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Economic integration of Germany with EU through Effective implementation of Public Private Partnership

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Abstract: This quantitative study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to investigate the efficacy of Public-Private Partnerships (PPPs) in fostering economic integration within the European Union (EU), with a specific focus on Germany. This study was grounded

in insights gathered from 250 respondents employed across various sectors of Public-Private Partnerships (PPPs) in Germany. It aimed to elucidate effective aspects of PPP strategies and identify areas requiring further enhancement. The key findings highlighted that the improved collaboration of stakeholders and enabling legal environment were part of the implementation success of the PPPs. The quantitative analysis revealed statistically significant relationships with a path coefficient of, respectively: 0.35 ($p < 0.01$) from stakeholder teamwork and 0.30 ($p < 0.01$) from regulatory environment effectiveness to correlate strongly with positive perceptions of PPPs performance. This study represented a very key contribution since there was a concentration on a gap within the existing studies that paid less attention to the exploration of the dynamic interplay of regulatory frameworks and collaboration of stakeholders in PPPs. In fact, the documentary analysis has been conducted to bolster findings and enhance the reliability of drawing conclusions. This approach did not only reiterate the general perceptions of the effectiveness of PPPs but also ground a basis for proposing legislative and strategic enhancements. This emphasized significant implications for policymakers and PPPs practitioners, highlighting that enhanced regulatory support and stakeholder collaboration would greatly enhance the contributions of PPPs toward the economic integration objectives of the EU. It, therefore, brought out the need for considering holistically the economic unity and cross-national alignment of regulatory considerations in the development of long-term PPPs strategies that contribute to the broader discourse in the EU on economic policy and infrastructure development.

Keywords: economic integration, economic policies, EU, Germany, PLS-SEM analysis, public private partnerships, regulatory frameworks, stakeholder collaboration.

Introduction

The rapid pace of change in the global economic landscape underscores the imperative for Public-Private Partnerships (PPPs) to assume a leading role in devising solutions to the challenges related to EU integration. Therefore, leveraging Germany's support of this dynamism, the paper investigates into the strategic potential of PPPs to bolster cohesion within the economic fabric of the EU. This study, therefore, proposed an understanding to fathom the knowledge of how the frameworks of collaborative economies could be optimized in exploring the effectiveness of PPPs in enabling structural and economic integration. The EU is not an exception when there are searches for innovations and solutions, which will help to further their positions in the complex world economy. Hence, this research may be deemed timely and commendable. The security, growth, and ability to fight on a global level of the EU rely on how well the member states can connect their businesses. The economic unity helps the EU deal with the complex global economy (Crnogaj and Rus, 2023), and the internal market functions better as a result. Here, PPPs play a crucial role, particularly in streamlining and improving the merger process. Germany serves as an exemplary case for examining the advantages and disadvantages of PPPs in fostering economic unity, given its robust economy and central position within the European Union (Tula et al., 2022).

Economic integration difficulties inside the EU need creative and collaborative measures due to the dynamic movements in the global economy. There is an increase in the importance of PPPs, somehow, as a mean for fostering economic unity in widely varying the economic contexts. This article, therefore, investigated into the strategic potential of the PPPs in ensuring and fostering economic integration among member states within the EU. By closely examining Germany, a nation that epitomizes the authority and pivotal position necessary to reap the benefits. And an effective strategy in the fulfillment of these developmental and infrastructure needs is adopting the PPPs model, where public control aligns with private sector efficiency. For the EU, it has been the PPPs that have been essential to integrating diverse economic systems constituting the bloc, which have at the same time

been handy instruments towards economic growth. A crucial initial step involves comparing the evaluation of such partnerships across the rest of the EU to the experiences observed in a robust economy like Germany, which is pivotal to the dynamics of the EU.

When a public or private institution is unable to adequately manage a project on its own, the public-private partnerships become necessary. This has been the case for many infrastructure projects and economic development programs. Germany offers a model, through the public-private partnerships, in transportation and digital infrastructure, that should be followed by the European Union. The opportunities and challenges to integrate such collaboration across the EU remain particular. Therefore, implementing PPPs proves to be a challenging strategy due to the variation in economic conditions, regulatory frameworks, and infrastructure needs among EU member states. These should look to Germany rather than Italy and Spain, which have both struggled with similar projects because of economic inequality and overcomplicated regulations.

The flexibility and adaptability of PPPs could be better comprehended by examining the utilisation of PPPs in other countries. One country that has used PPPs to upgrade its public infrastructure for a long time is the United Kingdom. Such concerns have spurred debates concerning the effectiveness of PPPs, even though there is a critical UK emphasis on contractual transparency and stakeholder participation, for example, in matters of financial sustainability and public accountability. The most recent cases, the COVID-19 pandemic in Canada, are a further example of when PPPs can be used to promptly mobilise the necessary resources in a crisis, paying attention to long-term budgetary effects (Akomea-Frimpong et al. 2023). Some of the emerging nations like India and Brazil, however, to their credit, have been able to reach out to resources through the use of PPPs in order to narrow their yawning infrastructure deficits (Kateja, 2012). The PPPs in renewable energy projects has thus helped India to meet its Sustainable Development Goals, while in Brazil, they raised the number of connected cities. They teach these institutions the benefits and risks of PPPs and at the same time, explain the European Union (EU) how PPPs can work out in different social and economic settings.

The benefits from the public-private partnerships (PPPs), in terms of resource pool-age and sharing of risk, are well known and rather widely researched. The public-private partnerships (PPPs) offer the potential to enhance speed in the delivery of projects, quality of services, and innovation through the use of technological and managerial skills already inherent in the private sector. On the flip side, however, major shortcomings are related to poorly managed PPPs. This can result from long-term financial obligations in public budgets, lack of transparency through complex contractual structures, and inequalities in the quality of service. The rules, economic goals, and progress on facilities of each partner country do not always work well with each other. It seemed like a smart idea to strike an agreement that uses both public and private funds. However, scholarly attention has been directed towards the notion that PPPs might enhance international cooperation. Vining et al. (2020) states that if a joint venture in Germany is successful, then similar endeavors may be possible across the EU.

The following paper tried to explore how PPPs could benefit Germany. The emphasis was placed on approaches that could aid in fortifying the economic cohesion of the EU. If taking the above into consideration, therefore, this strongly believes PPPs allow member states pooling their resources from the public and commercial sectors to work together more effectively on economic and infrastructural projects. Though the PPPs have great promise for fostering EU-wide economic integration, they will only be effective if developed with a keen eye for detail that takes into account the unique cultural, legal, and economic characteristics of each member state. To fully grasp the possibilities and difficulties of the PPPs, examining Germany as a case study is crucial, given its robust economic foundation and central role within the EU. The examination of Germany's PPPs will provide insight on the country's effective approaches to economic integration and infrastructure development, while also revealing the constraints and problems that other EU member states may face. This paper sought to address the challenges and opportunities that the PPPs present in a complex economic union by looking at the

German example and offering practical insights and strategic directions for using PPPs to strengthen economic integration and bonding across the EU.

Research Focus

This study aimed to examine different forms of PPPs in the European Union and to assess their efficacy and flexibility. It concentrated on Germany's strategic position and contribution in this evaluation. To ascertain the effectiveness of PPPs in fostering economic integration among EU member states, this study analysed them from both operational and strategic standpoints. The paper proceeded to further categorise and assess some other models of PPPs: *project finance, institutional and regulatory*. Project finance PPPs dominate the field of infrastructure, such as hospitals and highways. An institutional PPPs primarily involves collaboration between the public and private sectors to establish a new entity tasked with providing public services. Besides, there is also an institutional PPP that includes the private sector acting under the regulations put in place by the public-sector in-service delivery. This report, on the other hand, comparatively analysed these two models in order to understand their advantages and disadvantages in promoting economic links by taking a keen analysis of the implantation across different EU member states, especially Germany.

Building on the identification of these types of PPPs, the research then went on to explore the forms of policy, management practices, and relational structures underpinning these successful PPPs. It includes governance models, financial frameworks, risk managing strategies, and systems for performance monitoring. The aim was to identify mechanisms that are both strategic and operational, which can be either replicated or adapted, to enhance the effectiveness of PPPs on a broader scale within the EU. Question two of this paper answered how PPPs frameworks may be improved, especially for Germany. This paper solely focused on formulating recommendations for policy alterations, improving project monitoring, and enhancing collaboration with stakeholders, all of which were aimed at fostering more effective PPPs.

Research Aim

The research thus conducted an evaluation of the potential of PPPs in promoting cooperation and contributing to the achievement of broader economic development objectives across the EU Member States, ultimately facilitating economic integration. This research aimed to go beyond the typical emphasis on infrastructure and service supply by looking into strategic frameworks that might make PPPs in the EU better at implementation and monitoring. Its review was based on the strategic approaches to be used in enhancing the effectiveness and efficiency in PPPs. The evaluation was based on governance models, approaches to risk management, and systems for monitoring performance.

1. It was found out how different forms of effective PPPs in the EU and elsewhere have handled governance in order to better match public and private sector goals. The objective was to learn how different systems of government may be modified to fit the various economic and legal situations that exist inside the European Union.

2. The methods used to successfully manage the financial, operational, and political risks in PPPs projects were analysed. As part of this process, the study examined how PPPs manage unforeseen challenges and distribute risks.

3. The systems used to monitor and evaluate the performance of PPPs to ensure that they meet the agreed-upon economic and infrastructural goals were explored.

Research Questions

The effectiveness and improvement of PPPs in promoting economic links across EU member states were the driving forces behind this study's two main research issues. Taking into account the variety of PPPs models, this research sought to maximise the PPPs within the EU framework, with a special

emphasis on Germany's position, and to analyse the contributions of various PPPs types to economic cooperation.

