

# 14

## THE ROLE OF PRIVATE EQUITY INVESTMENTS IN INFRASTRUCTURE PROJECTS

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### 14.1 Introduction

Infrastructure is the backbone of any economy, encompassing a wide range of assets such as transportation networks, energy systems, water supply, and telecommunications. These systems are essential for facilitating trade, improving quality of life, and fostering economic growth. Historically, the development and maintenance of infrastructure have been largely the public sector's responsibility, with governments around the world investing heavily in these assets. However, in recent decades, a combination of fiscal constraints, rising demand for infrastructure, and the recognition of efficiency gains possible through private sector participation has led to a significant shift towards private financing models.

Among the various forms of private sector involvement, private equity (PE) has emerged as a particularly influential force in infrastructure development. The attractiveness of infrastructure assets to PE firms lies in their potential to provide stable, long-term returns, which align well with the investment horizons and risk profiles of these firms ([Gemson et al., 2012](#)). Moreover, the predictability of cashflows from infrastructure projects, often backed by government guarantees or regulated pricing models, makes them appealing targets for private equity investors.

According to the Global Infrastructure Hub (GI Hub), the global infrastructure investment gap is vast, with global demand for infrastructure investment projected to be around \$94 trillion by the year 2040, with a current estimated investment of \$79 trillion. This shows an infrastructural investment gap of \$15 trillion. The GI Hub estimates an additional need of \$3.5 trillion to meet the United Nation's Sustainable Development for electricity and water. This need is exacerbated by aging infrastructure in developed economies ([Bennett et al., 2020](#)) and the lack of adequate infrastructure in many developing countries. Public sector resources alone are insufficient to meet this demand, necessitating the involvement of private capital. This substantial need, driven by both developed and developing economies, has prompted a shift towards alternative financing mechanisms, including PE.

Private equity investors have responded to this opportunity by raising dedicated infrastructure funds, deploying innovative financing mechanisms, and increasingly participating in public–private partnerships (PPPs). These firms bring capital and expertise in project management, operational efficiency, and risk management. As a result, they have become key players in the development,

expansion, and modernisation of infrastructure across the globe. Traditionally, infrastructure projects have relied on public funding, but the constraints on government budgets and borrowing capacities have led to the emergence of PE as a critical player in this domain (Page et al., 2008).

This chapter aims to critically analyse the role of PE investments in infrastructure projects, focusing on both developed and developing countries. The objectives are threefold: first, to explore the historical evolution of PE involvement in infrastructure and identify the key drivers behind this trend; second, to analyse the impact of PE on infrastructure projects, particularly in terms of financing, risk management, and operational outcomes; and third, to assess future trends and challenges that could shape the role of PE in this sector. By addressing these objectives, the chapter seeks to provide a comprehensive understanding of how private equity has influenced the infrastructure landscape, both positively and negatively. The analysis will draw on available data, case studies, and theoretical insights to offer a balanced perspective on the opportunities and challenges associated with PE investments in infrastructure.

The chapter is structured as follows: Section 2 provides a detailed overview of the evolution of private equity in infrastructure investment, tracing the origins of this trend and examining the factors that have driven its growth over the past few decades. Section 3 explores the role of private equity in infrastructure development, focusing on how these investments are structured, the risks involved, and the strategies PE firms use to manage these risks and maximise returns. Section 4 offers a critical analysis of the impact of private equity on infrastructure projects, highlighting both the positive outcomes and the potential downsides of PE involvement. This section also includes case studies that illustrate the varied experiences of PE-backed infrastructure projects. Section 5 looks to the future, discussing emerging opportunities for private equity in infrastructure, particularly in the areas of sustainable and digital infrastructure. It also considers the policy and regulatory changes that could influence the role of PE in this sector moving forward. Section 6 concludes the chapter by summarising the key points discussed and reflecting on the broader implications of private equity's growing presence in infrastructure.

## **14.2 The Evolution of Private Equity in Infrastructure Investment**

### ***14.2.1 Brief Historical Development***

Private equity's involvement in infrastructure dates back to the 1900s during the Industrial Revolution, when some private companies invested in railroads. However, it gained substantial momentum in the early 2000s. Initially, infrastructure investments were primarily funded by public finances or project finance mechanisms involving significant government participation. However, as governments faced fiscal constraints, PE firms began to see infrastructure as a viable investment opportunity. The involvement of PE firms like Cintra and Macquarie Infrastructure Group in major projects such as the Chicago Skyway Toll Bridge in 2004 marked a significant milestone in this evolution (Ashton et al., 2012; Gemson et al., 2012).

The recent decades have seen a foray of private equity into infrastructure, with firms like Macquarie Asset Management, Brookfield Asset Management, and Global Infrastructure Partners leading the charge. These early pioneers recognised the potential for stable, long-term returns that infrastructure investments could offer. Macquarie established itself as a global leader in infrastructure investment, creating a model that many other PE firms would later emulate. The firm's approach involved the creation of infrastructure funds that pooled capital from institutional investors, such as pension funds and insurance companies, to invest in large-scale infrastructure

projects. This model proved to be highly successful, with Macquarie raising billions of dollars and investing in assets such as toll roads, airports, and utilities, among others.

The success of early infrastructure funds led to a rapid expansion of private equity's role in the sector. By the mid-2000s, infrastructure had become a distinct asset class within the private equity industry, attracting significant attention from both established PE firms and new entrants. The global financial crisis further accelerated this trend as governments around the world, particularly in Europe and North America, sought to reduce their balance sheets by privatising infrastructure assets. This wave of privatisation opened new opportunities for PE firms to acquire high-quality infrastructure assets at attractive valuations.

#### ***14.2.2 The Appeal of Infrastructure for Private Equity***

Infrastructure projects offer PE firms a unique value proposition due to their stable cash flows and the essential nature of the services provided (e.g., energy, transport, and utilities). These projects often come with long-term contracts that reduce volatility, making them attractive to PE investors who seek to balance risk with steady returns. The growing institutional investor interest in infrastructure further underscores the sector's appeal as these investors look for low-risk, inflation-protected assets to diversify their portfolios (Andonov et al., 2021).

