

How accountants can bridge the global infrastructure gap:

Improving outcomes
across the entire
project life cycle

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Founded in 1904, ACCA has consistently held unique core values: opportunity, diversity, innovation, integrity and accountability.

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About CPA Canada

Chartered Professional Accountants of Canada (CPA Canada) is one of the largest national accounting organizations in the world, representing more than 210,000 members. Domestically, CPA Canada works cooperatively with the regional CPA bodies who are charged with regulating the profession.

Globally, it works together with the International Federation of Accountants and the Global Accounting Alliance to build a stronger accounting profession worldwide. CPA Canada, created through the unification of three legacy accounting designations, is a respected voice in the business, government, education and non-profit sectors and champions sustainable economic growth and social development.

The unified organization is celebrating five years of serving the profession, advocating for the public interest and supporting the setting of accounting, auditing and assurance standards. CPA Canada develops leading-edge thought leadership, research, guidance and educational programs to ensure its members are equipped to drive success and shape the future.

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How accountants can bridge the global infrastructure gap:

Improving outcomes across the entire project life cycle

About this report

This report quantifies the global infrastructure gap and demonstrates how bringing the accountant to the forefront of infrastructure decision-making will improve the selection, financing, and delivery of projects.



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Foreword



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Infrastructure is the foundation on which our social and economic well-being is built. From the transportation networks that enable people and goods to move safely and effectively, to the power and utility systems that provide us with the energy and services that we need to survive, we all rely on infrastructure investment.

All around the world – national, regional and local governments make decisions that serve the public and play a critical role in building and maintaining these important and substantial infrastructure investments. The outcomes of those decisions will affect us today and into the future.

Forces such as demographics, rising cyber threats, urbanisation and climate change are all converging to increase the global demand for quality infrastructure. But efficiently delivering infrastructure can be a challenge, given the long asset life and significant sunk costs associated with infrastructure projects. Therefore, effective decision-making is critical through the entire process of project selection, financing, construction and operation to provide citizens with value for money.

To this end, ACCA and Chartered Professional Accountants of Canada (“CPA Canada”) are delighted to present this report on the global infrastructure gap. A variety of methodologies for quantifying the gap are presented below to explore the size and nature of this global challenge. Good practices abound around the world, and this report offers a platform for sharing the ideas of practitioners on how governments can best meet the needs of their citizens. The report also acts as an example of how the accountant is well placed to tackle many of the major challenges we face in the 21st century – from humanity’s need to adapt to climate change, to helping governments and companies meet the United Nation’s Sustainable Development Goals. We hope this work initiates conversations on how bringing the accountant to the centre of the decision- and policy-making process can improve outcomes at every point in the project life cycle – from planning through to decommissioning.

ACCA and CPA Canada would like to thank their respective members who responded to the survey or participated in the roundtable discussions. Member contributions add immense value to our thought leadership and this report would not be possible without their assistance.

Executive summary



DEFINING THE CHALLENGE: QUANTIFYING THE GLOBAL INFRASTRUCTURE GAP

The term 'global infrastructure gap' refers to the difference between the infrastructure investment needed and the resources made available to address that need. This report offers two approaches to understanding the global infrastructure gap: a notional, quantifiable investment gap and a subjective, needs-based service gap. Together, these approaches establish the size and nature of the overall challenge that frames this report.

The infrastructure investment gap

Analysis of the G20's *Global Infrastructure Outlook* shows that the global infrastructure investment gap is set to grow to US\$14 trillion by 2040. In 2018 alone, the investment gap grew by over US\$400bn.

Quantifying an infrastructure investment gap across world regions provides an aspirational target for governments looking to improve the provision of infrastructure in their country. This methodology highlights global top performers, such as Singapore, Japan and Canada, which exemplify good practices. The investment gap approach also reveals that many countries, such as Mexico, Myanmar and Brazil, are facing substantial and growing gaps. These countries may benefit from looking at their peers for good practice and novel methods of meeting infrastructure need.