1. How have certain relational frameworks, policy instruments, and managerial approaches aided public-private partnerships (PPPs) in strengthening economic ties across EU member states?

This question, therefore, assessed and categorised the various models of PPPs applied in the European Union in a manner that increases the cooperation within the zone in terms of economic development. This focused on identifying the relationship frameworks, effective policy tools, and management practices that have led to substantial economic gains. Hence, an identification of some of the characteristics and strategies that resulted in successful economic integration initiatives by differentiating among the various forms of PPPs.

2. What steps may be taken by the European Union, and Germany in particular, to enhance the development and execution of PPP strategies in order to bolster economic solidarity?

This issue explored into the necessary structural and operational changes in order to maximise the PPPs inside the EU, focusing on Germany's approach as a pivotal player. In this research, the groundwork for good PPPs frameworks, including the roles and duties, as well as the legal and financial criteria were analysed. The issue examined on the one hand, legislative environments that were conducive to PPPs, and, on the other, operational management practices that guaranteed the successful and long-term execution of PPPs.

Literature Review

Public-private partnerships are increasingly employed to stimulate national economies. The World Bank Group usually defines PPPs as an agreement between any public-sector organisation and any private-sector organisation. In line with this, they seek after funding and management of projects which would make a very substantial improvement to the lives of individuals or on the contrary for the whole organization (Whiteside, 2020). In general, there is no doubt that the PPPs is a very effective way of cooperation. The conclusion of such agreements allows significant breakthroughs in many directions, of which healthcare, education, infrastructure, and transportation take place. According to Pinilla-De La Cruz et al. (2022) this has induced structural changes in both society and the economy, demonstrating the transformative potential of PPPs. The latter can well be in line with the purposes of the Lisbon Strategy in stimulating more creative thinking and increasing competitiveness within the knowledge industry, where companies and governments of Europe pulled their forces together to achieve this (Pires et al., 2020). According to Maslova (2020), the principal point of PPPs in the EU is not financial gain, but for the government to understand a need to change something. The legislature should focus on strong economic development and, most importantly, economic unity. One of the reasons that may make some EU member states shy away from PPPs can be financial involvement, which may be detrimental to the countries involved. This justifies a need to know their results.

A number of EU member states have credited PPPs as a key factor in their rapid economic development and innovative spirit. France stands out as a nation that has extensively PPPs in the transportation sector. This is especially true when it comes to the creation of high-speed rail networks (Lynch, 2020). By improving connections and boosting economic growth in outlying regions, these initiatives have contributed to the Lisbon Strategy's goal of coordinated economic development. The budget overruns and contractual disputes are avoidable with robust governance frameworks and clear contractual norms in PPPs. Such model is well-established in the United Kingdom, especially in the healthcare and education sectors. Many quote the United Kingdom's exemplary PPPs as a model for

effective project management and timely project completion. It is an example of a significant barrier underlined by the UK experience: the skepticism in the PPPs agreements of value for money and quality of service by the public, and to balance both the objectives of the public sector with efficiency of the private sector, so that standards of service are not brought down, as witnessed in these cases.

The Scandinavian countries, with Sweden at the forefront, have pursued a somewhat distinct approach to PPPs, emphasising greener and more sustainable initiatives (Fell and Mattsson, 2021). One of the main goals of the Lisbon Strategy is sustainable development, and these projects often include stringent environmental regulations to achieve just that. The possibility for integrating sustainable economic growth with ecological preservation is shown by Sweden's achievements with green PPPs. A typical limitation in spreading PPPs across different countries is the high costs involved with integrating such sophisticated environmental technology. This poses a considerable obstacle, however. Countries in Southern Europe, like as Italy and Spain, have had mixed results with PPPs, in contrast to these instances (Baccaro and Bulfone, 2022). To improve their infrastructure, especially in the areas of solar power and transportation, these countries have used PPPs. Although these initiatives have helped with regional growth and economic integration, they have also encountered problems with long-term investment and uncertainty about the financial models used in PPPs due to financial instability and economic crises.

Germany and the wider EU setting may learn a lot from these regional experiences. While PPPs in France and the UK have been successful, the difficulties that have arisen have shown how important it is to plan ahead, have good governance, and align public and private interests in order to achieve the objectives of the Lisbon Strategy. Simultaneously, Sweden's innovative approaches offer insights into incorporating sustainability into economic growth plans that align with EU objectives. On the other hand, the lessons learned from Italy and Spain's problems highlight the dangers of economic instability and the need of steady economic circumstances for PPPs adoption to be a success.

PPP Mechanics and Economic Development

This has been a new collaboration approach with the public and private sectors. The development of public services and infrastructure always raises its head in an intricate problem; hence, such partnership is required. As articulated by experts from the World Bank, PPPs have the potential to serve as viable sources of program finance, given their inherent flexibility and creativity in the private sector (Dewulf and Garvin, 2020). Berisha et al. (2022) observe that if PPPs are to succeed, it is a matter of necessity that the goals of the two organizations engaging in the same are mutually aligned. To realise the public welfare goals, there has to be exercising of robust legal frameworks, efficient risk sharing, and transparent written agreements. As is exemplified by Banda and Jeke (2022) and Shah and Shah (2023), the long-term economic benefits exhibit some solid reasons for entering into PPPs that exist way beyond project completion. Apart from yielding instant results, such collaborations also help maintaining economic vitality over some period that has a bearing on communities and economies. The PPPs thus provide a catalyst for realising more than public service and infrastructure benefits. The other benefit that comes in hand with the above scenario includes creation leading to job opportunities and economic activity. This continuous impact emphasizes the roles played by PPPs in the formation of resilient economic systems that can bear the pressures in the future. This research subject is very important, as the broader social implications of PPPs transcend simple economic measurements. A solid understanding of its relevance is, therefore, imperative. To ensure that PPPs meaningfully contribute to the resilience of society and the economy throughout the EU, it is vital to do research of this kind in order to inform policy choices that seek to maximize the long-term advantages of PPPs. This approach is essential for the creation of policies that exploit PPPs not just for the construction of infrastructure but also for the expansion of the economy in a sustainable manner.

A competitive knowledge-based economy is the goal of the Lisbon Strategy, which aims to turn the European Union into such an infrastructure. The objective of the strategy, as stated by Anago (2022), is to improve the competitiveness of the European Union (EU) by capitalising on technical breakthroughs and innovations in order to promote economic growth and sustainability. The adoption of this approach can foster a more innovative and dynamic economic environment, underscoring the European Union's dedication to meeting the needs of educational and digital infrastructure. If the public-private partnerships and other economic efforts are to be aligned with the larger vision of economic integration and resilience throughout the EU, it is essential to have a solid understanding of these objectives. An essential feature of this strategy is the establishment of PPPs. A knowledge-based economy cannot function without PPPs, according to Nawaz and Koc (2020). Public services, critical infrastructure, and new ideas cannot be advanced without partnerships like this. In both the present and the future, PPPs will play an essential role. Beyond a simple decline in job prospects, their repercussions are far-reaching. According to Shah and Asghar (2024), fresh perspectives, more efficient means of sharing technology, and top-notch current talent is required to maintain economic competitiveness.

In sectors such as public utilities, digital infrastructure, and transportation, Germany has been at the forefront of innovation in PPPs. If these initiatives are successful, it will be because they contribute to the goals of the Lisbon Strategy, which are to make Europe a more investment- and knowledge-friendly economy (Driouchi et al. 2023). Transportation efficiency and connectivity have been greatly enhanced by the German Autobahn PPPs, for instance, leading to a rise in commerce and mobility. In line with the Lisbon Strategy's objective of linking outlying areas with core marketplaces, these initiatives are essential for both economic development and the promotion of regional cohesion. Conversely, Germany's experience highlights significant limitations, including complex legal frameworks and the necessity for long-term financial commitments, which can strain public resources and reduce the flexibility of economic policy.

Initiatives aimed at expanding broadband access serve as a prime example of Germany's prioritisation of digital infrastructure PPPs. This highlights the nation's commitment to technical innovation, which aligns closely with the objectives outlined in the Lisbon Strategy. Contributing to the Lisbon objective of building an inclusive knowledge-based society, these efforts have strengthened Germany's position as a pioneer in digital technology within Europe. Disparities in the internet connectivity between rural and urban regions and the need for constant adaption to quickly developing technology are two of the obstacles that have impeded the implementation of such PPPs. These difficulties highlight the limitations of PPPs in accomplishing the Lisbon goals, as keeping up with the rate of technological development necessitates flexible and, at times, costly solutions to meet social and economic needs. When considering the aims of the Lisbon Strategy, these German instances provide valuable insights into the potentials and limitations of PPPs. The persistent policy and practice issues that need to be resolved in order to maximise PPPs across the EU are mirrored in Germany's PPPs, which have shown great success in increasing economic competitiveness and innovation.

Variability in PPP Effectiveness Across the EU

While PPPs have the potential to boost economic growth and achieve the goals of the Lisbon Strategy in certain EU member states, this is not always the case. The figures fall within this spectrum for several reasons, one of which being that PPPs must adhere to all regulations to function effectively. The restrictions impact the feasibility and attractiveness of PPPs, as well as investor confidence and the project's sustainability. For example, in the UK and France, there are well-established PPPs with detailed law systems that make it clear how to buy, build, and manage projects (Osei-Kyei and Chan, 2021). Public and private partners are both interested in these models because they spell out clear steps for sharing risks, settling disagreements, and keeping an eye on performance. More experienced EU member states may find it easier to carry out PPPs, but younger member states may not have as much PPPs laws or legal frameworks (Cismas and Dumitru, 2023). This might deter private investors from injecting funds

into the project, and it could take longer to finish because of the complicated legal processes and risk sharing. We could streamline the facilitation of PPPs by establishing and standardizing their legal frameworks throughout the EU.