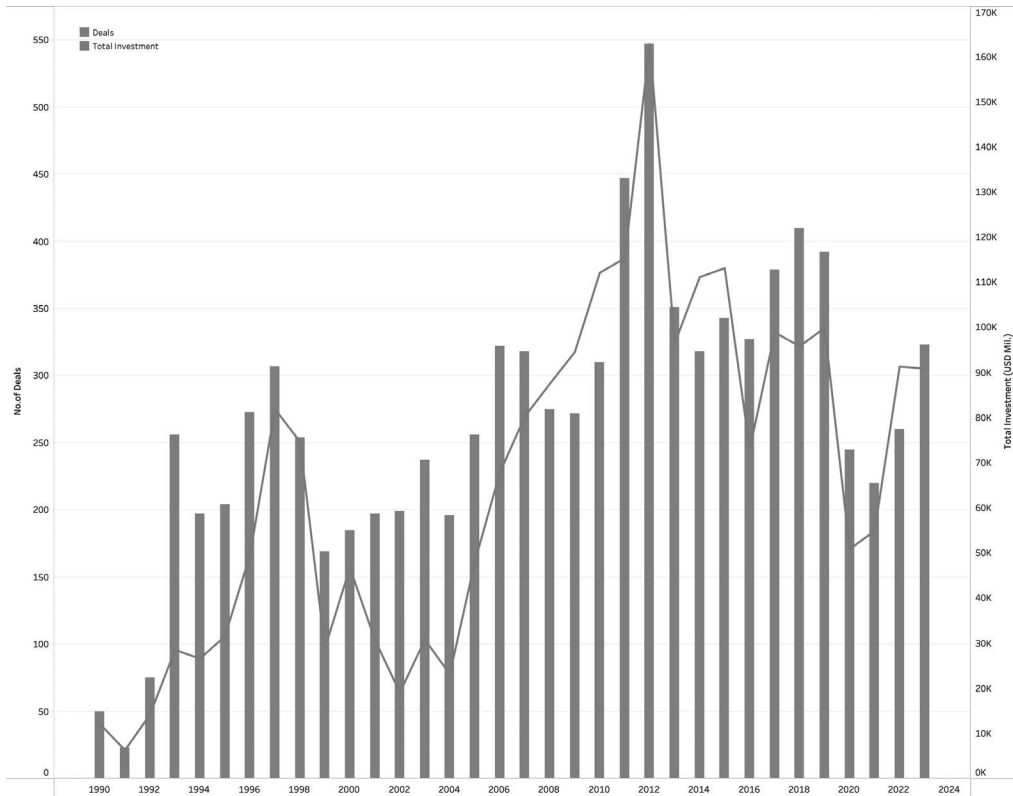
Infrastructure investments offer several key attributes that are particularly attractive to private equity investors. First, infrastructure assets typically provide stable and predictable cash flows (GI Hub, 2022). This is because they often operate in regulated markets or under long-term contracts, which reduce the volatility of returns. For example, toll roads, airports, and utility companies usually have stable demand and regulated pricing, which ensures a consistent revenue stream. This stability is highly appealing to private equity firms, which seek to generate reliable returns for their investors over the long term.

Second, infrastructure investments have a low correlation with other asset classes, such as equities and bonds (Andonov et al., 2021). This makes them an attractive diversification tool within a broader investment portfolio. The long-term nature of infrastructure projects, often spanning decades, also aligns well with the investment horizons of private equity funds, which typically hold investments for 5–10 years before exiting. Additionally, infrastructure assets often provide a natural hedge against inflation, as many contracts include provisions for price adjustments based on inflation rates. This feature further enhances the attractiveness of infrastructure as an investment class for PE firms. Indeed, Andonov et al. (2021), in a survey of institutional investors, found that stable income streams, low correlation to other assets, and inflation hedging are the three most important reasons why institutional investors participate in infrastructure investment.

Moreover, the growing global demand for infrastructure development, driven by urbanisation, population growth, and technological advancements, presents significant opportunities for private equity. The World Economic Forum has estimated that \$3.7 trillion needs to be invested annually in infrastructure to support global economic growth, yet current investment levels fall short by nearly \$1 trillion each year. This substantial infrastructure gap, particularly in emerging markets, creates a fertile ground for private equity investment as governments increasingly turn to the private sector to help bridge this funding shortfall.

#### ***14.2.3 Trends and Market Dynamics***

In recent years, there has been a marked increase in PE investments in infrastructure, particularly in developed markets where the regulatory environment is more conducive to private sector



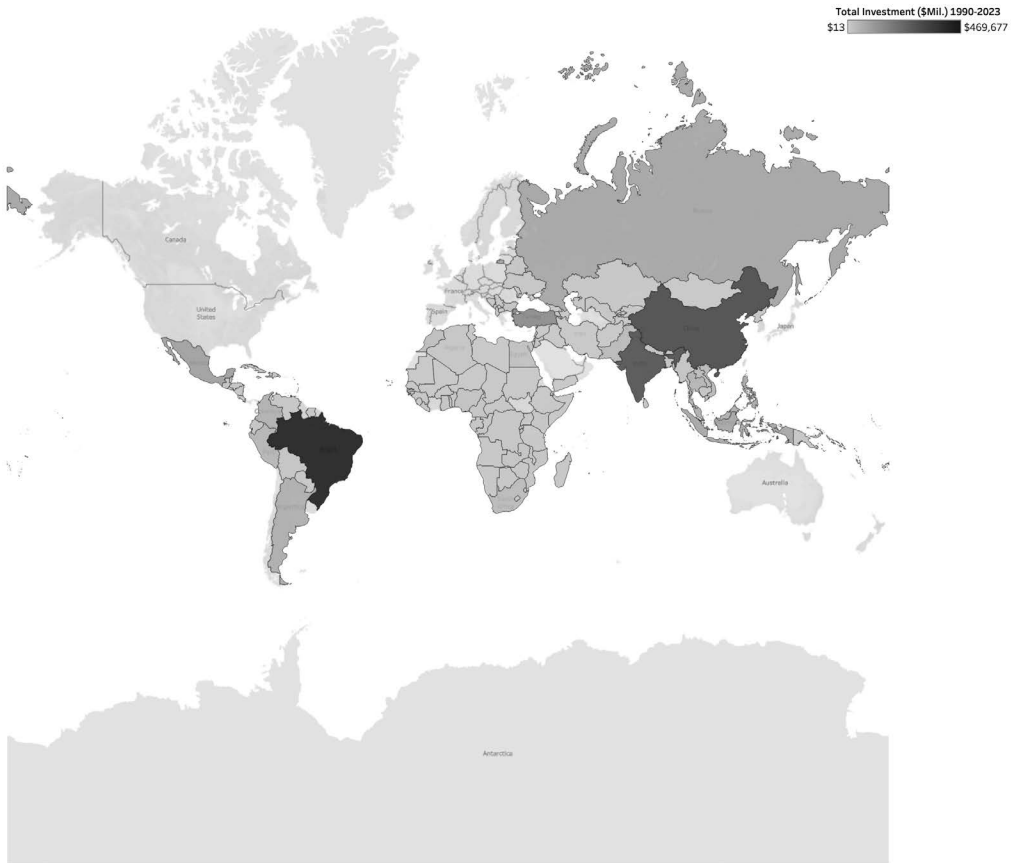
*Figure 14.1* Trends in number of deals and PPI total investments, 1990–2023

*Source:* Based on data from World Bank Private Participation in infrastructure (PPI) Database

participation. The private equity infrastructure market has experienced significant growth over the past two decades, with the size of the market tripling since the global financial crisis. Based on the World Bank’s Private Participation in Infrastructure (PPI) database,<sup>1</sup> [Figure 14.1](#) shows that the trend in the number of PPI deals and investments has generally followed an upward trend, with a significant increase after the 2008 GFC peaking in 2012 and slowing down at the onset of the COVID-19 pandemic in 2020.

By 2024, it is estimated that private equity firms globally will have amassed over \$3 trillion in infrastructure assets under management. This rapid growth is driven by a combination of factors, including low-interest rates, which have made traditional fixed-income investments less attractive, and the increasing recognition of infrastructure as a viable asset class. Currently, developing countries spearheaded by Brazil, China, and India (see [Figure 14.2](#)) have received a fair share of the global private investment. So far, up to 2023, Brazil has received an estimated \$470,000 (Mil.) in PPI investments among developing countries. There is still significant investment to meet the infrastructure needs of these countries.

