corruption, closely intertwined with the concept of judicial independence, exerts a notably positive influence on the overall investment volume of Public-Private Partnership (PPP) projects (Grafitanti & Ubed, 2022). This underscores the proposition that a robust and autonomous judiciary holds the potential to curtail corruption and cultivate a conducive milieu for private sector involvement in PPP ventures.

Similarly, another study underscores the paramountcy of curtailing corruption through the instrument of judicial independence. It establishes a constructive correlation between reduced corruption and both the proliferation of PPP projects and the cumulative investment therein (Fleta-Asín & Muñoz, 2021). The eradication of corruption can serve to mitigate the adverse repercussions of risks borne by the private sector, thereby serving as a catalyst for augmented private investment in PPP undertakings.

Moreover, it has come to light that the degree of corruption exhibits an inversely proportional relationship with the quantum of investment in PPP projects, particularly in nations that are less developed (Fleta-Asín & Muñoz, 2021). This posits that a robust and autonomous judiciary can function as a mitigating force against corruption risks while concurrently attracting heightened levels of investment into PPP initiatives.

In addition to corruption, other factors like completion risk and project profitability cast their influence on private sector investment determinations in PPP projects (Geng et al., 2022). A judiciary characterized by predictability and impartiality can furnish a legal assurance and curtail completion risk, thus beckoning private sector investments.

The countries of Albania (18.4) , Bosnia and Herzegovina (20.4), Moldova (21.4), and North Macedonia (23) have all registered an alarming low score in the section on judicial independence. Azerbaijan at (60.7) is the best standout with respect to the other countries.

The Next step for the study is to move on to the remaining component of overall checks and balance. The legal and regulatory framework surrounding PPP projects is crucial for attracting private investment. Referring to Table 6. Overall Checks and Balance indicators for PPPs in Countries (2nd part) the efficiency of legal framework in challenging regulations registered for most below 50 with Azerbaijan standing out at 61.

Table 6. Overall Checks and Balance indicators for PPPs in Countries (2nd part)

COUNTRY	EFFICIENCY OF LEGAL FRAMEWORK IN CHALLENGING REGULATIONS 0-100(BEST)	FREEDOM OF THE PRESS 0-100(BEST)
ALBANIA	22.3	70.2
ARMENIA	48	71
AZERBAIJAN	61	40.9
BELARUS	*	*
BOSNIA AND HERZEGOVINA	13.2	71
BULGARIA	38.2	64.9
GEORGIA	44.6	71
KAZAKHSTAN	42.4	47.2
KOSOVO	*	*
KYRGYZ REPUBLIC	31.6	70.1
MOLDOVA	27.3	68.8
MONTENEGRO	47.4	67.3
NORTH MACEDONIA	23.5	68.3
SERBIA	33.7	68.8
TAJIKISTAN	51.8	46
UKRAINE	33.6	67.5
UZBEKISTAN	*	*

Source 6. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

The effectiveness of the legal framework in challenging regulatory aspects exerts a substantial influence on the landscape of Public-Private Partnership (PPP) projects and investments. A meticulously crafted and efficient legal framework has the capacity to foster a favorable milieu, enticing private sector engagement and investments in PPP endeavors. An investigation carried out in Zambia underscored how the absence of a legal and regulatory framework specific to PPPs impeded the participation of the private sector in such projects (Muleya et al., 2019).

An exploration of concession-based PPP undertakings accentuated the pivotal role played by an efficient legal and regulatory framework in the triumph of PPP initiatives (Opawole et al., 2019). This scrutiny revealed that states boasting successful PPP models attributed their accomplishments to the presence of a streamlined legal framework. This underscores that a well-structured and efficient legal framework can contribute positively to the performance of concessionaires involved in PPP projects.