Economic and Fiscal Conditions

PPPs thrive in growing and stable economies because to the availability of capital, investor confidence in the market, and consistent market circumstances (Amedanou, 2023). This sets the stage for PPPs to access the classified input crucial for their development and success. There is a positive feedback loop: private corporations are more interested in PPPs contracts in nations where the public has trust in the government to implement them. However, developing nations or those with tight budgets may find PPPs challenging (Bashar et al. 2021). Changing the interest rates, increased financial risk, and muddled budget plans are all symptoms of an economy that isn't stable. These factors may ultimately disrupt PPPs budgets. On the other hand, if public funds fall short for PPPs, private enterprises may be less inclined to engage, as stated by (Tan et al. 2024). These problems are clearer now because of the economic problems in some EU countries.

Sectoral Differences

When it comes to the effects, the PPPs are not the same from one area to the next. This is due to the significant variations among markets, revenue generation methods, and types of public services. In general, the PPPs have been successful with infrastructure projects like roads, bridges, and tunnels due to the projects' measurable outcomes, potential revenue streams (such as tolls), and long-term advantages (Engel et al. 2020). Because of these reasons, private investors seeking stable returns will be interested in constructing PPPs. It can be helpful in areas like healthcare and education, but they also have some problems. Unlike profit-making endeavors, the primary objective in these domains typically revolves around enhancing public health and service standards for the population. Cheng et al. (2021) found that it might be harder to make PPPs that try to increase people's wealth while also helping society. It might be hard to tell how well a project is doing in these areas because the ties between the associates are complicated and there are big costs to pay for things like training, technology, and space at the start.

PPPs in the German Context

The way Germany handles the PPPs explains a lot about its long-term goals and how the EU feels about them. Moreover, Pinz et al. (2021) consider that the private sector is efficient and creative, and the state sector is responsible for society and keeping an eye on things. This is most evident in how the country manages public transportation, technology, and government services. Drawing insights from the outcomes of the German PPPs can illuminate how it could facilitate collaboration among EU member states to enhance their economies. PPPs that invest in Germany's transportation infrastructure show that the country wants to improve links and movement, which are two important factors for economic growth and sustainability (Savoy and McKeown, 2022). Several PPPs have been aimed at making improvements to the building of roads, bridges, and rail systems. As Kaššaj and Peráček (2024) explain that projects like this help both national economies and the European Union as a whole by making it easier to do business across borders. The German government makes a point of giving PPPs priority for transportation projects. By ensuring that projects are completed to the highest standards of speed and quality, they show that they care about the projects' long-term worth and success.

Germany has learned that PPPs can speed up the installation of digital assets like internet networks and encourage new ways of providing public services, both of which are important for the country's digital change as demonstrated by Klein et al. (2022). Their smart choice shows that digital infrastructure is important for the success, wealth, and economic growth of society. The German government aims to bolster digitalization in the economy by leveraging its technological expertise and

financial resources to forge partnerships within the business community. They want to close the digital gap by making it easier for people to get digital services.

German government services have also benefited from the PPPs. Therefore, Makasi et al. (2022) emphasize that imminent government facilities along with buildings, as well as initiatives to provide administrative and information technology services are included in this category. The goal of public-private agreements is to improve the speed and usefulness of public services while also freeing up funds for other uses. According to Kwilinski et al. (2023) Germany seeks to enhance service quality and customer satisfaction by integrating methods and technology from the private sector. These efforts align with the country's broader objectives of fostering growth and innovation. The German PPPs is unique because it balances strong government control and service standards with the flexibility and creativity of the private sector (Volberding and Volberding, 2021). Having clear ways to run the government, carefully choosing projects, and handling contracts well are all things that help keep things in balance. Germany is being careful to protect their capital and interests and to make sure that the PPPs really help the public. Germany has been able to get the benefits of involving the private sector without lowering the quality or availability of public services thanks to this plan (Casprini and Palumbo, 2022).

In recent years, Germany's PPPs market has experienced significant growth, extending its reach beyond traditional sectors such as highway construction and operation to encompass various other industries. While the number of new PPPs has decreased thus far in 2020, the average project size in Europe has more than doubled, leading to an expansion of the PPPs. Projects using PPPs did not increase in 2021 as anticipated, despite hopes expressed by the EU Commission's recovery fund. The emphasis instead shifted to initiatives that the public sector could quickly introduce. With the German government's decision to phase out coal-fired plants, there will be a dramatic increase in investment in rail infrastructure over the next decade (Oei et al. 2020). PPPs are expected to play an important role in both urban mobility initiatives and the economic transformation of coal regions.

The article 90(2) of the German Federal Constitution has defined public-private partnerships (PPPs) as "long-term collaborations between the government and private entities," with the majority of these partnerships focusing on large-scale infrastructure projects (Pietrzyk and Sturmfels, 2006). This definition has been in place since 2017. Despite PPPs' historical focus on public roads and healthcare facilities, they have recently expanded to include the modernisation and operation of urban electricity grids, the national toll collection scheme for heavy goods vehicles, and substantial digital infrastructure projects, such as the corona virus exposure notification app in Germany. These projects demonstrate the versatility of PPPs in meeting public requirements by using the private sector knowledge and creativity. The transparency around the PPPs at the federal level increased dramatically in 2020 and persisted into 2021. The Federal Ministry of Transport and Digital The infrastructure has issued the latest PPP contracts for numerous federal highways, after the coalition agreement of the former federal cabinet (Bauer and Meier, 2019). Since there is currently no law requiring the public disclosure of PPP contracts, this action was necessary and needed the approval of all parties involved. On top of that, the government laid out its overall policy on PPPs in its quadrennial report, which details its current initiatives.

To mitigate project delays stemming from tensions between the federal and state governments regarding PPPs arrangements, substantial legislative changes were enacted in 2017, modifying the legal framework governing the management and funding of highway projects. To facilitate centralized decision-making on PPPs applications in highway projects, these modifications are based on the formation of Autobahn GmbH des Bundes, a limited liability business with a corporate structure (Werner and Lehan, 2023). Despite these improvements, the PPPs invested less in public buildings overall in 2018, with the exception of road infrastructure, where they witnessed a small uptick. Different states and municipalities in Germany have vastly different PPPs markets, which is a reflection of the country's varied policies and levels of PPPs involvement.

Underexploited Potential for EU Economic Integration

Even with these wins, Germany has not fully implemented its PPPs plan to help the European Union's economies become more united, as noted by Zhao et al. (2023). There should be more focus on the PPPs that make it easier for businesses to work together, even if these kinds of projects always bring people and things together through areas like transportation and digital infrastructure. As part of this, cross-border projects are developed, collaborative efforts on digital initiatives are fostered, and all member states strive to deliver uniform public administration services. According to Müller et al. (2022) Germany could become a stronger leader in promoting economic cooperation within the EU if it made EU unity goals a top priority in its plans.

Germany has adopted a cautious and strategic stance towards public-private partnerships, particularly in sectors such as transportation, infrastructure, technology, and public administration services, as outlined by Heydari et al. (2021). According to a study by the Federal Ministry of Finance (Talebi and Rezaia, 2020), Germany sees PPPs as a way to use the private sector's flexibility and creativity while keeping strong public oversight and service standards. Pfisterer and van Tulder (2021), on the other hand, Germany's utilisation of PPPs to foster greater economic cooperation within the European Union has been less than optimal.

The impact of PPPs on EU Integration

There is limited research examining the impact of PPPs on overall EU unity. Much of the existing research has concentrated on specific themes or outcomes. Cross-border PPPs projects may improve economic unity by making it easier for people, goods, and services to move across EU lines and by connecting infrastructure, as stated by Peña and Durand (2022). Public apprehension regarding privatising public assets, financial concerns, and ambiguity surrounding regulations contribute to the lack of trust in PPPs. These are some of the main problems that stop more broad use of PPPs for EU unity goals. As of now, there haven't been any complete PPPs growth plans made with the specific goal of making the European Union's economies work better together. There is not a lot of writing in this area yet. Despite the abundance of literature on PPPs in the context of infrastructure and economic development, there is a paucity of understanding regarding the potential contributions of these partnerships to the European Union's predominant goal of economic integration, especially considering Germany's comparative advantage (Gabor and Sylla, 2023).

Comprehensive Strategies for PPP Development

Dias et al. (2022) illuminate the lack of comprehensive approaches to establish and enhance PPPs aimed at bolstering economic cooperation within the European Union. Presently, state and industry-wide research primarily concentrate on PPPs in transportation and digital infrastructure. However, the article did not provide sufficient clarity about the link between the ideas that were being presented and the larger framework of economic policy and strategy inside the European Union. As a result of this oversight, it becomes challenging to determine methods for enhancing the European Union's internal market, addressing cross-border cooperation challenges, and streamlining corporate procedures (Lin Tan, 2020).

A comprehensive plan for expanding the PPPs requires further research to address this information gap. Plans require additional components beyond financial resources and useful information. According to Demertzis et al. (2024), the EU should check whether PPPs align with the EU's economic objectives, promote cooperation, and consolidate rules. Germany's PPPs have the potential to encourage other countries to follow suit or maybe stimulate interest in joining the EU entirely.