While offering significant growth opportunities, comparatively, emerging markets present higher risks, which PE firms mitigate through syndication and risk-sharing mechanisms. From [Figure 14.3](#), upper-middle-income countries in Latin America and the Caribbean have seen the largest PPI from 1999 to 2023. Low-income South Asian countries have received the least share



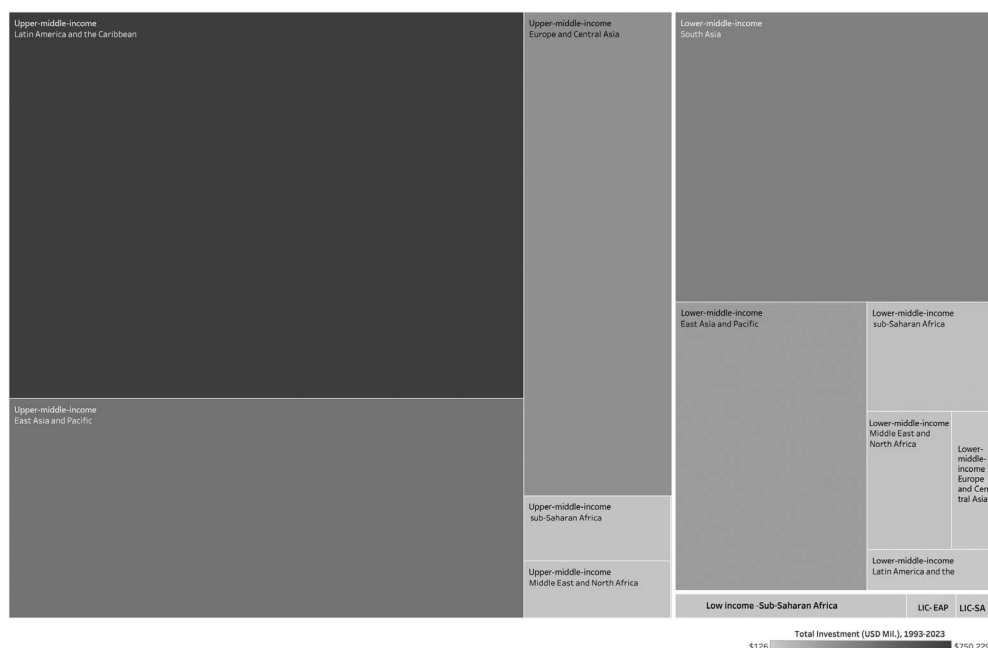
*Figure 14.2* Map of PPI total investment (USD Mil.), 1990–2023 for developing countries

*Source:* Based on data from World Bank Private Participation in infrastructure (PPI) Database. Color shows sum of Total Investment (USD Mil.) 1990–2023. Details are shown for Country. The view is filtered on Longitude (generated), which keeps not-null values only. Gray colors shows non-available data

of PPI investment over the last decades. These countries present a good opportunity for private investors to take advantage of the usually higher returns.

Private equity firms are, therefore, increasingly targeting emerging markets where the demand for infrastructure is highest. As seen in [Figure 14.2](#), Asia has become a focal point for PE infrastructure investment, with countries like India and China undertaking massive infrastructure development programs. However, investing in emerging markets also comes with additional risks, including political instability, currency fluctuations, and weaker regulatory frameworks. To mitigate these risks, private equity firms often partner with local investors or governments, leveraging their local knowledge and networks to navigate the complex investment environment. Moreover, through PPPs, governments can provide guarantees and additional support to private firms in such projects to help mitigate risks.

These opportunities would require the PE firms to provide the needed capital to finance infrastructure projects. We can also observe from [Figure 14.4](#) that the needed required range of investment for most infrastructure projects, especially in developing countries, is between \$100



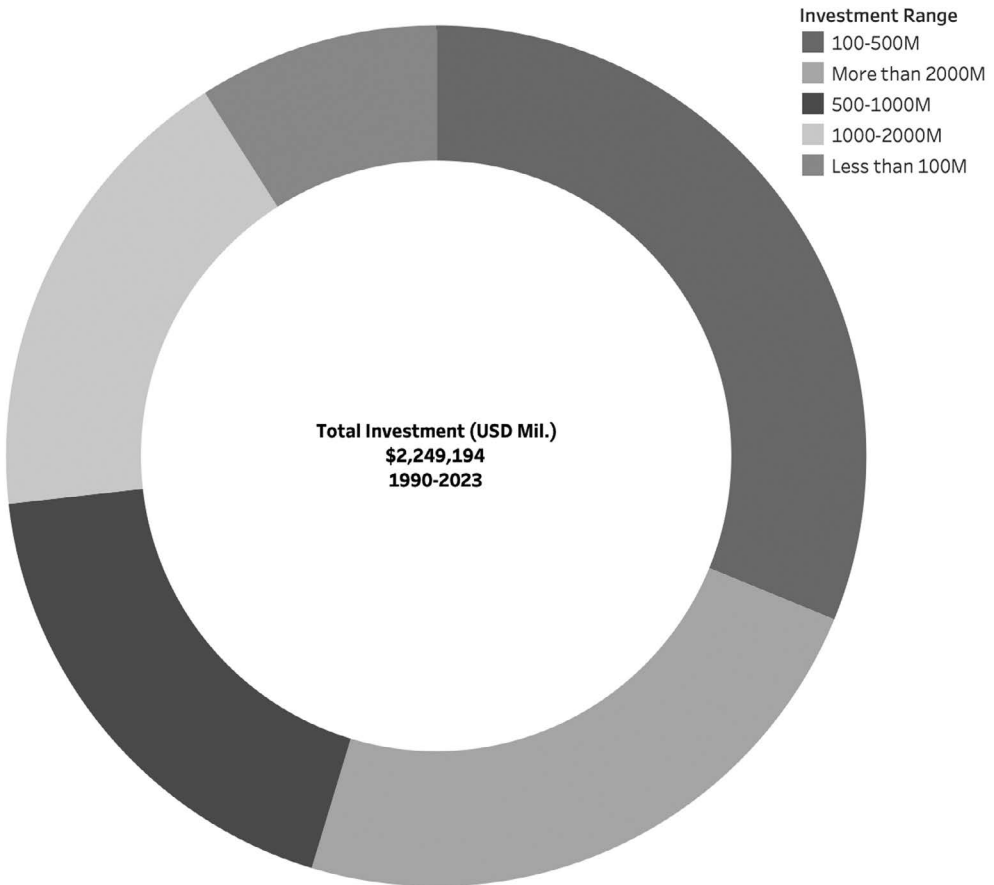
**Figure 14.3** Private participation in infrastructure (PPI) total investment (USD Mil.), 1990–2023 by region and income groups

*Source:* Based on data from World Bank Private Participation in infrastructure (PPI) Database. Note: LIC - Low income EAP - East Asia and Pacific SA - South Asia

and \$500 million, followed by over \$2000 million. While still huge, the spread of investments between the ranges provides investment opportunities for different sizes of PE firms who may want to explore these projects.

The sectoral focus of PE investments has also diversified, with significant capital now flowing into renewable energy projects, digital infrastructure, and transportation ([Global Infrastructure Hub, 2017](#)), with electricity remaining the dominant sector, particularly in developing countries. As can be seen in [Figure 14.5](#), in developing countries, the electricity sector has received the most investment from PPI projects with most of these investments being greenfield followed by brownfield investments.