Moreover, the dearth of a legal and regulatory framework tailored to PPPs can serve as a hindrance to private sector involvement in these projects (Muleya et al., 2019). The study underlines the imperative for governments to establish legislation and regulatory frameworks that facilitate the execution of PPP projects and allure both domestic and foreign investors. In the absence of a clearly delineated legal framework, ambiguity, and a trust deficit may prevail between the public and private sectors, potentially dissuading private-sector investments.

Furthermore, a study centering on the educational sector within Egypt identified pivotal success factors for PPP projects, one of which is the presence of a supportive legal framework (Helmy et al., 2020). The research accentuated that a well-defined legal framework plays an indispensable role in establishing unambiguous roles, responsibilities, and contractual arrangements between the public and private sectors. Such clarity can serve to mitigate risks and ensure the seamless execution of PPP projects.

An efficient legal framework also possesses the capacity to address regulatory hurdles that may arise during the lifecycle of PPP projects. It can furnish mechanisms for dispute resolution, contract enforcement, and adherence to regulations, all of which are pivotal in upholding the stability and sustainability of PPP projects. Countries scoring below 50 in the sector face negative impacts and a barrage of regulatory conflicts.

Referring to Table 6. Overall Checks and Balance indicators for PPPs in Countries (2nd part) and addressing freedom of the press one finds contradictory to Efficiency of legal framework in challenging regulations Azerbaijan ranks lowest with 40.9. most of other countries achieved a score above the 50 marks one in opposition to the previous indicator.

The role of press freedom significantly influences the landscape of public-private partnership (PPP) initiatives and investments. A press that operates without constraints is vital for advancing transparency, accountability, and effective governance, which are pivotal factors in attracting private sector involvement in PPP undertakings.

One of the key benefits of an unrestricted and autonomous press lies in its capability to uncover and reveal instances of corruption and malpractice within the domain of public procurement, including PPP projects. Investigative journalism assumes a central role in exposing irregularities, cases of bribery, and indications of favoritism – all elements that may deter private sector investors from participating in PPP ventures (Muleya et al.,2019). By shedding light on such

issues, the media serves as a vigilant watchdog, holding public officials responsible and upholding the integrity and transparency of processes.

Furthermore, a free press fulfills the critical function of furnishing potential investors with essential insights into the associated risks and opportunities inherent to PPP projects. Through diligent investigative reporting and rigorous analysis, the press can accentuate facets such as financial viability, project performance, and potential hurdles specific to certain undertakings. This information equips investors with the knowledge required to make well-informed decisions and evaluate the feasibility of channeling investments into PPP initiatives.

Additionally, an independent press contributes to the broader landscape of public discourse and deliberation concerning PPP projects, ushering in a more inclusive and participatory decision-making process. By providing a platform that accommodates a multitude of perspectives and opinions, the press fosters dialogues pertaining to the social, economic, and environmental repercussions of PPP projects. It ensures that the interests of all stakeholders, including local communities, are duly considered throughout the phases of project planning and execution.

However, it is imperative to acknowledge that the freedom of the press should be accompanied by responsible journalism practices. Sensationalism, the dissemination of misinformation, and biased reporting can engender adverse repercussions for PPP projects and potential investments. Therefore, it remains crucial for the press to adhere steadfastly to ethical standards and furnish the public with information that is both precise and well-balanced.

Finalizing the WEF analysis in countries it is crucial to mention the overall property rights present in Table 2. WEF indicators for PPPs in Countries translated into Albania , Uzbekistan and Bosnia and Herzegovina ranking bottom with 41.7/100 , 42.1/100 and 37.5/100 respectively.