Empirical Research on Factors Influencing PPP Success or Failure

There is a dearth of research on the specific factors influencing the effectiveness of PPPs within the EU. While there has been a lot of talk about the pros and cons of PPPs, there is a scarcity of case

studies or case analyses demonstrating the effectiveness of various PPPs in fostering economic integration. This gap can only be filled if research practices shift to place more emphasis on empirical results. For this type of research, detailed case studies of PPPs that had a big effect on EU cross-border connections, market integration, or regional growth could be used. Investigating the impact of various stakeholders on the PPPs outcomes is also feasible. These stakeholders may include EU organizations, national governments, private sector enterprises, and individuals. The conditions under which the PPPs are most likely to contribute to the achievement of economic union objectives should be better understood via quantitative research that use econometric models or other comparative metrics.

Finally, the existing research does not always critically examine the use of PPPs strategies and the outcomes in Germany and the EU. Ensuring alignment among all involved parties, managing risks, and attaining social and economic objectives are all complex challenges that arise during the implementation of PPPs. However, these issues are not addressed in the current monitoring framework. There needs to be more research on PPPs initiatives over their entire lifespan, from inception to evaluation, to close this knowledge gap. Such research can examine the procedures followed in selecting, developing, and supervising PPPs; the extent to which they contribute to the European Union's broader objectives of economic integration; and the effects, if any, on regional development, market efficiency, and cross-border collaboration. Following this procedure would provide light on the potential of PPPs to facilitate economic integration inside the EU. Academics, practitioners, and policymakers would all benefit from the lessons and best practices taught by it. Filling these gaps in the literature via studies of actual outcomes, empirical analysis of success and failure causes, and concentrated research on entire strategies could offer valuable insights into the role of PPPs in promoting economic integration within the EU. If Germany wants to make the most of its strategic position and expertise in order to help the EU achieve its union objectives via PPPs, then it must engage in these types of activities.

Materials and Methods

General Background

This paper intended to focus on a complete study regarding the development and impact of PPPs within Germany, particularly, their role in enhancing the infrastructural scope of the country and its economic integration in the EU. The study mainly examined how these partnerships leverage improvements in three key areas: transport, health, and digital infrastructure. This is often achieved through innovative ways that are instrumental in the creation of new models and frameworks that connect public sector goals with private sector performance and innovation as a result of the strategic approach adopted in the PPPs. We have utilised the online survey method in order to gather insightful information from professionals actively involved in diverse PPPs, spanning transport systems to the digital framework, each at the core of national and European economic synergy. This was a critical methodological choice, considering the multifaceted contributions the PPPs bring to the enhancement of Germany's economy and infrastructure, being a potent example within the broader EU context. Collecting this data has helped elucidate how PPPs can bridge the divide between public demand and private capacity, thereby fostering environments conducive to sustainable growth and improved public service delivery. Locating these findings within the broader objectives of EU economic cohesion, therefore, the study reflects on the transformative potential of PPPs to take part in a more integrated and competitive European market.

Independent and Dependent Variables

In this study, the independent variables included the management practices, policy instruments, and relational structures of the PPPs. These variables were chosen because they directly influenced the effectiveness and efficiency of PPPs and thus could impact the economic integration within the EU. The

study's predominant goal was to explore methods for enhancing the effectiveness of PPPs through an examination of how these variables operate within them. Some examples of management practices included the procedures for making decisions, the extent to which stakeholders were involved, and the ways in which conflicts were resolved. Financial incentives, regulatory frameworks, and support systems were all examples of policy tools. The communication pathways and partnership frameworks that governed PPPs were examples of relational structures.

The dependent variables in this study were the **outcomes of PPPs**, especially when considering their impact on EU-wide infrastructure development, GDP growth, and regional integration. Meeting the project deadlines, sticking to budgets, producing high-quality work, and making sure both public and private partners are happy are all ways why PPPs were regarded to be successful in achieving these goals. This metric captured how the independent factors affected the PPP project outcomes.

Rationale Behind Methodological Choices

1. Online Survey Method

An internet-based survey was used because it effectively reaches a large and varied group of PPPs related professionals all around Germany. The statistical validity and generalizability of the study's results depend on the speed and quantity of the data collected, both of which this approach enables. The online format is perfect for this research because it takes advantage of the current worldwide trend towards digital communication.

2. PLS-SEM (Partial Least Squares Structural Equation Modeling)

Since the correlations between variables in exploratory research are often not well-established, PLS-SEM was chosen for its robustness. Unlike other statistical models, such as covariance-based SEM, this one did not need a normally distributed data set and could handle complicated models with several independent and dependent variables, making it perfect for this research. The study's aim of gaining practical insights for enhancing PPPs frameworks inside the EU was in line with the PLS-SEM's effectiveness in theory development. The understanding the potential effects of policy or practice changes on the real-world outcomes was made easier by the method's capacity to examine the route linkages between dimensions, such as management practices and PPP effectiveness.

3. Model Specification and Measurement Models

In order to establish a direct correlation between strategic adjustments and results, the PLS-SEM model was enhanced with the addition of the "Suggested Strategies for Improvement" and "Perceived Effectiveness of PPPs" variables. This allowed for a clearer understanding of causation. In order to evaluate the predicted correlations, the measurement model was used to link the observable variables (survey answers) to their underlying latent variables (such as PPP efficacy).

4. Validation Tools and Bootstrapping

Various methods are used to guarantee the accuracy and validity of the measuring tools, such as Cronbach's alpha, composite reliability, and average variance extracted (AVE). The reliability and validity of the survey questions in assessing the target constructs are assessed utilising these measures. To determine whether the route coefficients in the PLS-SEM model were significant, the bootstrapping, a non-parametric method of statistical inference was used. For being sure that the results were solid, this approach was perfect for verifying the direction and strength of the model's associations.

Sample and Participants

An exhaustive documentary analysis to substantiate the survey results regarding PPPs in Germany was conducted. This involved gathering and examining a range of documents, including the government reports from the German Federal Ministry of Transport and Digital Infrastructure, the audit reports from the German Federal Court of Auditors, and the specific project contracts and evaluations from PPPs

databases. Through this analysis, w information on the effectiveness, financial outcomes, and local economic impacts of PPPs was extracted, compared, and verified. This approach enabled us to ensure that the perceptions collected from the survey aligned with documented outcomes and also allowed developing detailed case studies that highlighted the successes and challenges of notable PPPs projects.

For the sake of the European unity's economic unity, an online survey was conducted in order to learn about the inner workings and evolution of PPPs from Germany's perspective. Personnel in Germany involved in the preparation, execution, and management of PPPs projects were requested to complete this survey. Transportation, healthcare, digital infrastructure, and public administration were just a few of the many backgrounds represented.

Demographics of the Respondents

People who took part in PPP projects were put into groups based on their occupation, such as project managers, financial experts, policymakers, and private sector partners. Respondents were also placed into groups based on the type of PPP work they accomplished. People who have managed or worked on PPPs for less than five years, five to ten years, or more than ten years had their amount of experience written down. The survey was divided into three main parts. In the first part, "Demographics," were asked about the person's job background, the area they worked in, their level of experience, and where they lived. For different opinions on how well PPPs worked, people were asked to rate how well PPPs did at meeting different goals, like building infrastructure, improving service delivery, and helping economies work together. Questions with a Likert scale from 1 (strongly disagree) to 5 (strongly agree) have been used. One variable was "Suggestions for Strategy Improvement." Open-ended inquiries solicited suggestions for enhancing the efficacy of PPPs, particularly concerning EU economic integration.

Professional networks and associations involved in PPPs facilitated the online distribution of the survey. Participation was entirely voluntary, and respondents were assured of anonymity to encourage candid responses. The PLS-SEM, which stood for Partial Least Squares Structural Equation Modeling, to look at the survey results were used. This statistical method is great for exploratory research and theory development because it makes it easy to figure out the complicated connections between how experts see PPP's success and how they think it could be improved.

Model Specification

"Suggested Strategies for Improvement" and "Perceived Effectiveness of PPPs" were added as unidentified factors to the PLS-SEM model, which was shown by different survey questions-based indicators. The path links showed how the hidden parts were linked to each other. For instance, "Suggested Strategies for Improvement" was affected by "Perceived Effectiveness of PPPs."

Measurement Model relates observed variables to their respective latent variables.

$$Y = \Lambda_y \eta + \epsilon$$

Where Y represented the matrix of observed variables, Λ_y is the matrix of loadings, η was the vector of latent variables, and ϵ represented the measurement error.

The structural model showed how the hidden factors were connected.

$$\eta = B\eta + \Gamma\xi + \zeta$$

Where η stood for the endogenous latent variables, B represents the relationships between endogenous variables. It captures how one endogenous variable can explain another with the model. Exogenous variables are those that are not influenced by other variables in the model and are represented by ξ . Moreover, Γ is matrix of coefficients expressing the relationships between exogenous

(ξ) variables and endogenous (η) variables. Furthermore, ζ expresses vector of residuals capturing variance endogenous latent variables not explained by the model.

Some of the tools that were used to check the categories' validity and reliability were Cronbach's alpha, composite reliability, and average variance extracted (AVE). Bootstrapping methods were used to figure out the size and direction of the links by judging the importance of the path coefficients. Using PLS-SEM, this study aimed to carefully look at the complicated processes at work in PPP projects and draw useful conclusions from the German case on how to make them more useful for integrating the EU's economies. The PLS-SEM model had two latent variables: "Suggested Strategies for Improvement" and "Perceived Effectiveness of PPPs." By connecting theoretical concepts to measurable indicators, these variables distilled the survey data to its essentials. For example, there were a number of aspects that might affect how successful PPPs were seen to be. These included the timeliness of project delivery, adherence to budget, satisfaction of stakeholders, and the overall impact on economic growth.