One of the key trends in the private equity infrastructure space is the increasing focus on greenfield and brownfield projects. As seen in [Figure 14.6](#), based on the World Bank PPI data, Greenfield is the PPI type with the highest investment, followed by brownfield, divestiture, and management and lease contracts. Greenfield projects, which involve the development of new infrastructure from the ground up, offer higher potential returns but come with greater risks, including construction delays and regulatory hurdles. Brownfield projects, on the other hand, involve the acquisition and enhancement of existing infrastructure assets. These projects are typically less risky compared to greenfield and provide more immediate cash flows, making them attractive to risk-averse investors. Meanwhile, in a divestiture, a private entity acquires equity in a state-owned enterprise through methods such as asset sales, public offerings, or mass privatisation programs. Like a concession, the private operator assumes full responsibility for operations, maintenance, and investment. For management and lease contracts, a private entity assumes management responsibilities



*Figure 14.4* Private participation in infrastructure (PPI) total investment (USD Mil.), 1990–2023 by investment range

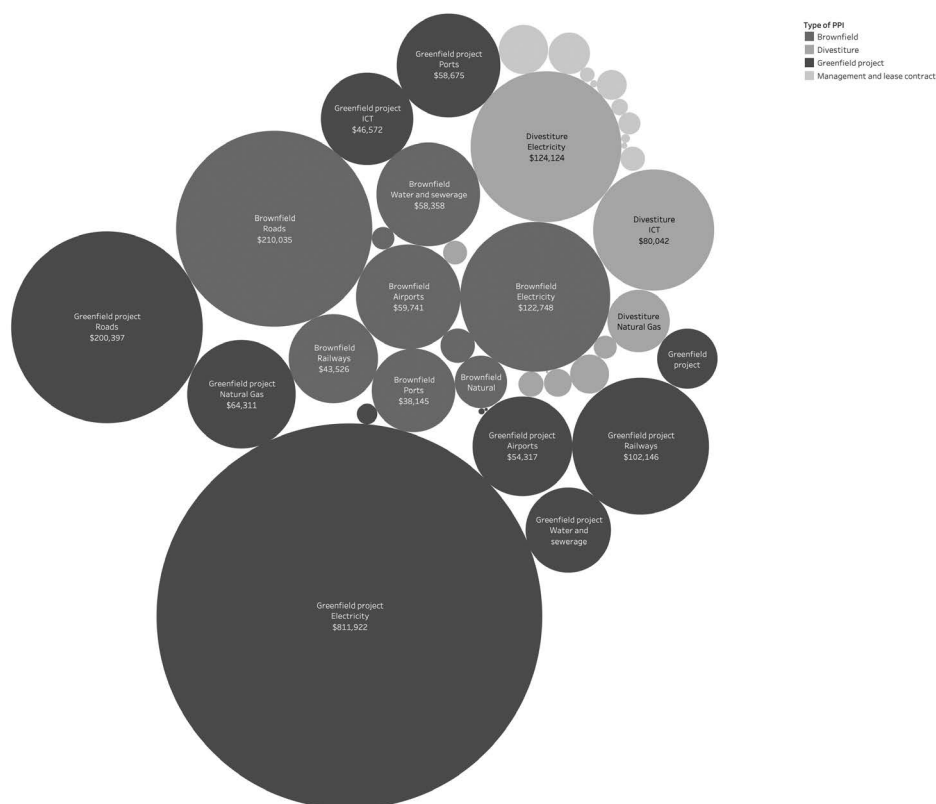
*Source:* Based on Data from World Bank Private Participation in Infrastructure (PPI) Database. Sum of Total Investment (USD Mil.) 1990–2023 (size)

for a public asset for a specified period, while the state retains ownership and control over investment decisions ([World Bank n.d.](#))

Furthermore, the growing emphasis on sustainability and environmental, social, and governance (ESG) criteria reshapes the private equity infrastructure landscape. Investors are increasingly demanding that infrastructure projects adhere to stringent ESG standards to mitigate risks and capitalise on the growing market for sustainable infrastructure. This trend drives private equity firms to invest in renewable energy projects, smart cities, and other sustainable infrastructure initiatives that align with global efforts to combat climate change and promote sustainable development.

In conclusion, the evolution of private equity in infrastructure investment has been marked by rapid growth, driven by the sector's unique characteristics and the increasing global demand for infrastructure. As private equity firms continue to expand their presence in this space, they are

## The Role of Private Equity Investments in Infrastructure Projects



**Figure 14.5** Private participation in infrastructure (PPI) total investment (USD Mil.), 1990–2023 by sector and type of PPI

*Source:* Based on Data from world Bank Private Participation in infrastructure (PPI) Database. Type of PPI and sector. Color shows details about Type of PPI. Size shows sum of Total Investment (USD Mil.) 1990–2023. The marks are labeled by Type of PPI and Sector

likely to play an even more critical role in shaping the future of global infrastructure development, particularly in emerging markets and sustainable projects.

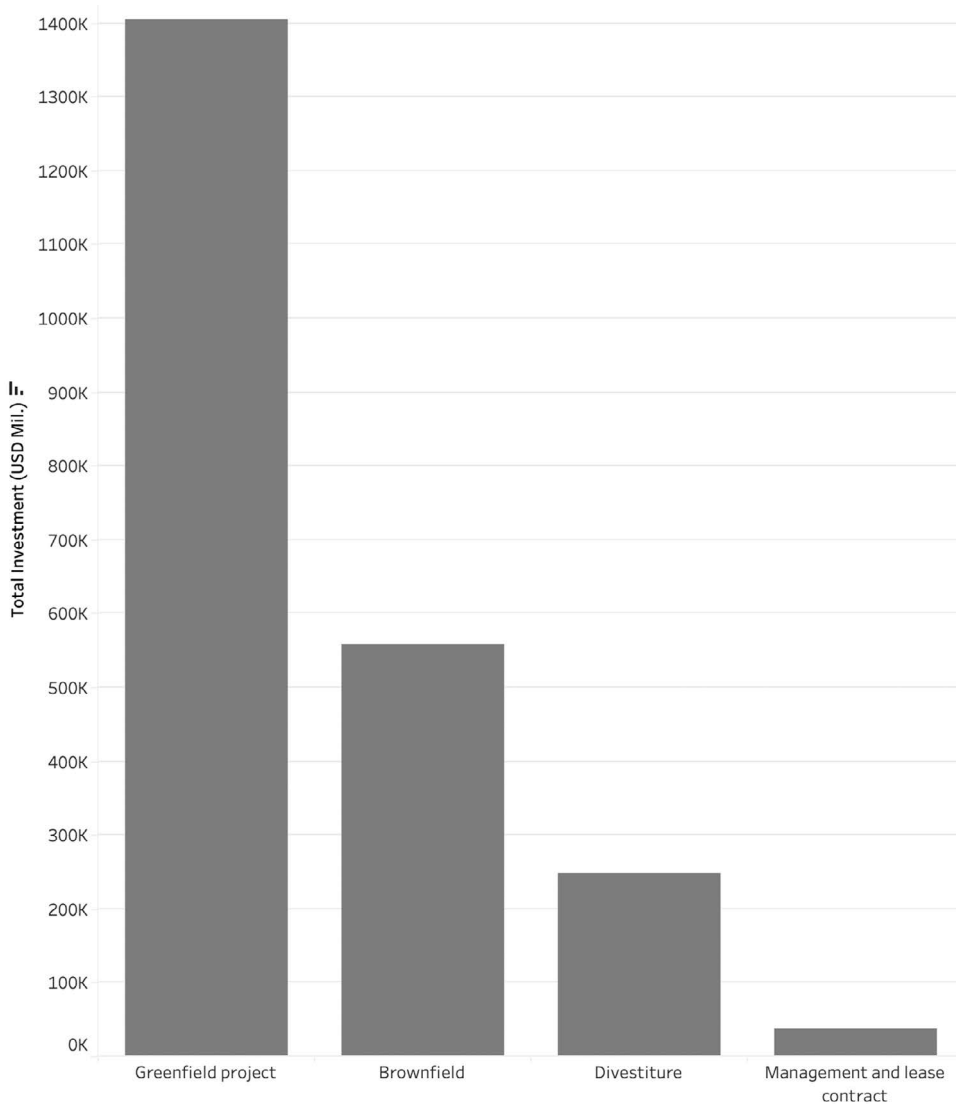
### 14.3 Private Equity's Role in Infrastructure Development

#### 14.3.1 Funding and Financing

Private equity plays a critical role in bridging the infrastructure financing gap by providing the necessary equity capital to complement traditional debt financing. Governments around the world are increasingly constrained by budget deficits and growing public debt, which limits their ability to finance large-scale infrastructure projects. This financial gap is particularly acute in developing countries, where infrastructure needs are often the most pressing. Private equity firms have stepped in to fill this gap by raising dedicated infrastructure funds and pooling capital from institutional investors such as pension funds, insurance companies, and sovereign wealth funds.