Table 7. Overall property rights indicators for PPPs in countries

COUNTRY	INTELLECTUAL PROPERTY PROTECTION 0-100(BEST)	QUALITY OF LAND ADMINISTRATION 0-100(BEST)
ALBANIA	35	51.7
ARMENIA	53.8	68.3
AZERBAIJAN	70.4	58.3
BELARUS	*	*
BOSNIA AND HERZEGOVINA	31.8	43.3
BULGARIA	45	63.3
GEORGIA	46.5	71.7
KAZAKHSTAN	50.9	83.7

KOSOVO	*	*
KYRGYZ REPUBLIC	40.2	80
MOLDOVA	47.1	73.3
MONTENEGRO	48.2	58.3
NORTH MACEDONIA	37.6	83.3
SERBIA	44.5	60
TAJIKISTAN	55.5	25
UKRAINE	39.4	48.3
UZBEKISTAN	*	*

Source 7. Values taken from The Global Competitiveness Report 2019 by Klaus Shwab

Property rights have a significant impact on public-private partnership (PPP) projects and investments, both positively and negatively. The protection and enforcement of property rights are crucial for creating a favorable investment environment and attracting private sector participation in PPP projects.

One favorable aspect associated with property rights is their capacity to instill a sense of security and assurance among investors about their financial commitments. In instances where property rights are meticulously defined and safeguarded, investors are afforded the confidence that their investments will receive due protection and that they will retain the prerogative to employ, transfer, and capitalize on their assets. This, in turn, fosters an environment conducive to private sector involvement in PPP projects, as investors exhibit greater willingness to allocate their resources when they hold trust in the safeguarding of their property rights (Grafitanti & Ubed, 2022).

Moreover, property rights serve as a catalyst for the efficient allocation of resources within the context of PPP projects. The lucidity and precision that characterize well-established property rights empower the private sector to formulate judicious investment decisions. By having the capacity to gauge the prospective returns and potential hazards associated with their investments, the private sector can achieve more streamlined and judicious resource allocation. Consequently, this augments the overall performance and efficacy of PPP projects (Wang et al., 2019).

Conversely, it is worth noting that property rights can potentially exert adverse repercussions on PPP projects and investments. On certain occasions, property rights may remain obscure or disputed, precipitating conflicts, and encumbering the execution of projects. The ambiguity surrounding property rights can pose hindrances for private sector investors, as they may grapple with difficulties related to procuring and exploiting the essential assets for PPP projects (Shen et al., 2016).

Furthermore, the sphere of property rights can be influenced by political factors and fluctuations in government policies. Political instability and alterations in regulatory frameworks have the potential to erode property rights, thereby generating risks for private sector investors. The uncertainty stemming from property rights concerns intertwined with political variables may dissuade private sector engagement in PPP projects, as investors may perceive elevated risks and diminished returns (Sy et al., 2017).

As done with previous indicators the breakdown of an overall indicator is fundamental for the understanding of the constituents weighing in on it. The overall property rights are dissected into two elements: intellectual property rights and quality of land administration.

In Table 7. Overall property rights indicators for PPPs in countries Azerbaijan led with 70.4 in comparison to other countries lingering around the 50-mark in the category of intellectual property rights.

It is essential to acknowledge that Intellectual Property Rights (IPRs) can exert both advantageous and detrimental influences on Public-Private Partnership (PPP) projects and investments. One favorable facet of IPRs is their capacity to stimulate innovation and technological progress. Robust protection of IPRs serves as an impetus for private sector investment in research and development, as it empowers companies to secure exclusive rights to their innovations and creations. This, in turn, can engender the emergence of novel technologies and solutions that hold the potential to augment the efficiency and efficacy of PPP projects (Harstad, 2015).

Furthermore, IPRs can facilitate the transfer of technology and the dissemination of knowledge within the domain of PPP projects. Through licensing arrangements, holders of technology can transfer their intellectual property to other entities, including public sector bodies participating in PPP projects. This can facilitate the adoption of pioneering technologies and elevate the caliber and performance of infrastructure and services (Harstad, 2015).

Nevertheless, it is imperative to recognize the potential adverse repercussions of IPRs on PPP projects and investments. Vigorous safeguarding of IPRs can engender monopolistic practices and impede healthy competition. When intellectual property rights assume an excessively restrictive character, they can curtail the capacity of other market participants to access and utilize patented technologies, thus inflating costs and diminishing the efficiency of PPP projects (Harstad, 2015).