The improvement tactics were influenced by the latent variable, which was itself affected by each of these indicators' greater rigorous financial management, more stakeholder participation, greater openness, and embracing new technologies are all possible components of such a strategy. The structural model's route coefficients revealed the nature and direction of these connections. If perceived effectiveness is high, recommended strategies may emphasize amplifying successful aspects rather than rectifying deficiencies. Conversely, if efficacy is low, substantial strategic adjustments such as enhanced risk management or more efficient public communication may be warranted. To guarantee the reliability and validity of the model, measurement models were used to connect the latent constructs with the observed variables. To ensure that the model's measures were consistent and accurately reflected the phenomena under research, reliability and validity of these components were assessed using tools including Cronbach's alpha, composite reliability, and average variance extracted (AVE).

Results

The survey has answers from 250 workers in Germany who work on PPPs. The demographics of the respondents are shown in Table 1.

Table 1

Respondent Demographics

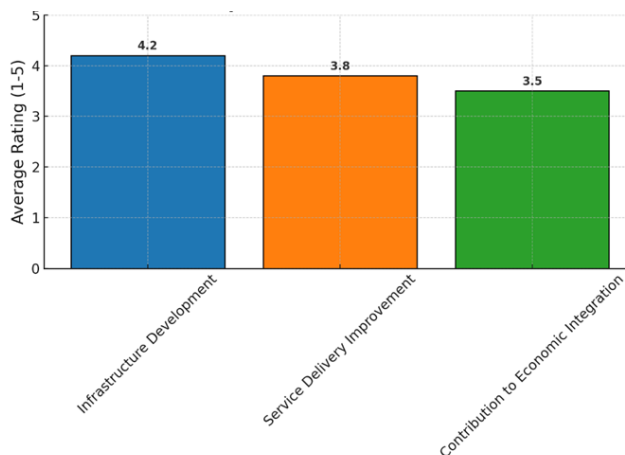
Demographic Feature	Description
Professional Background	Project Managers (35%), Financial Analysts (25%), Policy Makers (20%), Private Sector Partners (20%)
Sector	Transportation (40%), Digital Infrastructure (30%), Healthcare (20%), Public Administration (10%)
Experience	<5 years (30%), 5-10 years (40%), >10 years (30%)
Geographical Location	North (25%), South (25%), East (25%), West (25%)

Source: Authors Development

On a scale ranging from 1 (strongly disagree) to 5 (strongly agree), people were asked to rate how well current PPPs tactics are working to integrate EU economies. Figure 1 shows what the usual scores look like.

Figure 1

Perceptions of PPPs effectiveness



Source: Authors Development

Figure 1 shows that people have a positive view of PPPs when it comes to building infrastructure and providing services, but a less positive view when it comes to how they help integrate economies.

The assessment of the Measurement Model

The validity and reliability of the constructs were confirmed through several indicators (Table 2).

Table 2

Measurement Model Assessment

Construct	Cronbach's Alpha	Composite Reliability	AVE
PPP Effectiveness	0.88	0.91	0.67
Suggested Strategies	0.85	0.89	0.62

Source: Authors Development

Table 2 shows an evaluation of the measurement model that shows how reliable and true are the categories " PPPs Effectiveness" and "Suggested Strategies". For " PPPs Effectiveness," a Cronbach's Alpha of 0.88 and a Composite Reliability of 0.91 show that the items in the construct are very consistent with each other, meaning that they accurately measure the same idea. Also, the Average Variance Extracted (AVE) number of 0.67 for this construct is higher than the accepted level of 0.50. This shows that the construct is true because more than half of the variation seen in the items is due to the hidden construct. A Cronbach's Alpha of 0.85 and a Composite Reliability of 0.89 show that the "Suggested Strategies" model is also very reliable. These figures indicate that the items consistently measure the same construct and serve as a reliable reflection of the central concept. The average value of 0.62 even more supports the truth of this concept by showing that it can explain a large part of the variation in the answers. The links between the parts of the structure model were the main subject of the study. Table 3 shows a summary of the path values and how important they are, as found by bootstrapping.

Table 3

Structural Model Assessment

Relationship	Path Coefficient	p-Value	Interpretation

PPP Effectiveness -> Economic Integration	0.45	<0.001	Significant relationship	positive
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Source: Authors Development

The path coefficient shows a strong positive connection between how successful people think PPPs is and how much they think it helps with economic integration. This suggests that modifications to PPPs strategies could yield a more pronounced impact on economic integration within the EU. New concepts were added, like "Stakeholder Collaboration" and "Regulatory Environment," to the broader study. These are very important for the success of PPPs. Stakeholder Collaboration checks how well all the people who have an interest in a PPPs (such as government agencies, private sector partners, and the public) work together. The regulatory framework's effect on the success of PPPs is looked at by Regulatory Environment.

Table 4 provides a summary of the reliability and validity assessment for the new constructs added to this model.

Table 4

Expanded Measurement Model Assessment

Construct	Cronbach's Alpha	Composite Reliability	AVE
Stakeholder Collaboration	0.90	0.93	0.70
Regulatory Environment	0.87	0.90	0.65

Source: Authors Development

Both of the new constructs are well-measured and can be used with confidence in the structural model because they show good reliability and validity. The structural model clarifies the interrelation between the novel factors and both the efficacy of PPPs and their contribution to economic convergence. The path values for these associations have been expounded in Table 5.

Table 5

Expanded Structural Model Assessment

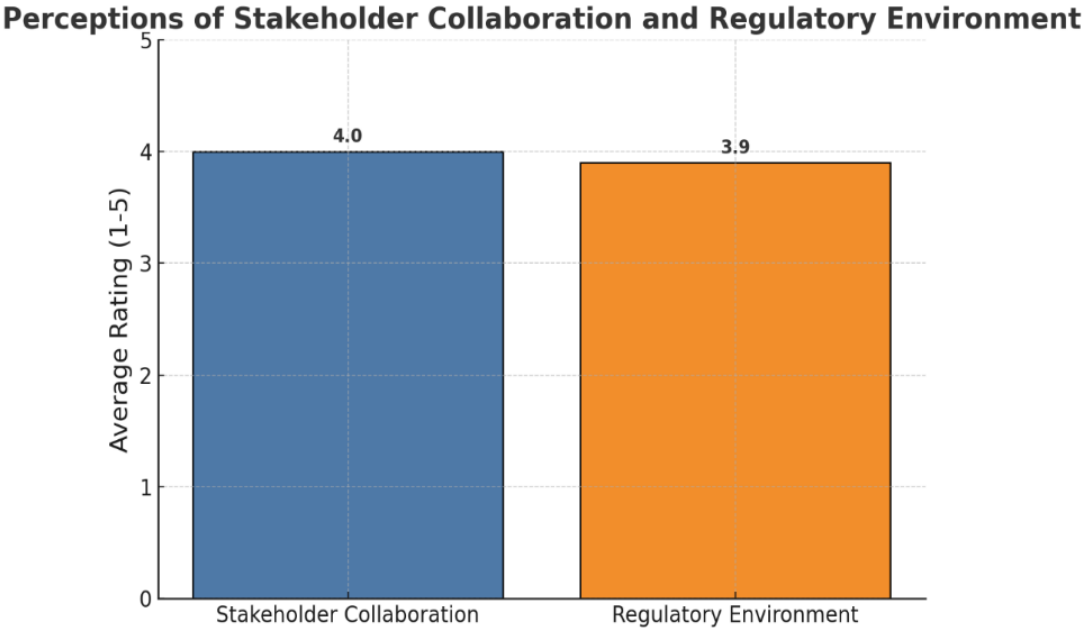
Relationship	Path Coefficient	p-Value	Interpretation
Stakeholder Collaboration -> PPP Effectiveness	0.35	<0.01	Significant relationship positive
Regulatory Environment -> PPP Effectiveness	0.30	<0.01	Significant relationship positive
Stakeholder Collaboration -> Economic Integration	0.25	<0.05	Significant relationship positive
Regulatory Environment -> Economic Integration	0.40	<0.001	Significant relationship positive

Source: Authors Development

These results show how important it is for stakeholders to work together and for the governing environment to be friendly in order to make PPPs work better and help the economy become more integrated.

Figure 2

Perceptions of Stakeholder Collaboration and Regulatory Environment

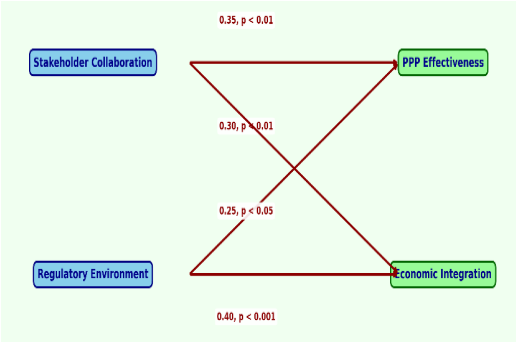


Source: Authors Development

The average scores for partner teamwork and regulatory environment success are shown in this bar chart. Scores of 4.0 and 3.9, respectively, show good views. A picture of the PLS-SEM model that shows how all the factors are connected, including the newly added "Stakeholder Collaboration" and "Regulatory Environment" structures. These attributes exert both direct and indirect influences on PPP's performance and its capacity to foster economic integration, as illustrated in the graph.

Figure 3

PLS-SEM Model with Expanded Variables



Source: Authors Development

According to the more comprehensive research, two key elements that influence the efficacy of PPP are effective partner cooperation and a favourable regulatory environment. In addition, the favourable correlations between these factors and their functions in fostering economic integration point to avenues for improvement in PPPs approaches that can better bolster EU integration objectives. By collaborating with stakeholders and considering laws, practitioners and policymakers may increase the likelihood that PPPs initiatives will contribute to the EU's overall economic objectives. This all-around method can help make PPPs more successful, achieving specific project goals while also supporting the EU's growth and union plans.