A significant advantage of private equity is its ability to quickly mobilise large amounts of capital, which is essential for infrastructure projects requiring substantial upfront investment. For





*Figure 14.6* Private participation in infrastructure (PPI) total investment (USD Mil.), 1990–2023 by type of PPI

*Source:* Based on Data from World Bank Private Participation in infrastructure (PPI) Database

instance, private equity firms raised \$87.75 billion for infrastructure in 2023, even though this is a significant decrease from \$176.08 billion in 2022 (Thomas, 2024). These funds are often structured as PPPs or the Private Finance Initiative (PFI) in the UK, where private equity firms collaborate with governments to design, finance, build, and operate infrastructure assets. PPPs are particularly attractive to governments because they transfer some of the risks associated with infrastructure development to the private sector while providing access to private capital and expertise.

In addition to mobilising capital, private equity firms have introduced innovative financing structures that enhance the financial viability of infrastructure projects. One such innovation is project finance securitisation, which allows private equity firms to bundle infrastructure project loans into securities that can be sold to institutional investors. This approach, exemplified by Clifford Capital's \$458 million infrastructure take-out facility, has enabled private equity firms to recycle capital, allowing banks to invest in new projects while mitigating risk (Enterprise Singapore & Infrastructure Asia, 2024; GI Hub, 2020).

### **14.3.2 Risk Management**

Private equity's involvement in infrastructure projects also brings a sophisticated approach to risk management. Infrastructure investments are typically long-term, capital-intensive, and exposed to a wide range of risks, including political, regulatory, operational, and market risks. Private equity firms, with their expertise in structuring complex deals, are well-equipped to manage these risks through a variety of strategies.

One key element of private equity's risk management approach is diversification. Private equity firms can spread their risks by investing in a broad portfolio of infrastructure assets across different sectors and regions. For example, they may invest in a combination of greenfield and brownfield projects. By balancing investments across these types of projects, private equity firms can achieve a more stable overall return.

Private equity firms also use sophisticated financial instruments, such as hedging and currency swaps, to mitigate interest rates, currency fluctuations, and inflation risks. Many infrastructure projects are subject to long-term contracts with fixed or regulated pricing, which can create challenges if inflation outpaces revenue growth. In such cases, private equity firms may negotiate contract clauses that allow for periodic price adjustments based on inflation or other economic factors (Demirel et al., 2022). Additionally, by securing financing through long-term fixed-rate debt, private equity firms can protect themselves against fluctuations in interest rates and exchange rates even though it may be difficult to secure such fixed-rate funds (Lu et al., 2019).

Political and regulatory risks are another major concern for private equity firms, particularly when investing in emerging markets. Many infrastructure projects, such as energy, water, and transportation, are highly regulated, and changes in government policy or political instability can have significant implications for project viability. To mitigate these risks, private equity firms often engage in thorough due diligence before committing to an investment, assessing the political environment, regulatory framework, and potential for changes in law. In some cases, private equity firms may also secure political risk insurance to protect their investments against expropriation, nationalisation, or other adverse government actions (Lu et al., 2019).

Moreover, private equity firms have developed advanced project management and operational strategies to mitigate operational risks. These firms typically appoint experienced management teams to oversee infrastructure projects, ensuring that best practices in project execution, cost control, and operational efficiency are implemented (Preqin, 2020). This hands-on approach improves the likelihood of successful project completion and enhances the overall performance of the infrastructure assets. For example, private equity-backed infrastructure projects often achieve higher operational efficiency through the adoption of new technologies, better asset management practices, and more rigorous performance monitoring (Bahçeci & Leh, 2017; Page et al., 2008).

### **14.3.3 Operational Efficiency and Value Creation**

One of the most significant contributions of private equity to infrastructure development is the focus on operational efficiency and value creation. Inefficiencies, such as cost overruns, delays, and suboptimal asset management, often plague infrastructure projects. Private equity firms, with their strong focus on maximising returns, bring a performance-driven mindset to infrastructure projects, which can result in significant improvements in operational efficiency.

Private equity firms typically conduct a thorough analysis of infrastructure assets before acquiring them, identifying areas where operational improvements can be made. This process, often referred to as “value creation”, involves implementing strategies to reduce costs, increase revenues, and enhance the overall performance of the assets. For example, private equity firms may invest in upgrading outdated infrastructure, optimising maintenance schedules, or renegotiating contracts to achieve better terms (Ashton et al., 2012).

In the case of brownfield projects, private equity firms often focus on enhancing the value of existing infrastructure through operational improvements. These improvements may include modernising equipment, improving maintenance practices, and introducing new technologies to increase the efficiency of the assets (Private Corner, 2024). For example, in the energy sector, private equity firms may invest in upgrading power plants to improve fuel efficiency, reduce emissions, and increase capacity (Carapellucci & Giordano, 2015). In the transportation sector, private equity firms may implement dynamic pricing strategies for toll roads or airports to maximise revenue during peak usage times.

Private equity’s emphasis on value creation is particularly important in sectors such as renewable energy, where operational efficiency directly impacts the financial performance of the assets. In wind and solar energy projects, for instance, private equity firms may invest in advanced monitoring systems that optimise the performance of turbines and solar panels, ensuring that energy production is maximised. Additionally, private equity firms often negotiate long-term power purchase agreements (PPAs) with utility companies, securing stable revenue streams for renewable energy projects and reducing market risks.

Furthermore, private equity firms bring discipline to infrastructure projects through rigorous performance monitoring and accountability. By establishing key performance indicators (KPIs) and regularly tracking progress, private equity firms can quickly identify and address any issues that arise during the construction or operation of infrastructure assets. This hands-on approach ensures that projects are completed on time and within budget while also delivering the expected financial returns to investors (Yescombe & Farquharson, 2018).

In conclusion, private equity’s role in infrastructure development extends far beyond simply providing capital. Through innovative financing, sophisticated risk management, and a focus on operational efficiency, private equity firms have become key players in the global infrastructure landscape. Their involvement has not only helped bridge the infrastructure financing gap but has also led to significant improvements in the performance and value of infrastructure assets worldwide.

## **14.4 Critical Analysis of Private Equity’s Impact on Infrastructure Projects**

### **14.4.1 Positive Impacts**

Private equity investments have had a transformative impact on infrastructure development globally. One of the most significant positive outcomes of PE involvement is the acceleration of project delivery timelines. Private equity firms are adept at quickly mobilising large amounts of capital,

which is particularly critical for large-scale infrastructure projects. Unlike government budgets, which can be slow and subject to political constraints, PE funds are more agile and can finance projects rapidly. This has resulted in shorter project timelines, allowing infrastructure projects such as transportation networks, utilities, and renewable energy facilities to be completed faster than if they had relied solely on public funding.