Moreover, the elevated expenses associated with the acquisition and enforcement of IPRs may pose entry barriers for smaller enterprises and startups. This predicament has the potential to constrict competition and innovation within the realm of PPP, given that smaller entities may grapple with competitive challenges against more substantial corporations endowed with superior resources for investing in intellectual property protection (Harstad, 2015).

Furthermore, IPRs can introduce complexities into the negotiation and implementation of PPP agreements. The aspects of intellectual property ownership and licensing terms necessitate meticulous deliberation and negotiation to guarantee the safeguarding of the rights and interests of all stakeholders involved. Disputes pertaining to intellectual property rights can precipitate delays and escalated costs within the domain of PPP projects (Zhen et al., 2021).

The general observation of the countries (except Azerbaijan) is in Table 7. Overall property rights indicators for PPPs in countries show a mismatch of the right amount of IPRs to be implanted to positively impact PPPs to the negative amount that would be detrimental to them.

Lastly, it is worth considering in Table 7. Overall property rights indicators for PPPs in countries the quality of land administration. It is evident that a great disproportionality is in play where Tajikistan ranks bottom at 25 with the closest being Bosnia and Herzegovina at 43.3 hence an 18.3 difference.

The variation in the effectiveness of land administration systems can exert substantial influences on the appeal of Public-Private Partnership (PPP) projects and investments. The references cited offer insights into diverse facets pertaining to land administration and its sway over PPP endeavors. One pivotal element underscored in these references pertains to the risk perception correlated with land acquisition and compensation (Likhitruangsilp et al., 2017). The unpredictability and protraction inherent in these procedures may introduce risks for private sector investors, who might grapple with obstacles in procuring the requisite land for PPP projects. This, in turn, may discourage the participation and investment of the private sector.

Furthermore, the availability of land and its expeditious acquisition represent pivotal prerequisites for the efficacious execution of PPP projects (Nguyen et al., 2020). Delays or complications encountered during the land acquisition phase can culminate in project postponements, budget overruns, and potentially, project abandonment (Rohman, 2021). Consequently, the presence of efficient and transparent land administration processes assumes an indispensable role in engendering private sector investment interest in PPPs.

The caliber of land administration concurrently influences the feasibility and financial viability of PPP projects. Proficient land administration instills confidence in investors by upholding unequivocal property rights and securing land tenure (Shen et al., 2016). These facets are pivotal for investors to repose trust in their investments. Furthermore, they cultivate a stable and anticipated environment for private sector participants, empowering them to appraise the attendant risks and returns associated with their investments.

5. Regression Test

In statistical analysis, regression serves as a technique employed to discern the connections among variables within a given dataset. It has the capacity to reveal both the extent of such

relationships and assess their statistical significance, essentially determining whether these associations are likely attributable to random chance. Regression stands as a potent tool for making statistical inferences and has also been applied in attempts to forecast future outcomes based on prior observations.

More specifically, statistical regression testing concentrates on utilizing regression analysis to scrutinize the interplay between variables and make predictions or draw conclusions. In this context, the dependent variable pertains to the cumulative total of investments made by Public-Private Partnerships (PPPs) for all countries in Eastern Europe and Central Asia. Meanwhile, the independent variables encompass the macro-level factors characteristic of these respective countries.

5.1. Variables Analysis

Macro variables combination per country of all countries in eastern Europe and central Asia that have been discussed previously have been chosen for this test. As seen in Table 8. Macro variables calculations for :

- Gross Domestic Product (GDP) of the countries' data indicates a wide range of GDP values, with a significant standard deviation, suggesting substantial variation between the countries. The next variable represents the average GDP growth rate. The data shows relatively low variability, with most entities experiencing moderate GDP growth.
- For the average inflation rate, there is a wider range of inflation rates, with a moderate standard deviation, indicating variability in inflation across the countries. After is the average level of political stability where the is some variation in political stability, with a moderate standard deviation.
- The data indicates a moderate level of variation in GDP per capita. For the standard deviation of the official exchange rate, there exists significant variability in exchange rates, with a very high standard deviation. Considering average population density, it's clear that variation in population density across countries, with a moderate standard deviation.
- We move to the average population growth rate where data suggests relatively low population growth rates on average, with a small standard deviation. Lastly is the surface area of the countries. The data shows a wide range of surface areas, with a moderate standard deviation.