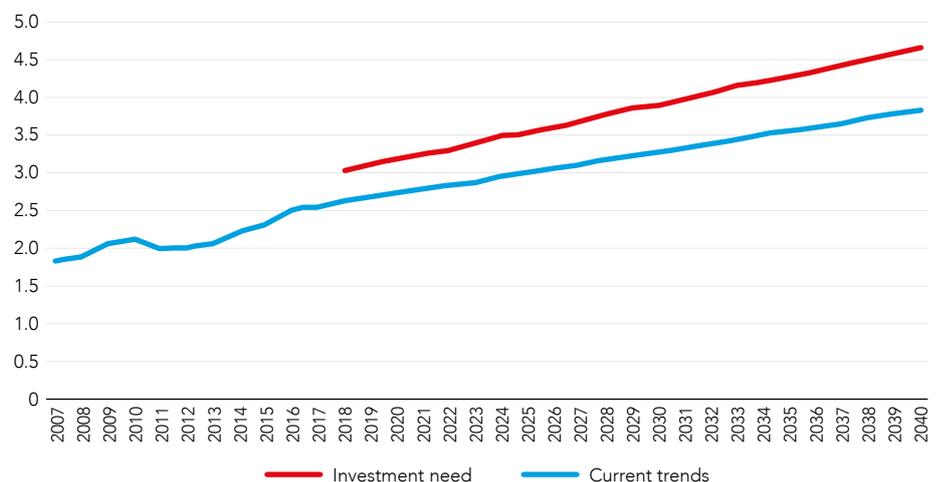
The infrastructure service gap

The ultimate objective in fulfilling a country's infrastructure need is not a notional investment figure; rather, it is closing a recognised service gap. Doing this requires that governments develop a vision of what the country seeks to achieve through the development and maintenance of its infrastructure.

The ACCA and CPA Canada conducted a global survey of their respective members on the infrastructure gap ("the survey"). The survey responses showed particular service gaps emerging in certain world regions

across seven types of infrastructure: power and energy; water and sanitation; road and highways; other transport (eg air and sea); information and communication technology (ICT); railways; and core public service infrastructure (eg hospitals and schools). Finance professionals in Africa and South Asia reported consistently poor levels of infrastructure across all these types, with the notable exception of ICT. In comparison, North American respondents had much higher overall scores, but reported a particular dip in their road and highway infrastructure. In the Caribbean region, respondents to the survey isolated

FIGURE 1: Global infrastructure investment needs and current trends, 2015 US\$ trillions



Source: GHI and Oxford Economics 2018

Just as the barriers to bridging the gap vary by country, there is significant variability in the capacity of governments to respond to the infrastructure gap.

road and highway infrastructure and core public service infrastructure as key areas requiring intervention to reduce the service gap. Respondents from Central and Eastern Europe cited core public service infrastructure and railway infrastructure as areas requiring further investment.

OVERALL BARRIERS TO MEETING INFRASTRUCTURE NEED

Respondents to the member survey were also asked what they saw as the biggest barriers to meeting the infrastructure needs of their countries. A few top global barriers were:

1. a lack of political leadership (cited by 52%)
2. a lack of finance or funding (49%)
3. planning and regulatory barriers (40%).

These results show that the barriers to closing the gap extend beyond having the financial resource to meet need, with ‘a lack of political leadership’ ranking as the number one barrier. This suggests that failing to articulate a vision of future infrastructure provision can be a significant barrier in some countries. These top three barriers informed the framework for the chapters that follow on the role of the accountant, demonstrating that finance professionals have an essential role in addressing all three of the top barriers to closing the gap. A lack of political leadership affects a country’s ability to select projects (Chapter 3), the lack of finance and funding clearly impedes effective financing of projects (Chapter 4), and planning and regulatory barriers speak to the interface between the public and private sector in the delivery of infrastructure (Chapter 5).

Capacity for governments to respond to the gap

Just as the barriers to bridging the gap vary by country, there is significant variability in the capacity of governments to respond to the infrastructure gap. Analysis of data from the World Bank, the Organisation for Economic Cooperation and Development (OECD), International Monetary Fund (IMF), and Central Intelligence Agency (CIA) World Factbook allowed for the generation of a typology based on the size of the challenge and a country’s ability to respond to this challenge.