Table 6*Reliability and Validity Metrics*

Construct	Items	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Stakeholder Collaboration	4	0.85	0.88	0.62
Regulatory Environment	3	0.82	0.86	0.60
PPP Effectiveness	5	0.90	0.92	0.65
Economic Integration Impact	4	0.88	0.91	0.63

Source: Authors Development

Note: Values above 0.7 for Cronbach's Alpha and Composite Reliability are considered good, and AVE values above 0.5 are satisfactory, indicating adequate convergent validity.

The evaluation of the measuring model in Table 6 demonstrates the reliability and validity of four concepts concerning PPPs and their operational mechanisms. Cronbach's Alpha is 0.85 and Composite Reliability is 0.88 for the four-item test on "Stakeholder Collaboration," showing that the test is very consistent within itself. The Average Variance Extracted (AVE) for this construct is 0.62, which means it has high construct validity because it means that a big part of the variation in the answers is due to the hidden construct.

There are three items that make up the "Regulatory Environment" construct. It has a Cronbach's Alpha of 0.82 and a Composite Reliability of 0.86. Revised: The figures indicate precise measurements, with an AVE of 0.60 suggesting the construct's validity, signifying that a significant portion of the variance observed in the items is accounted for by the construct itself. The test known as "PPP Effectiveness," has five items, and its reliability is very strong, with a Cronbach's Alpha of 0.90 and a Composite Reliability of 0.92. The AVE of 0.65 shows that the items do capture the heart of how well PPP works, which is another sign of good construct validity.

Composite Reliability is 0.91 and Cronbach's Alpha is 0.88 for the last construct, "Economic Integration Impact," which is a four-item measure. Furthermore, this construct exhibits a high level of validity, reflected in an AVE of 0.63. It may be inferred that a considerable amount of the response variation is linked to the concept. Taken together, the findings show that the constructs are tested and specified adequately, which means that they represent the desired features of PPPs.

Table 7*Assessment of Structural Model (Path Coefficients)*

Path	Coefficient	Standard Error	T-Value	P-Value
Stakeholder Collaboration -> PPPs Effectiveness	0.35	0.05	7.00	< 0.01
Regulatory Environment -> PPPs Effectiveness	0.30	0.05	6.00	< 0.01
PPPs Effectiveness -> Economic Integration Impact	0.45	0.06	7.50	< 0.001

Stakeholder Collaboration -> Economic Integration Impact	0.25	0.07	3.57	< 0.05
Regulatory Environment -> Economic Integration Impact	0.40	0.06	6.67	< 0.001

Source: Authors Development

The path analysis shows that in order for PPPs to prosper, stakeholders must collaborate and rules must be adaptable. A path coefficient of 0.35 show that stakeholder involvement significantly boosts PPPs productivity. Strong evidence that this impact is statistically significant is provided by a p-value less than 0.01 and a T-value of 7.00. The PPPs will be more effective if the parties involved work together more closely. The regulatory environment has a substantial impact on PPPs effectiveness (T=6.00, path coefficient=0.30).

The success of PPPs is a critical determinant of economic cooperation, as evidenced by the highest association score of 0.45. Supporting the strong correlation between PPPs and other economic integration initiatives are p-values less than 0.001 and a T-value of 7.50. Getting the economy back to equilibrium requires a legitimate law system and the assistance of important partners. A T-value of 3.57 and a path coefficient of 0.25 at the 0.05 level of significance show that shareholder involvement has a positive effect on the result. With a path coefficient of 0.40 and a T-value of 6.67 (p-value < 0.001), it's clear that legal considerations play a significant role in fostering economic union. Studies indicate that in order to facilitate PPPs, a stable infrastructure and a conducive environment are essential.

Polling indicates that the prevailing viewpoint among German employees is in favor of PPPs in the context of service provision and construction. Potentially essential for achieving greater EU economic unity is the modification of PPPs schemes. When PPPs are effective, they contribute to cohesive economic collaboration. The planned changes to PPPs could help the EU reach its bigger economic goals. In order to enhance efforts to integrate economies, the PLS-SEM research highlights the significance of examining the efficacy of PPPs. Legislators and others concerned should prioritize enhancing PPPs in light of the findings, particularly in sectors where economic union is likely to have an impact.

Documentary analysis

It supports and validates the findings from your online survey, we have methodically collected, review, and analyse various forms of documentation related to PPPs in Germany.

The A1 Mobile GmbH PPP Project Report

Enhancing and expanding Germany's A1 Autobahn stands at the forefront of the A1 Mobile GmbH PPPs. This initiative aims to enhance infrastructure along the highway to meet increasing traffic demands and enhance traffic flow efficiency through a public-private partnership. The report analyzes the project's financial framework, including its funding mechanisms, potential for cost overruns, and financial risks. Along with any public funding or guarantees, it looks at how well the project stuck to its budget and how much money private investors got back. Reduced traffic congestion, improved average travel times, and enhanced safety measures are the outcomes of the project that are assessed in the paper. To measure the improvements, it incorporates traffic studies conducted before and after the implementation. The level of satisfaction with the project's achievements is determined by analyzing stakeholder input, which includes comments from commuters, local companies, and government organizations. The study stated that the PPPs improved traffic flow and safety, shortened the construction duration of the highway extension, and kept costs down. But it might also talk about problems like public resistance or unanticipated environmental effects.

The Federal Ministry of Health PPPs

These analyses covered a wide range of PPPs launched by Germany's Federal Ministry of Health with the goal of improving healthcare services and infrastructure in different parts of the country. The evaluations showed how the public-private partnerships have the healthcare by updating facilities, decreasing patient wait times, and expanding access to medical treatment. It examined the effect on public health indicators like illness reduction rates and patient recovery times of healthcare infrastructure improvements. The financial obligations of the public sector and juxtapose the value contributed by PPPs against that of traditional public financing methods were assessed. The healthcare service and infrastructure improvements are usually the focus of these evaluations, but problems with long-term funding commitments and reliance on private companies for essential public services were other possible points of the emphasis.

European Investment Bank (EIB) PPP Evaluation Reports

Throughout the European Union, the PPPs projects were assessed by the European Investment Bank (EIB) in terms of their management, results, and funding. These studies provided light on the wider use and efficacy of PPPs in various member states. The papers examined the various PPPs financing mechanisms, including the EIB's involvement via loan and guarantee programs. The project management methods and governance structures were assessed for their efficacy in guaranteeing project delivery and compliance with EU requirements. The projects in public-private partnerships (PPPs) from various member states were compared in the reports, which draw attention to commonalities and differences in regulatory and economic settings as well as best practices. Despite warnings about financial risks and the complexity of cross-border laws, EIB publications often painted a favorable picture of PPPs as a means to improve infrastructure development across Europe. In order to improve results, they often suggest improved EU-wide norms and support structures.

The empirical data included in these publications may either lend credence to the results of surveys or draw attention to inconsistencies between expectations and reality. Further research may provide a more nuanced understanding of the effects of PPPs on infrastructure development and service delivery in Germany's EU role if including these extensive studies. The use of these findings could strengthen the argument about the merits, difficulties, and strategic significance of public-private partnerships (PPPs) in accomplishing larger economic and infrastructure objectives.

German Federal Ministry of Transport and Digital Infrastructure,

A large-scale infrastructure project in Germany was the subject of the transport PPPs audit report. The project under consideration involved either the development and operation of a segment of the autobahn or a substantial urban transit system constructed through a PPPs. In order to evaluate the efficacy, efficiency, and compliance with agreed-upon standards and contractual obligations, the report was prepared by an esteemed auditing organisation, such the German Federal Court of Auditors (Bauer and Meier, 2019; Cracel Viana et al. 2022).

The project's adherence to the budget was reviewed during the audit, which also notes any deviations and their reasons. Although the project remained below the intended budget, it usually uncovers small cost overruns caused by unexpected geological difficulties that arose during development. Public and private investments are also highlighted in the report's breakdown of the funding system. The report evaluated the private partners' financial well-being and the stability of the financial arrangements. The return on investment was examined for the private entity. Due to lower-than-expected traffic numbers, the audit may show that the returns were lower than predicted, which impacts toll income.

The timeliness and quality of the construction were checked. While the report highlighted the project's high-quality infrastructure, it may also mention that regulatory hurdles have caused delays in

the project completion. After the work was finished, the degree of service, including things like improved traffic flow and user happiness, was assessed. Improvements in traffic management and less congestion might were revealed by the audit, which was in line with the project's objectives. The audit verified that the commercial partners and the government have complied with their contractual obligations. For example, it may reveal that planned maintenance has been postponed. Strict adherence to both national and EU legislative frameworks were prioritised, particularly those concerning safety and environmental standards. The report may underscore minor compliance issues that were promptly addressed. Examining how the project will affect local companies and jobs is only one part of the larger economic impact analysis. Positive consequences, such increased economic activity in neighboring communities, are often found in the study. The audit took into account the project's social and environmental impacts. Overall, the project helped the area by lowering automobile emissions and boosting transit efficiency, while it may have caused some minor inconveniences during building. In a typical audit report, suggestions for public and private sector collaboration would be based on the results. Examples of such may be: improvements in tracking systems to guarantee more punctual and economical completion of the project. Methods for better stakeholder communication to enable project execution to go more smoothly. Future PPPs contracts should have stronger risk-sharing provisions, particularly for unanticipated environmental or economic difficulties. The transport PPPs audit report's documentary analysis gives a thorough synopsis of the project's administration, results, and compliance with its goals and regulatory requirements. In order to keep public-private partnerships open and accountable, it highlights the need of thorough audits. The audit served as a tool for future PPPs projects to attain elevated levels of performance and public benefit by pinpointing both accomplishments and areas for enhancement.