Table 8. Macro variables calculations for countries

VARIABLES	LOWER QUARTILE	MEDIAN	UPPER QUARTILE	STD. DEVIATION
AVERAGE GDP	6780448431	11689360151	43351751483	35605434879

AVERAGE GDP GROWTH	0.03	0.04	0.06	0.01835115
AVERAGE INFLATION	0.03	0.06	0.115	0.08877
AVERAGE POLITICAL STABILITY	0.255	0.35	0.515	0.161286191
AVERAGE GDP PER CAPITA PPP CURRENT INTERNATIONAL$	8007.575	9223.372037	9223.372037	4264.683153
STDV OFFICAIL EXCHANGE RATE	0.297684449	3.357862284	22.27119391	980.2956461
AVERAGE POPULATION DENSITY PEOPLE PER SQKM OF LAND AREA	49.17884932	71.82536619	95.18779125	28.92899987
AVERGE POPULATION GROWTH	-0.01	0	0.01	0.01061
SURFACE AREA SQKM	30766.84783	87406.73913	92233.72037	9223.372037

5.2. Regression Analysis

The analysis is conducted to discover any positive relationships between the dependent variable on those of the independent variables. First, the presence of multicollinearity among the independent variables was investigated via the calculation of the variance inflation factor (VIF). “The VIF evaluates the relationship between an independent variable and all the other independent ones within the model, and it is calculated as $1/(1-R2)$, where R2 is the coefficient of determination of one predictor on all the others” (De Marco, Mangano & Narbaev, 2017). It represents the proportion of variance in the independent variables under study that is associated with the other independent variables in the model (De Marco, Mangano & Narbaev, 2017).

Variables with a VIF greater than 5 are subject to exclusion from the model (Tabanick and Fidell, 2001), as this would lead to erratic estimation of the regression coefficient (O’Brien, 2007). For all variables considered the associated VIFs are lower than 5. A VIF value between 1 to 5 is appreciated. For the results to be valid, the significant p-factor must be of a certain value which would in turn show the reliability of the independent variable in question. A mean value of 0.05 was chosen as the benchmark for the significant factors. The analysis was carried out by using the linear regression analysis of IBM SPSS.

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Figure 8. Coefficients model regression un-iterated

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	636.656	2832.822		0.225	0.83		
AverageGDP	8.94E-08	0	1.275	3.071	0.022	0.214	4.681
AverageGDPGrowth	13331.248	37778.089	0.099	0.353	0.736	0.465	2.152
AverageInflation	-8935.894	6754.846	-0.316	-1.323	0.234	0.646	1.549
AveragePoliticalstability	4907.332	3611.609	0.322	1.359	0.223	0.658	1.521
AverageGDPpercapitaPPPcurrentinternational$	-0.025	0.156	-0.043	-0.159	0.879	0.502	1.99
stdvOfficailexchangeRate	1.085	0.638	0.432	1.7	0.14	0.572	1.75
AveragePopulationdensitypeoplepersqkmoflandarea	-18.012	29.699	-0.205	-0.607	0.566	0.322	3.107
AvergePopulationgrowth	-112194.666	78214.978	-0.469	-1.434	0.201	0.344	2.907
Surfaceareasqkm	-0.004	0.002	-0.938	-1.808	0.121	0.137	7.316
Dependent Variable: SumofTotalInvestmentm$							

As an initial look to Figure 8. Coefficients model regression un-iterated surface area is of VIF>5 and for the sake of multi-collinearity proofing must be eliminated. Average GDP although lingering

around VIF=5 with VIF of 4.681 is of significance (0.022) below the target of 0.05 significance value. Such a value is of positive consequence to the dependent variable. Three variables exhibit a sig (significance) higher than 0.5 which is troubling for the study. However, all other variables' VIFs are appreciated in the zone of 1 to 5.