Moreover, PE firms bring significant operational expertise to the table. Their experience in managing complex projects and implementing best practices has led to improved operational efficiency in infrastructure projects. For example, as indicated earlier, the discipline of private equity-backed infrastructure projects often leads to reduced cost overruns and fewer delays. This is especially important in sectors such as energy, where efficient operations can have a direct impact on profitability and sustainability. PE firms often implement advanced technologies, streamline processes, and introduce new management strategies to ensure that infrastructure assets are optimised for performance (Lu et al., 2019).

A key benefit of PE in infrastructure is the ability to leverage private capital to fill the funding shortfall left by constrained public finances. By attracting private equity investment, countries can access the capital required to develop critical infrastructure such as roads, ports, and power plants. This influx of private capital has been instrumental in driving economic development, creating jobs, and improving the quality of life for local populations. Infrastructure is essential for economic growth, and by investing in this sector, PE firms indirectly support the broader economy. For instance, improved transportation networks enhance trade and commerce, while better energy infrastructure boosts industrial productivity. This ripple effect benefits a wide range of industries and promotes overall economic development (Lu et al., 2019; Private Corner, 2024).

#### **14.4.2 Challenges and Criticisms**

Despite these positive impacts, private equity's involvement in infrastructure projects has not been without its challenges and criticisms. One of the most significant concerns is the potential for a mismatch between private equity firms' short-term objectives and infrastructure projects' long-term needs (Bhattacharya et al., 2012). PE firms typically operate with a focus on maximising returns within a 5 to 10-year investment horizon, which can sometimes conflict with the long-term nature of infrastructure projects, which often require decades of sustained investment and maintenance (Kaplan & Schoar, 2005; Maurer, 2017).

This short-term focus can lead to underinvestment in critical areas such as maintenance and upgrades. For example, while PE firms may prioritise cost-cutting and efficiency in the short term to boost profitability, this can result in deferred maintenance and reduced long-term asset quality. In the energy sector, for example, failure to regularly maintain power plants or transmission infrastructure can lead to increased downtime and higher repair costs in the long run. Similarly, in the transportation sector, cost-cutting measures may result in lower service quality, which can negatively impact users.

Another criticism of PE involvement in infrastructure is the potential for increased user costs. Private equity firms, driven by the need to generate high returns for their investors, may implement aggressive pricing strategies to maximise revenue, which may pose a challenge, especially for middle and low income, where there are typically pressures to make these services affordable (Global Infrastructure Hub, 2023). This can result in higher tolls on roads, increased utility bills, or elevated fees for essential services such as water or electricity. This is particularly concerning in sectors where infrastructure projects provide essential public services. The need to balance profitability with affordability is a challenge that many private equity-backed infrastructure projects face, and in some cases, this has led to public backlash and regulatory intervention.

Regulatory challenges are another significant hurdle for private equity firms investing in infrastructure. Infrastructure projects, particularly in the energy, transportation, and water sectors, are often subject to strict government regulation. Changes in regulatory policy, such as the introduction of new environmental standards or tariff regulations, can have a significant impact on the profitability of infrastructure investments (Schmundt et al., 2024). Furthermore, in emerging markets, where political instability is not uncommon, PE firms face additional risks related to expropriation, nationalisation, or abrupt changes in policy. These risks can deter investment and make it more difficult for PE firms to operate effectively in these markets (Demirel et al., 2022; Lu et al., 2019).

Additionally, the illiquidity of infrastructure investments poses challenges for PE firms. Infrastructure projects are capital-intensive and typically require long-term commitments, which limits the ability of private equity firms to exit investments quickly. While the medium to long-term nature of these projects aligns with the investment horizons of institutional investors, it also creates challenges in terms of liquidity and flexibility. This illiquidity can be particularly problematic when market conditions change or when a PE firm needs to rebalance its portfolio (Gompers et al., 2016; Maurer, 2017).

#### **14.4.3 Case Studies**

Several case studies illustrate the complex and sometimes conflicting impacts of private equity on infrastructure projects. A notable example is the involvement of private equity in the acquisition and operation of the Chicago Skyway, a major toll road in the United States. In 2004, a consortium, The Skyway Concession Company (Cintra-Macquarie), of private equity firms, including Macquarie Infrastructure Partners and Cintra, acquired the 99-year lease for the Skyway, marking one of the first significant PE investments in US infrastructure. While the private equity firms improved the operational efficiency of the Skyway and extended the lifespan of the asset, toll prices increased significantly, leading to public dissatisfaction (Enright, 2006).

The Dominican toll road project, a 30-year concession, involved constructing, operating, and maintaining a 106-km toll road to connect Santo Domingo with the Samaná peninsula, at a total cost of \$220 million. Financing included \$30 million each from Autopistas del Nordeste (AdN) and the Dominican government in equity, with a \$162 million bond covered by MIGA's \$108 million political risk insurance. MIGA's insurance, covering risks like expropriation and breach of contract, was pivotal in securing investor confidence, supporting economic growth, and establishing infrastructure management standards in the region (Multilateral Investment Guarantee Agency –MIGA, 2007). This represents a complex financing structure where different parties, including private equity firms, governments, multilateral cooperations and construction firms, work together on infrastructure projects.

Again, the expansion of Madrid's subway to the new Terminal T-4 at Barajas Airport in 2006 employed a PPP model that separated infrastructure management from transport service operation. This nonintegrated approach allowed the private partner to handle construction and maintenance while Metro de Madrid operated the trains. Benefits included reduced costs through economies of scale, competitive tendering, and minimised financial risks. The project's innovative structure exemplified an effective PPP for urban rail by unbundling tasks, enhancing efficiency, and preserving service continuity, providing a model for similar projects where integration poses operational challenges (Soliño & Vassallo, 2009).

For the Madrid toll motorways R-3 and R-5 PPP project, the total investment was estimated at €928 million, undertaken by the special purpose vehicle "Accesos de Madrid", which included private partners. However, the project faced significant cost overruns, delays, and traffic shortfalls.

Ultimately, these financial pressures led to bankruptcy, with the Spanish government later assuming control of the assets. This case underscores challenges in PPPs, such as accurately forecasting demand and managing unforeseen expenses, highlighting the need for effective risk-sharing structures in infrastructure projects (de Albornoz et al., 2021).

These case studies underscore the diverse and sometimes conflicting impacts of private equity on infrastructure projects, revealing both successes and challenges. The Chicago Skyway case demonstrates how private equity can enhance operational efficiency and asset longevity, though it may lead to public dissatisfaction due to increased user costs. The Dominican toll road exemplifies the importance of complex financing structures, combining public and private resources with risk mitigation tools like MIGA insurance to attract investor confidence and foster regional economic growth. In contrast, the Madrid subway expansion showcases an effective PPP model that optimises task allocation and operational efficiency. However, the R-3 and R-5 toll motorways illustrate the financial risks in PPPs, especially where traffic and revenue projections fall short, leading to government intervention. Collectively, these cases highlight the need for strategic risk-sharing and transparency to balance profitability with public service goals in infrastructure projects.