Countries under the group of ‘Large gap, fiscally restricted’, such as Pakistan and Nigeria, will struggle to meet their growing demands for public infrastructure. Others, such as China in the top-right corner of the figure, are well placed to meet their infrastructure needs, compared with their income-group peers.

The role of the accountant in closing the gap

The successful provision of public infrastructure requires governments to have the right professional team in place. And yet, a clear message resounded from the international roundtable discussions: a key player is often missing from the infrastructure project table – the accountant.

The accountant must be brought to the centre of the decision-making process on the selection, financing, building and operation of infrastructure – where the particular skills and perspective of the finance professional can mean the difference between success and failure.

TABLE 1: A typology of infrastructure gap responsiveness

	LIMITED FISCAL ROOM	GREATER FISCAL ROOM
Low infrastructure gap	‘Small gap, Fiscally restricted’ (eg Canada)	‘Small gap, Fiscally flexible’ (eg China)
High infrastructure gap	‘Large gap, Fiscally restricted’ (eg Pakistan, Nigeria)	‘Large gap, Fiscally flexible’ (eg Malaysia)

Establishing and comparing the need for infrastructure are key considerations in building the case for planning and selecting a particular project.

Planning and selecting infrastructure projects

Chapter 3 further explains the two key impediments identified in the survey: the lack of a standard for project selection and the misalignment of the infrastructure life cycle and the political cycle.

Establishing and comparing the need for infrastructure are key considerations in building the case for planning and selecting a particular project. This report sets out methods of establishing 'need' in order to inform the planning and project selection process. The survey also identifies the misalignment between a political cycle (often four to six years) and the total life cycle of an infrastructure asset (often over 20 years). This mismatch can generate two biases: a bias towards short-term decision-making, and a bias for creating megaprojects over maintenance.

In response to these barriers, this report offers the following *recommendations based on observed good practice*.

Governments should:

1. Establish expert-led bodies to forecast infrastructure requirements and recommend projects on the basis of need.
2. Collect reliable data on the service potential of existing infrastructure and on the performance of past projects.
3. Disaggregate expenditure on infrastructure to report both maintenance and new project spend.

Accountants should:

4. Take the lead in applying standard selection tools to determine the need for, and priority of, a project.
5. Advise on the distributional impact, and regional growth outcomes, of selecting particular projects; good practice in this area can be found in Japan.
6. Embed adaptation and resilience into the project-selection process.

Financing infrastructure projects

Chapter 4, on financing infrastructure, highlights three key impediments to closing the infrastructure gap: the funding gap; accounting for the higher cost of private capital; and the need to professionalise the public sector finance function.

In response to these barriers, the report offers the following *recommendations based on observed good practice*.

Governments should:

7. Consider innovative solutions for closing the funding gap, such as a value capture, civic crowdfunding and other revenue funding schemes.
8. Direct supreme audit institutions to monitor the interaction of off balance sheet liabilities and fiscal targets in order to improve the efficient allocation of public sector funds.
9. Align long-term infrastructure plans with the annual budget process, in order to minimise the use of higher-cost private finance to achieve capital budget flexibility.
10. Adopt full accrual accounting and maintain a public sector balance sheet to support decision-making on infrastructure policy.

Accountants should:

11. Advocate a more holistic approach to maintaining fiscal discipline to avoid poor financial decisions driven by 'fiscal illusions'.
12. Conduct a balance sheet review to maximise the value of public sector assets.
13. Produce an intertemporal balance sheet to improve long-term decision-making and support the sustainability of public finances, as is done, for example, in New Zealand
14. Produce disaggregated assets in the balance sheet, to include commercial, social and financial assets – in order to improve the return on public assets.

The roundtable participants identified poor monitoring and oversight by government as key impediments in delivering infrastructure projects.

Delivering infrastructure projects

The roundtable participants identified poor monitoring and oversight by government as key impediments in delivering infrastructure projects. Chapter 5 offers results from the survey demonstrating disagreement about where each party in a PPP agreement provides value. Finally, the roundtable participants argued that the public sector often lacked the commercial acumen required to manage an infrastructure PPP effectively.

In response to these barriers, this report offers the following *recommendations based on observed good practice*.