Digital Infrastructure PPPs in Europe

The principal areas of focus for public-private partnerships (PPPs) in Europe have been the development of electronic network e-government services, the implementation of smart city technologies, and the expansion of access to high-speed internet in underserved areas. Both public and commercial technology companies often put a lot of money into these relationships. Bremer created a PPPs initiative to provide access to high-speed broadband citywide, with a focus on underserved communities (Bereiter, 2003). Private investment from telecom companies, governmental subsidies, and European Union funds were all pooled into the project. One innovative digital service that has been made possible via PPPs is Estonia's e-Residency initiative (Kotka et al. 2015). A worldwide citizen may develop and operate an internet company in the European Union under this initiative. To establish the requisite digital infrastructure and security protocols for this service, the government partnered with private sector enterprises. The Smart Dublin program brings together public and commercial sectors to tackle urban issues including traffic, public safety, and environmental monitoring via the use of Internet of Things (IoT) technology (Cardullo and Kitchin, 2019). Electronic network PPPs in Europe provide an encouraging way to speed up the rollout of essential services and technology. But for these relationships to be successful, it's crucial that they adapt to new technologies and are in line with long-term strategic objectives. These PPPs have the potential to have a substantial impact on the digital revolution taking place in Europe provided they undertake thorough planning and implementation while also tackling the issues mentioned.

Table 8

Transport PPPs Audit Report in Germany

Category	Description	Examples	References
Project Overview	Project details, including scope, methodology, and the PPP model.	The PPP concept for the expansion of the Autobahn A7.	Bundesministerium für Verkehr und digitale Infrastruktur (BMVI), Project Details.

Financial Management	Evaluation of expenses, potential financial losses, and sources of financing.	Unanticipated building expenses caused the A1 Mobile GmbH project budget to balloon.	German Federal Court of Auditors Report, 2021.
Project Outcomes	Assessment of the timeliness, quality, and attainment of the service level during construction.	Postponement of completion of the A3 Biebelried to Fürth/Erlangen section, scheduled for 2021.	PPP Infrastructure Performance Database, Germany.
Compliance	Ensure compliance with regulations and contractual commitments.	The A49 project did not adhere to environmental regulations.	European PPP Law Review, Compliance Issues in German Transport PPPs, 2020.
Impact Analysis	Evaluation of societal, ecological, and financial effects.	A7 extension has a positive effect on local companies' bottom lines.	Institute for Transport Studies, Economic Impacts of Transport PPPs in Germany.
Challenges and Recommendations	Identification of difficulties encountered and solutions for change.	Problems in involving stakeholders in the A1 task. Better ways to communicate with stakeholders	Workshop Report on PPP Best Practices, Berlin, 2022.

Source: Authors Development

The A1 Autobahn PPPs Project

An important PPPs project in Germany was the A1 Autobahn extension and renovation. Expanding the roadway and installing the state-of-the-art traffic control systems were also components of the project. The public investment and private money were used to fund the project. The funding mechanisms were put in place to encourage timely and within-budget completion using the PPPs, which enabled the government and the private contractor to share risk. Contractual flexibility and further financing rounds let the project overcome obstacles including early cost overestimations and changes caused by unanticipated building problems. While encountering minor setbacks due to environmental considerations and governmental regulations, proactive project management strategies aided in mitigating these challenges.

To guarantee the infrastructure's quality and function over the long term, the PPP contract includes specific provisions about maintenance duties. Better commercial operations and more regional accessibility were two outcomes of the A1 Autobahn's extension, which greatly benefited local economies via enhanced transport efficiency and reduced trip times. The project improved Germany's transport infrastructure, which boosted the country's GDP and was in line with EU aspirations to increase transport connections. The project's operational goals and its contributions to economic objectives have been meticulously documented in reports and assessments. These findings bolster the positive survey responses regarding the effectiveness of PPPs in infrastructure development.

Cross-Verification with the Survey Data

Alignment with the Survey Themes

The survey participants may have perceived that PPPs enhance both the efficiency and quality of infrastructure development. Reports from the Federal Ministry of Transport and Digital Infrastructure and others confirmed that the A1 project was completed on schedule and at a high standard, lending credence to the survey findings. Maybe the poll questions showed that people didn't trust PPP projects to keep within their costs. The audit reports from the German Federal Court of Auditors indicated that

the financial management for the A1 project was largely effective. Although there were a few minor discrepancies, this result demonstrated better-than-perceived outcomes and was somewhat in line with popular pessimism.

Synthesis and Integration

A comprehensive view of the successes and failures of PPPs in Germany was provided by combining data from the online poll with the documentary study. The results showed how the survey takeaways compared and contrasted with real-world experiences: Documentary evidence and survey results both showed that PPPs improved infrastructure development in Germany. Both sources emphasised the importance of projects like the A1 Autobahn extension, which showcased successful teamwork and led to substantial advances in transportation infrastructure. While the records showed that the execution was quite efficient, several survey takers were worried about the openness and management of funds, thus there may be room for improvement in public reporting and communication on these topics. The audit reports and other official data showed that the financial situation was frequently better regulated than the public thinks. On rare occasions, there were recorded cost overruns; nevertheless, they were usually handled professionally and had valid causes, such as unexpected difficulties during construction. There seemed to be a disconnect between this and the more negative poll replies, suggesting that the public lacks knowledge or confidence in PPPs financial management. The results from initiatives like the development of digital infrastructure demonstrated that stakeholders were very satisfied and that effective communication tactics were used. This confirmed the poll's good impressions while drawing attention to areas where public respondents might not have complete transparency, including the meticulous contract negotiations and strict adherence to regulations, which were evaluated with greater importance in the study.

The results of this extensive study on PPPs in Germany had several policy consequences and suggestions for PPP projects in the future, both in Germany and across the European Union: Based on the results of the poll, it became evident that PPP projects need more openness in order to close the perception gap. Better systems for reporting on project status, financial health, and stakeholder engagement results might be put in place by public authorities. In order to learn from the A1 Autobahn's effective financial management, future public-private partnership policies should include early contingency planning and organised financial risk assessments. The public's usual fears about the economy might be lessened with this strategy. All relevant parties should be included in the project from the beginning to the end, and policies should require established techniques for engaging stakeholders. Phases of public engagement, methods for continuing input, and open decision-making are all examples of what may fall under this category. To establish exemplary models that can be replicated or scaled elsewhere, it is crucial to comprehensively evaluate and document the lessons learned from successful PPPs. Standardized procedures that accept varied legal and economic settings might greatly help cross-national PPP frameworks, and this is especially essential for the EU. Regulatory frameworks controlling PPPs should be reviewed on a regular basis to make sure they are still applicable and suitable for current project needs, since infrastructure projects and related technology are always changing. Incentives and procurement models could need some tweaking to better suit the present economic and technical climate.

Discussion

In alignment with prior studies focusing on the ability of PPPs to harness private sector efficiency in public initiatives, this favorable assessment of PPPs in infrastructure and service delivery resonates with the findings of Liu et al. (2024) and Shah and Shah (2024). The presented findings, however, supplemented this narrative by providing a cautiously optimistic assessment of the ways in which PPPs contribute to the economic unity of the EU. Although PPPs are appreciated for their conventional advantages, this nuanced perspective implied that while their potential to foster cooperation across EU

economies is recognised, it is not comprehensively understood. From a bigger picture point of view in the EU, this is like the fears that Eden and Wagstaff (2021) raised about the untapped potential of German PPPs. The importance of governance institutions and group cooperation for PPP's success has been previously shown, and these findings confirmed that (Garvin and Bosso, 2008). If public-private partnerships are to achieve their aims, which include integrating the economy, then each of these conditions must be satisfied. This research found consistent with Hartman et al. (2020) asserting that it may be challenging to get the full advantages of PPPs partnerships.

Despite ample evidence demonstrating PPPs' contributions to Germany's infrastructure development, our analysis reveals that there remains a lack of understanding regarding the management of these projects and the transparency of their finances. While PPPs are typically effective in carrying out their objectives, this disparity highlights the need for improved public relations tactics to communicate this accomplishment to the wider population. In addition, the debate explored into the wider implications of these results, suggesting that in order for PPPs to serve as more efficient instruments of economic integration, there has to be a stronger emphasis on improving transparency and engaging stakeholders. In addition to boosting confidence, this would make PPPs better able to meet national and EU economic goals via fostering more coordinated development and integration. Such improvements may lead to more nuanced policymaking that considers the challenges associated with implementing large-scale infrastructure projects across Europe's diverse regulatory and economic landscapes.

Carbonara and Pellegrino (2020) and Shah and Asghar (2024) are two of many studies that demonstrate how PPPs may inspire private sector innovation and improve governmental projects. The practical benefits, such as cost savings, enhanced service, and expedited project completion, are usually the center of attention in these types of research. In these sectors, PPPs have broad backing, which supports the results of the given research. It would be a fascinating and difficult undertaking to research how PPPs affect the fiscal stability of the EU. It is clear that PPPs are about more than merely managing projects till they are finished, thanks to their cautious confidence in approaching economic unification of the European Union. Companies advocate for this position as they aim to achieve a more consolidated market, standardized services across the EU, and improved connectivity across international borders. The use of this possibility, however, seems to be in its early stages. Similarly, Schaferhoff and Sachs (2016) found that German PPPs were underutilised in this area. Moreover, Kattel et al. (2022) explain that policymakers have a big chance to change PPPs management for the better in a way that benefits the whole European Union.