As in Figure 9. Anova analysis un-iterated the significance level is at 0.155 which is not so close to 0.05 mark but in a range that can be adjusted for a better result. The anova analysis observes 9 degrees of freedom for regression and 6 degrees of freedom for residuals for a total of 15 degrees of freedom.

F-statistic is a measure of the ratio of the variance explained by the model (regression) to the variance due to random error (residuals).It quantifies the extent to which the group means differ from each other relative to the variability within each group. A larger F-value suggests that the group means are more different from each other, which may indicate a significant effect. In this case F-statistic resides at 2.35

Figure 9. Anova analysis un-iterated

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	75392724.15	9	8376969.35	2.35	0.155

Residual	21383714.3	6	3563952.383
Total	96776438.45	15	

A first iteration is done as in Figure 10. Coefficients model regression First iteration where surface area is eliminated. VIF of all variables decreases while there remains three variables of significance > 0.5.

Figure 10. Coefficients model regression First iteration

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	165.326	3245.712		0.051	0.961		
AverageGDP	4.65E-08	0	0.664	2.396	0.048	0.636	1.573
AverageGDPGrowth	-20972.594	37586.762	-0.156	-0.558	0.594	0.621	1.609
AverageInflation	-2929.77	6767.137	-0.104	-0.433	0.678	0.852	1.174
AveragePoliticalstability	4635.336	4152.04	0.304	1.116	0.301	0.659	1.518
AverageGDPpercapitaPPPcurrentinternational$	-0.093	0.174	-0.161	-0.533	0.61	0.533	1.874
stdvOfficailexchangeRate	1.124	0.734	0.447	1.531	0.17	0.572	1.748
AveragePopulationdensitypeoplepersqkmoflandarea	17.49	25.633	0.199	0.682	0.517	0.572	1.748
AvergePopulationgrowth	-121031.291	89821.04	-0.506	-1.347	0.22	0.345	2.896
Dependent Variable: SumofTotalInvestmentm$							

Regarding the Anova analysis in Figure 11. Anova analysis First iteration the F-statistic showed a much lower value at 1.69 thus being negatively impacted with a higher significance at 0.252. The increase in sig implies a worse correlation among variables as such the variables with higher sig are to be eliminated. Degrees of freedom regression wise decrease to 8 while that of residual increase to 7.

Figure 11. Anova analysis First iteration

ANOVA

	Sum squares	df	Mean Square	F	Sig.
Regression	63746637.1	8	7968330	1.69	.252
Residual	33029801.4	7	4718543		
Total	96776438.5	15			

In the final version of the coefficient model in Figure 12. Coefficient Model Regression of final iteration while still preserving the targeted region of VIF for all variables it is observable that the sig has decreased for all as well. Average GDP records 0.01 much lower than 0.05 target. Average population has 0.02 sig as well which ranks it along with average GDP as most significant to the dependent variable respective.

Figure 12. Coefficient Model Regression of final iteration

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-48.035	1454.931		-0.03	0.97		
AverageGDP	3.87E-08	0	0.55	2.894	0.01	0.989	1.01
AveragePoliticalstability	3148.035	3348.568	0.203	0.94	0.37	0.768	1.3
stdvOfficailexchangeRate	1.158	0.633	0.454	1.829	0.09	0.581	1.72
AvergePopulationgrowth	-141509.08	53318.97	-0.6	-2.65	0.02	0.7	1.43
Dependent Variable: SumofTotalInvestmentm$							

In accordance with Figure 13. Anova analysis for final iteration the F-statistic increased way more than previous iteration showcasing a stronger positive significance effect. The sig at 0.028<0.05 hits the target set for the test achieving a sign of notable significance between variables . Thus this calls to accept the null hypothesis.