#### ***14.4.4 Comparison with Other Funding Models***

Compared to other funding models or institutional investors, such as sovereign wealth funds (SWFs), pension funds, and insurance companies, the private equity approach to infrastructure investment is distinct in a number of ways. Sovereign wealth funds and pension funds typically set up an equity department that normally invests a small portion of their funds in infrastructure (IF-SWF & PwC, 2021), unlike infrastructure PE firms that are more focused on this sector. They have longer investment horizons and are often more conservative in their approach to risk. These funds tend to invest in infrastructure projects for decades, with a focus on generating stable, long-term returns that match their liability and inflation hedging (OECD, 2014). In contrast, infrastructure private equity firms generally seek higher returns over shorter periods, which can sometimes lead to more aggressive management practices. It is important to also note that funds like SWFs also participate in infrastructure through being limited partners (LPs) in private equity. These funds have been shown to be the largest group of LPs in the world (PwC, 2014).

One advantage of infrastructure private equity over other funding models is its ability to quickly implement operational improvements. Private equity firms often take an active management approach, bringing in experienced teams to oversee the day-to-day operations of infrastructure assets. This hands-on approach contrasts with the more passive investment strategies of SWFs and pension funds, which may lack the operational expertise that infrastructure private equity firms possess.

However, the shorter investment horizon of infrastructure private equity also presents challenges. While SWFs and pension funds are willing to hold infrastructure assets for decades, private equity firms typically seek to exit their investments within 5 to 10 years. This can create pressure to generate quick returns, which may not always align with the long-term needs of infrastructure projects. Moreover, this can create a mismatch challenge in co-investing relationships between LPs (e.g., SWFs) and general partners (GPs) (PwC, 2014). Additionally, SWFs and pension funds are often more risk-averse, which can influence their choice of projects and markets to invest (Maurer, 2017).

In conclusion, while private equity has brought much-needed capital and expertise to the infrastructure sector, its involvement is not without challenges. The tension between short-term profitability and long-term sustainability, coupled with regulatory and political risks, creates a complex

landscape for PE firms. As private equity continues to play a critical role in global infrastructure development, it will be important for both investors and policymakers to find ways to balance the needs of private capital with the public good.

## **14.5 The Future of Private Equity in Infrastructure Investment**

### ***14.5.1 Emerging Opportunities***

The PE in infrastructure investment looks bright, largely driven by global trends such as urbanisation, technological advancements, and the transition to sustainable energy. As governments struggle to meet the enormous financing needs for infrastructure projects, PE firms are well-positioned to fill the gap. This shortfall presents significant opportunities for private equity, especially in emerging markets where infrastructure demand is growing rapidly.

#### ***14.5.1.1 Green Infrastructure and Sustainability***

Green infrastructure is one of the most promising areas for future PE investment, which focuses on environmentally sustainable projects and supports the global shift toward decarbonisation. Governments and companies are increasingly prioritising climate resilience and sustainability, which has created a surge in demand for renewable energy infrastructure such as solar farms, wind power plants, and energy storage facilities. The Paris Climate Agreement and other global initiatives have further accelerated this trend by encouraging countries to adopt stricter environmental policies, which, in turn, has driven demand for sustainable infrastructure.

PE firms have recognised the profitability of investing in green infrastructure and are positioning themselves to take advantage of these trends. From 2018 to 2023, around \$1.1 trillion of private investment, representing 45% of aggregate private infrastructure deals, was made in the energy and environment sector, with renewables and energy services taking the most assets in the sector ([Schmundt et al., 2024](#)). For example, firms such as Brookfield Asset Management and Macquarie Asset Management are among the top PE firms that have raised billions of dollars specifically for renewable energy projects, tapping into both public and private sector commitments to reduce carbon emissions ([IPE Real Assets, 2024](#)).

Another key area is the development of smart cities and digital infrastructure, which are crucial components of the modern economy. The digital revolution, accelerated by the COVID-19 pandemic, has highlighted the importance of robust and resilient digital infrastructure, including data centres, broadband networks, and telecommunications towers. PE firms have been increasingly investing in these sectors, with Macquarie Asset Management, DigitalBridge, and Macquarie Asset Management leading the charge, as they provide high returns and align with long-term economic trends ([IPE Real Assets, 2024](#)). As indicated by [Schmundt et al. \(2024\)](#), digital infrastructure, along with transport and logistics, received the most deal values between 2018 and 2023. Furthermore, the integration of digital technologies into traditional infrastructure systems, such as smart grids and intelligent transportation networks, is creating new investment opportunities that private equity can capitalise on.

#### ***14.5.1.2 Social Infrastructure and PPPs***

In addition to green and digital infrastructure, social infrastructure – also referred to as public real estate – such as healthcare facilities, schools, and affordable housing ([Schmundt et al., 2024](#)) presents another growth area for private equity investment. As populations grow and urbanise,



particularly in developing countries, the demand for high-quality social infrastructure will increase. Governments are increasingly looking to PPPs to develop and maintain these facilities, providing an avenue for PE firms to enter the market.

PPPs are particularly attractive because they allow governments to leverage private sector expertise and capital while retaining some control over essential services. Private equity firms benefit from these projects' stability and long-term nature and the potential for government-backed guarantees or subsidies, which reduce risk (Lu et al., 2019). Moreover, with the shift toward ESG (environmental, social, and governance) considerations, many institutional investors are seeking to invest in projects that generate social impact, making social infrastructure an appealing target for PE funds.

In the healthcare sector, for instance, the demand for private capital to build hospitals and medical facilities has surged in both developed and developing countries. In India, for example, private equity-backed healthcare infrastructure has played a critical role in expanding access to healthcare in underserved regions, given the over 1.4 billion population of the country (Jain et al., 2024). Similar trends can be observed in education, where private equity investments have been used to build and improve schools, universities, and other educational facilities, with notable examples from the UK's Building Schools for the Future (BSF) through PFIs and those in Australia, Canada, and South Korea (OECD, 2014). These sectors are likely to remain key areas for PE investment in the coming decades as governments seek to modernise social services without overburdening public finances.

#### ***14.5.2 Policy and Regulatory Outlook***

The policy and regulatory environment will play a crucial role in shaping the future of private equity investments in infrastructure. As governments increasingly rely on private capital to fund infrastructure projects, regulatory frameworks will need to evolve to attract more private equity investment while ensuring that public interests are protected.

One of the main challenges private equity firms face in infrastructure investment is navigating complex regulatory environments, particularly in highly regulated sectors such as energy, transportation, and water. In some cases, regulatory changes can significantly impact the profitability of infrastructure projects, making it essential for private equity firms to engage with policymakers and regulators to ensure that the rules governing infrastructure investment are transparent, consistent, and conducive to private sector participation (Lu et al., 2019; OECD, 2014).

In response to these challenges, many countries are working to create more favourable regulatory environments for private investment in infrastructure. For example, several governments are implementing policies that provide tax incentives, streamlined approval processes, and risk-sharing mechanisms to attract private capital (OECD, 2014). These policies reduce entry barriers for private equity firms and help ensure that projects are completed on time and within budget. In the European Union, for example, the European Green Deal includes provisions that aim to facilitate private investment in sustainable infrastructure projects, particularly in the energy sector.

Furthermore, the rise of ESG considerations in infrastructure investment has led to an increased focus on regulations related to sustainability. Governments are beginning to impose stricter environmental and social requirements on infrastructure projects, which presents both challenges and opportunities for private equity. While these regulations can increase project costs and complexity, they also create opportunities for private equity firms to invest in projects that align with global sustainability goals, such as renewable energy, energy-efficient buildings, and low-carbon transportation systems.