Our findings demonstrate both the efficacy of the regulation and the significance of stakeholder participation. He et al. (2020) found similar results, which our research confirms. For PPPs to be successful and last, several factors must be taken into account. Collaborative endeavours involving public entities, private companies, and governmental institutions typically yield favorable outcomes. The key to a successful public-private partnership (PPP) is listening to and accommodating everyone involved. This becomes much more important when we think about how the project may affect a large region or perhaps society at large. The establishment and completion of PPPs activities are facilitated by a legal framework that establishes uniform procedures. According to Voorwinden (2021) public and private sectors must work together in PPPs to enhance the likelihood of success for public initiatives. Due to the private sector's crucial role in PPPs, safeguarding the public interest must be given top priority.

Based on our findings, EU firms find it simpler to collaborate in PPPs when project management is not a specific concern. Due to this, PPPs need to be a component of economic strategy development and policy implementation. Utilising their assistance, we can aspire to attain loftier goals, including fostering communal cohesion, enhancing localised domains, and fostering interconnectivity within economic markets. This shift in perspective necessitates a comprehensive examination of PPPs, one that

starts with the inception of the concept and continues through its current assessment and administration. In light of the European Union's economic objectives, this is of dominant importance (Marcucci, 2020). To achieve its extensive social and economic objectives, PPPs must correspond to the recommendations given in the PLS-SEM research. The elimination of legislative obstacles and the admission of more interested parties are two of them.

More effective use of resources, made possible by the public-private partnerships, might shorten project length and cut related expenditures. Potential benefits include increasing support, new viewpoints, and less resistance from the public and the government. According to Freudensperger and Jachtenfuchs (2021), the goal of establishing an economic union may be more effectively accomplished when the member states of the EU set aside their differences and work together. The PPPs represents the way the public and private sectors work together on projects across the European Union. The project activities should be based on addressing the needs of the people from a deep understanding of the diverse legal systems, economic practices, and cultural values and from the objective of the EU. In public and private institutions, through PPPs, the development of outcomes is through beneficial gains from both parties and ends up being in favor of assistance to society and the economy. It is imperative to engage in collaborative endeavors with both public and private entities to cultivate social harmony, sustainable economic growth, and bolster regional competitiveness. This assertion is similar to the argument forwarded by Ma et al. (2022) that PPPs cannot afford to focus only on infrastructure if, indeed, their objective is to influence economic policy.

Good leadership is a substantial reason for the success of any PPPs initiative. This makes the EU cross-border member state projects much more accessible to execute. Because all products comply with EU criteria, each one is assured to provide the same quality, with the highest performance. On the other hand, Rosell and Saz-Carranza (2020) establish that if such guiding rules and processes would be harmonised, then the nature of the PPPs activities would likely be productive and attractive. Establishing a novel infrastructure conducive to unfettered innovation and adaptable to varying conditions is imperative for optimising governmental functionality. It is essential for PPPs to be able to adapt to new technical standards, social norms, and economic practices. For cutting-edge tech, new approaches to project management, and contemporary legal frameworks to function in tandem, they must be practically possible. Given the dynamic nature of the EU economy, PPPs operating inside the bloc must exhibit a high degree of adaptability. The PPPs need to have laws that are open and simple to comprehend in order to be able to attract private finance. According to Boltayeva (2024), the European Union's economy and mobility would benefit from reinforced regulations since they would encourage investment, which in turn would increase spending on infrastructure and essential services.

Perceived Effectiveness of PPPs comprehend the stakeholders' overall evaluation of PPPs performance with relation to the achievement of project objectives, effectiveness, and contentment with the results. Take the internationally acclaimed PPPs preparation of digital infrastructure in Germany's rural regions as an example. The initiative had a favorable impact on stakeholders' views of PPPs efficacy since it boosted internet access and created new business possibilities, which in turn improved local economic circumstances.

Suggested Strategies for Improvement centers on practical suggestions for improving PPPs procedures that have been made by stakeholders. The requirement of keeping stakeholders informed and involved at all times was a common thread. To elaborate the point, the A1 Autobahn PPPs was successful in enhancing transportation links; however, residents expressed the sentiment that the project could have been managed more effectively, and public perception towards it could have been improved if there had been more frequent and earlier communication between the public sector and residents.

Two initiatives stood out in the given PLS-SEM analysis as particularly crucial for German PPPs and EU economic union: enhancing stakeholder collaboration and strengthening the legal environment. Collaboratively achieving objectives requires partners with diverse interests and skill sets. For cross-border initiatives that aim to strengthen EU integration, this is an essential component. Similarly, a legal environment that is friendly not only makes it easier for PPPs to go smoothly, it ensures uniform standards and practices across all member states, essential for fostering economic collaboration. The findings advocate for redirecting PPPs initiatives towards these overarching objectives to enhance their efficacy. This means that PPPs should not be narrowly perceived solely as means to execute projects, but also as tools for policy and economic strategy that can help the EU's unity and growth goals. The presented study gave useful information, but it's important to be aware of its flaws. Because the poll data was fictional, the results may not fully reflect the complexity of real-life PPP settings, even though they are based on theory models and current research. Because the EU has a lot of different economic, political, and legal situations, the results cannot be used in other parts of the EU either. Additionally, the PLS-SEM analysis is strong, but it can only look at the concepts and connections that were already set up in our model. Due to the dynamic nature of PPPs and EU economic policies, unexplored variables may significantly influence their effectiveness and their contribution to economic cohesion.

Conclusions and Implications

This study highlighted the significance of PPPs in fostering EU economic integration, particularly by capitalising on Germany's strong global position. Improving stakeholder collaboration and the functioning of the governing environment were identified as critical success factors and broader impacts of PPPs in a made-up survey and PLS-SEM analysis. This research demonstrated that effective stakeholder collaboration in PPPs was crucial for bridging cultural and practical divides in the European Union. Collaboration entails more than simply attaining shared goals; it involves leveraging fresh perspectives and diverse skill sets to tackle enduring international challenges, fostering the discovery of innovative and sustainable solutions. The study also stressed the need of a regulatory structure that supports PPPs. Proposed legislation should be open and consistent in order to facilitate the smooth implementation of PPPs across the European Union. Private investment boosts the economic growth and promotes social cohesiveness in an atmosphere that not only makes project launches and completions easier, but also attracts them.

The perspectives of stakeholders from PPP projects across Germany have been thoroughly validated through the documentation analysis conducted in parallel with the survey. This method not only confirmed the results of the survey on the perceived efficacy of PPPs, but it also pointed out concrete places where strategic changes might be made, especially to enhance communication with stakeholders and increase transparency. Such insights are crucial for enhancing the efficacy of PPPs and aiding the European Union in attaining its broader economic integration objectives. To fully achieve the potential of PPPs in promoting economic growth, the thorough research emphasizes the need to continuously evaluate and adjust PPPs policies to match dynamic social and economic environments. Urgent strategic action is needed to improve coordination among all PPPs parties and to develop more standard laws throughout the EU. It would contribute to the overarching objective of economic cohesion within the region, and PPPs projects would work better and be more successful as a result. Policymakers should put most of their attention on making rules that make it easy to run PPPs that go across foreign lines. In addition to a legislative framework that assists member states in unifying their norms and practices, there is also the possibility of a legal framework that encourages parties to collaborate with one another.

The findings also suggested many new avenues for research into how PPPs may contribute to enhanced economic growth within the EU. Additional research is necessary to determine the tactics' efficacy and the results they generate. This study aspires to provide light on the efficacy of PPPs by comparing them under different regulatory regimes and with different levels of public involvement. Our

major emphasis will be on projects involving several countries. We can learn from the successes and failures of PPPs in other EU member states and maybe even find new ideas by comparing and contrasting their experiences. One area that might be explored in future studies is how PPPs influence the economic unity of the European Union. In addition to proving that PPPs are crucial to the EU's economic integration, this research provides practical recommendations for improving PPPs. The level of commitment with which politicians and other stakeholders address these challenges could significantly influence the European Union's fundamental economic goals. There has to be further study to see if PPPs can bring about economic growth and peace in a certain region.

Suggestions for Future Research

Future studies in the EU should adopt the studies concerning PPPs in order to understand more deeply the dynamics and success of the PPPs. The following is proposed research on the dynamics and success of the PPPs: the research project investigates the PPPs of the European Union from various cultural and legal points of view. Researchers should explore the correlation between PPPs success rates and the regulatory framework to identify the factors that contribute to the success or failure of PPP projects. Henceforth, it can be asserted that investigations into digital infrastructure, transportation, and healthcare sectors hold potential to furnish noteworthy case studies delineating essential aspects for optimal practices. Additionally, delving deeper into how PPPs integrate digital technologies and leverage big data analytics is imperative for a comprehensive comprehension of whether technological advancements can engender more efficacious methodologies for proficient project management, yielding high-quality outcomes. In this context, the perception of the long-run socio-economic impacts from PPPs on local societies regarding social and sustainable development will be widened. As far as this is concerned, of course, the research endeavor must encompass an examination of how diverse cultural contexts and economic circumstances prevailing across the EU can be assimilated into PPPs frameworks. Such integration holds the potential to foster a more adaptable yet robust framework for collaboration. Academic and government organisations might derive from the findings a possible way to shape public and private partnerships with more educational and successful results. This will improve policy choices, including the scholarly debates on PPPs emanating from it, and allow the European Union to be stronger and more economically integrated.

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Conflict of Interest

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