Moreover, it is evident the distribution of four degrees of freedom for the regression side in comparison with twelve degrees of freedom for the residual side adding to sixteen degrees of freedom in total.

Figure 13. Anova analysis for final iteration

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	57202146.12	4	14300536.53	3.992	0.028
Residual	42987248.24	12	3582270.687		
Total	100189394.4	16			

5.3. Boxplot Analysis

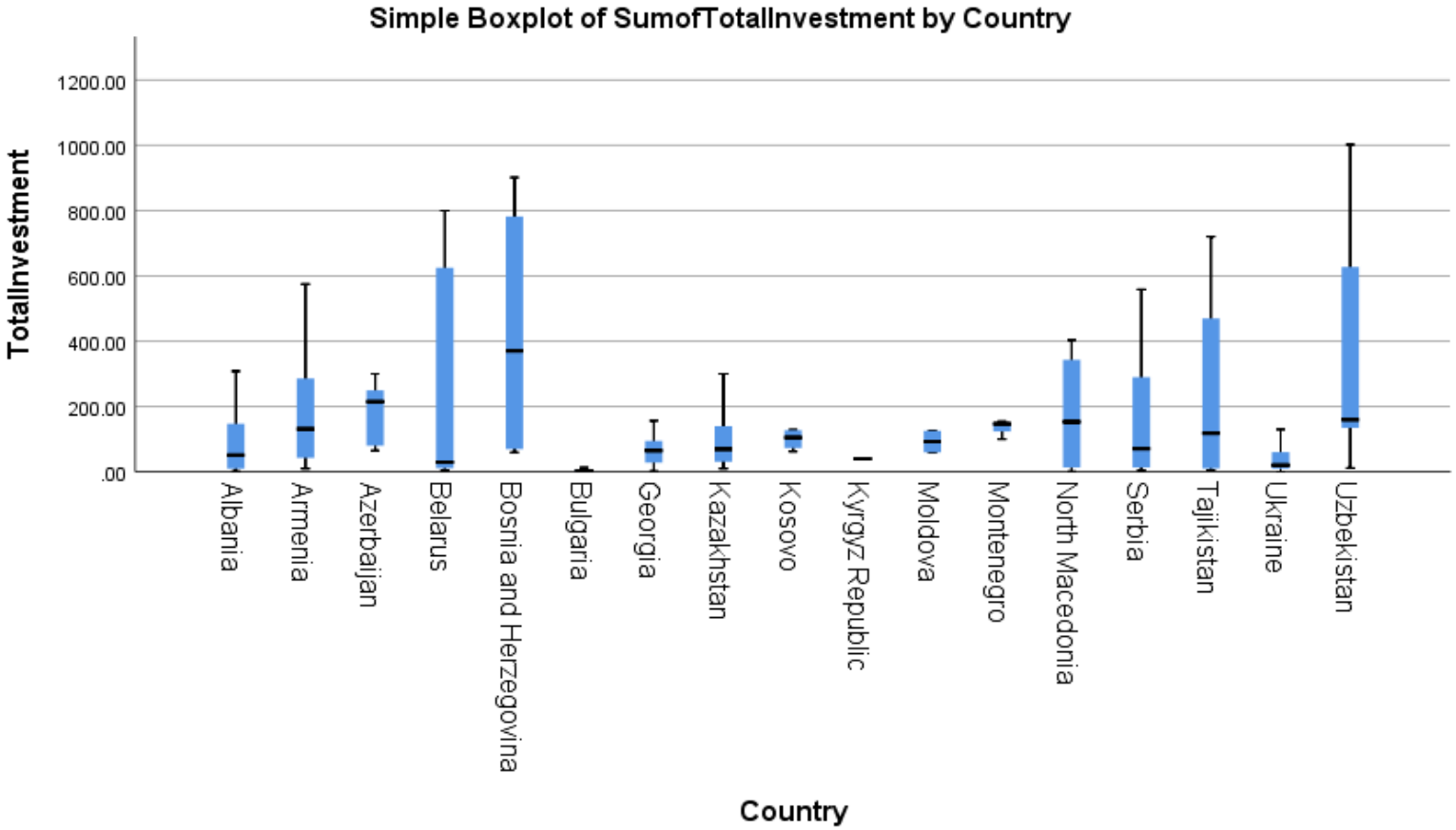
The box in the plot represents the interquartile range (IQR), which contains the middle 50% of the data. The box is drawn from the first quartile (Q1) to the third quartile (Q3). The length of the box is the IQR, which is a measure of the data's spread. It consists of multiple factors such as:

- Median Line: A vertical line or marker inside the box represents the median (Q2) of the data, which is the middle value when the data is sorted.
- Whiskers: The whiskers extend from the edges of the box to the minimum and maximum values within a defined range. The range is typically calculated as 1.5 times the IQR. Data points beyond this range are considered outliers and are plotted individually as points (outlier dots).
- Outliers: Data points that fall outside the whiskers' range are considered outliers. Outliers can be valuable for identifying unusual or extreme values within the dataset.

A variation of median levels for the countries is witnessed in Figure 14. Dependent variables per country through boxplot showing the vast median distribution of investments between the countries. The outliers are not present in the boxplot as they have been eliminated for a better reading. The graphing of boxplot has been done with the aid of IBM SPSS. The data included that of sum of total investments already mentioned in the PPI indicators section.

Bosnia and Herzegovina have the highest median of investment at 370.34 with 2nd largest variance in investment. It is led by Uzbekistan in the respective of variance that reaches around 1000 while the median only rates at 159.78. Belarus achieves 3rd biggest variance while only amounting to 29.25 in median level which is a low-level amount with respect to the countries analyzed. Azerbaijan has 216 in investment median while a mid-size variance. All other countries attain a median level below the 200 marks. Notably, Bulgaria with 3 median level is

lowest among all others while also realizing the smallest variance. Kyrgyz Republic has the 2nd smallest variance with a median level at 40.



Those with greatest variance (longest bars) indicate a higher roof of instability in yearly investments compared to those of more compact size (shorter bars) with respect to their

Figure 14 Dependent variables per country through boxplot

median level. This denotes a lack of consistency policy of in investments in PPPs.

6. Conclusion

The adoption of Public-Private Partnerships (PPPs) has witnessed a significant surge over time, with their far-reaching impact evident across various sectors spanning from infrastructure and energy to healthcare in numerous countries. Nonetheless, there exist specific policies and suggestions that can facilitate the prosperous execution of PPP projects and investments.

To encourage private sector participation in Public-Private Partnership (PPP) initiatives in Eastern Europe and Central Asia, it is imperative to enact a series of pivotal policies.

First and foremost, governments must establish an amenable legal and regulatory framework that furnishes private sector investors with clear and stable guidelines. This entails the enactment of laws safeguarding the rights of private investors, guaranteeing transparency throughout procurement procedures, and instituting mechanisms for dispute resolution. By ensuring a steadfast and predictable environment, governments can instill confidence in private sector investors, thus stimulating their active involvement in PPP initiatives.

Additionally, governments should proactively collaborate with the private sector and integrate them into the decision-making process. This can be achieved through ongoing consultations, the establishment of platforms for public-private dialogues, and the creation of dedicated PPP units within government entities. By engaging private sector expertise early in the project development stages, governments can leverage their knowledge to ensure that projects are conceived and executed in a manner that aligns with the interests of both the public and private sectors.

Furthermore, governments should advocate for transparency and accountability within PPP programs. This encompasses conducting comprehensive due diligence on prospective private sector partners, ensuring competitive bidding processes, and consistently monitoring and assessing the performance of PPP projects. By championing transparency and accountability, governments can foster trust among private sector investors and underscore their commitment to fostering equitable and just partnerships.

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