In emerging markets, regulatory risks remain a significant concern for private equity investors. Political instability, inconsistent enforcement of regulations, and legal uncertainties can deter investment in these regions. However, multilateral organisations such as the World Bank and the International Finance Corporation (IFC) are working with governments in developing countries to create more stable and attractive environments for private investment in infrastructure ([World Economic Forum, 2015](#)). These efforts include providing political risk insurance, offering technical assistance, and promoting the use of PPPs to mitigate risks and enhance investor confidence.

### ***14.5.3 Strategic Directions for Private Equity***

Looking ahead, private equity firms will need to adopt new strategies to remain competitive and capitalise on the emerging opportunities in infrastructure investment. One key strategy is the increased focus on ESG principles. As institutional investors and governments emphasise sustainability more, private equity firms that prioritise ESG factors in their investment decisions will be better positioned to attract capital and generate long-term value. This involves investing in green infrastructure projects and ensuring that existing infrastructure assets are managed in an environmentally and socially responsible manner.

Another strategic direction for private equity is expanding investments in emerging markets. While these markets present higher risks, they also offer significant growth potential, particularly in the energy, transportation, and telecommunications sectors. Private equity firms that can navigate these regions' regulatory and political risks can benefit from the high demand for infrastructure development. To mitigate risks, many private equity firms are forming partnerships with local governments, development banks, and other stakeholders to co-invest in projects, share risks, and leverage local expertise.

In addition, private equity firms are likely to explore new financing models and structures to enhance their investments in infrastructure. One emerging trend is the use of blended finance, which combines public and private funding to reduce risk and mobilise capital for infrastructure projects. Blended finance structures allow private equity firms to invest in higher-risk projects while benefiting from the support of public sector institutions that provide guarantees, first-loss capital, or concessional financing ([Global Infrastructure Hub, 2023](#)).

Lastly, private equity firms will need to continue innovating in terms of technology and project management to improve the efficiency and profitability of infrastructure investments. The integration of digital technologies, such as smart grids, automated toll systems, and real-time data analytics, will play a crucial role in enhancing the performance of infrastructure assets. By adopting these technologies, private equity firms can optimise asset performance, reduce operational costs, and create new revenue streams. However, care must be taken that technology does not become obsolete and not perform to expectations given the long-term nature of infrastructure projects ([Makovšek, 2018](#)).

## **14.6 Conclusion and Implications**

### ***14.6.1 Summary of Key Points***

The role of private equity (PE) in infrastructure investment has grown significantly over the past few decades, largely in response to the increasing need for private capital to finance critical infrastructure projects worldwide. As governments face budgetary constraints and fiscal challenges,

PE firms have stepped in to fill the infrastructure financing gap, offering much-needed capital, operational expertise, and innovative financing structures. This chapter has explored the various dimensions of private equity's involvement in infrastructure, analysing both the benefits and challenges associated with this form of investment.

One of the key takeaways is that private equity has the potential to accelerate the development of infrastructure projects by mobilising large amounts of capital quickly. Through PPPs and other collaborative models, PE firms have become essential players in the financing and operation of infrastructure assets. They bring advanced project management skills and a strong focus on operational efficiency, which often results in faster project completion, reduced costs, and improved asset performance.

At the same time, private equity's involvement is not without its challenges. The short-term profit motives of PE firms can sometimes conflict with the long-term needs of infrastructure projects, particularly in sectors that require sustained investment over many decades. Regulatory risks, especially in emerging markets, add further complexity to PE investments in infrastructure. Additionally, the potential for higher user costs and concerns about the privatisation of essential services remain key points of criticism.

Despite these challenges, private equity has shown that it can play a critical role in modernising global infrastructure. By investing in sectors such as renewable energy, transportation, telecommunications, and social infrastructure, PE firms are helping to drive economic development, create jobs, and improve the quality of life for millions of people. Moreover, the growing emphasis on sustainability and Environmental, Social, and Governance (ESG) criteria offers a promising avenue for PE firms to align their investments with broader societal goals.

#### ***14.6.2 Implications for Stakeholders***

The increasing role of private equity in infrastructure has important implications for a variety of stakeholders, including governments, institutional investors, and the public. For governments, the reliance on private capital to fund infrastructure projects presents both opportunities and challenges. On the one hand, PE firms can provide the financial resources needed to modernise aging infrastructure and build new assets that support economic growth. On the other hand, governments must carefully design regulatory frameworks that ensure public interests are safeguarded while encouraging private sector participation.

One key policy consideration for governments is the balance between public and private sector control over essential infrastructure. While private equity firms bring expertise and efficiency to the management of infrastructure assets, there is often public concern about the privatisation of services that are traditionally seen as public goods, such as water, electricity, and transportation. Policymakers must ensure that infrastructure projects funded by private equity remain accessible and affordable to the public, particularly in sectors that provide critical services.

For institutional investors, the rise of infrastructure as a distinct asset class presents significant opportunities for portfolio diversification and long-term returns. Infrastructure assets tend to have a low correlation with other asset classes, such as equities and bonds, making them attractive to investors seeking stable, inflation-protected returns. Furthermore, as institutional investors increasingly prioritise ESG considerations, infrastructure projects promoting sustainability, such as renewable energy and green buildings, will likely attract substantial investment.

As the ultimate beneficiaries of infrastructure development, the public stands to gain from the improved quality of infrastructure services that private equity investments can deliver. However, concerns about rising costs and the potential loss of public control over essential services must be

addressed. Effective regulation, transparent PPP structures, and robust stakeholder engagement will be critical to ensuring that the benefits of private equity investment in infrastructure are widely shared.

### **14.6.3 Final Thoughts**

Looking ahead, the role of private equity in infrastructure is set to grow even further as global demand for infrastructure investment continues to rise. The shift toward sustainable and resilient infrastructure, driven by climate change and urbanisation, offers private equity firms a unique opportunity to contribute to the global agenda of decarbonisation and sustainable development. As governments and businesses increasingly prioritise green infrastructure, private equity firms will play a pivotal role in financing the transition to a low carbon economy.

At the same time, private equity firms must adapt to the evolving regulatory and political landscape. The growing emphasis on ESG criteria, combined with heightened public scrutiny of private sector involvement in infrastructure, will require PE firms to adopt more transparent and socially responsible investment practices. Firms that can successfully navigate these challenges will be well-positioned to capitalise on the vast opportunities in the global infrastructure market.

Furthermore, as infrastructure needs grow in both developed and emerging markets, private equity firms will need to continue exploring new financing models and partnerships to maximise their impact. Blended finance, which combines public and private funding and innovative risk-sharing mechanisms, will become increasingly important as PE firms seek to de-risk their investments while expanding into new regions and sectors.

In conclusion, private equity has the potential to play a transformative role in the development of global infrastructure. By providing capital, expertise, and innovation, PE firms are helping to build the infrastructure that is essential for economic growth and sustainability. However, to fully realise the benefits of private equity investment, stakeholders must work together to ensure that these investments are aligned with long-term societal goals and that the risks are managed appropriately. As private equity continues to evolve, its impact on the infrastructure landscape will be profound, shaping the future of global development for decades to come.

### **Note**

- 1 The World Bank's Private Participation in Infrastructure (PPI) database tracks more than 6,400 projects across developing nations. As the primary resource for monitoring PPI trends in these regions, it encompasses various sectors, including energy, transport, water and sewerage, ICT backbone, and municipal solid waste (MSW). The projects documented involve management or lease agreements, concessions, greenfield developments, and divestitures. Country regional and income groupings are based on the World Bank classification. Source: <https://ppi.worldbank.org/en/methodology/ppi-methodology>

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