Governments should:

15. Enact effective whistle-blowing legislation and professionalise the public sector finance function to allow public servants to challenge unethical behaviour that can derail infrastructure projects.
16. Establish centres of excellence that coordinate public sector expertise in contract management, which allows any organisation within the public sector to draw on the specialist skill when negotiating a PPP contract.

17. Consider introducing guarantee schemes for nationally significant infrastructure projects in order to encourage additional private sector involvement in infrastructure projects. This will help address the assumptions identified in the survey, which showed that private finance professionals were less likely to view the public sector as a stable partner.

Accountants should:

18. Implement proper monitoring and oversight for all projects.
19. Advocate embedding themselves in the professional teams delivering infrastructure by highlighting their expertise of risk management.

Professional bodies should:

20. Act as facilitators of knowledge transfer between the public and private sector, through thought-leadership events and roundtables.

The global infrastructure gap



Finance professionals reported the *largest* service gap in **Africa**; the **Middle East** had the *smallest* service gap¹



Globally, some top barriers to meeting infrastructure need were:

52% lack of political leadership

49% lack of finance or funding

40% planning and regulatory barriers



The global investment gap will grow to: **US\$14 trillion** by 2040



Selecting projects

93% of respondents said governments could improve the infrastructure project selection process.

'Removing political decision-making and making the process technocratic' was the most cited for improving project selection.



Delivering projects and the public-private relationship

62% of public sector respondents argued that they offered a *'long-term and stable partnership'* for a PPP, compared to only

45% of private sector respondents



Financing projects

The most cited barriers for securing private finance for infrastructure were:

'Insufficient skills in government' **45%** and

'negative perception of private finance' **43%**

¹ See Chapter 1 for definitions of the 'infrastructure investment gap' and the 'infrastructure service gap'.



Introduction

Infrastructure is critical for economic and social development across the world. Physical infrastructure systems ensure that basic human needs are met: people need access to energy to light and heat their homes and safe water for drinking, sanitation and cooking. Transport infrastructure allows people to travel to work and transport goods to different markets.

In these, and many other ways, infrastructure is vital to social and economic activity and development – and its provision is intrinsically tied to achieving the United Nation’s Sustainable Development Goals to address global challenges such as poverty, inequality, climate change, and environmental degradation, and to achieve a better and more sustainable future for all. There is also a unique opportunity for governments to respond to the global infrastructure gap challenge. The anaemic economic growth following the 2008 financial crisis and the sustained low-interest rate environment means that the cost of increased investment has rarely been lower for governments; and the prize is sustainable economic growth, a sustained boost to productivity, and improved living standards.

But execution matters, and there are many examples of infrastructure projects that have gone badly wrong. Design failures can cause the death of workers, as in the case of the Chirajara bridge collapse in Colombia in 2018; poor demand forecasting and design can result in significant infrastructure investments being underused, such as the Ciudad Real Airport in Spain, which remains abandoned after a construction cost in excess of 1bn euros (BBC 2015).

In addition, the collapse of the Morandi Bridge in Genoa, Italy demonstrated that, to avoid disaster, governments must allocate sufficient resources to the maintenance of existing infrastructure, fighting the bias towards focusing resources on new-build projects.

Finally, cases of natural disaster – such as the flooding in Bangkok, Thailand in 2011 – are becoming increasingly common, and future infrastructure projects must be adaptable and resilient to enable countries to meet the threats of climate change.

Therefore, the successful provision of public infrastructure requires governments to have the right professional team in place to be able to harness the benefits of additional investment, while working to mitigate the significant risks associated with infrastructure projects. The accountant must be brought to the centre of the decision-making process on the selection, financing, building and operation of infrastructure, where the finance professional’s particular skills and perspective can mean the difference between success and failure.



Research methodology

How accountants can bridge the global infrastructure gap: Improving outcomes across the entire project life cycle report is the result of a joint research project conducted by ACCA and CPA Canada. The research objective of this study was to quantify and explain the nature of the global infrastructure gap, and explore how professional accountants can contribute to bridging the gap through improvements in the selection, financing, and delivery of projects.

The report encompasses the collection of economic research, country-specific narratives, and best practices in building and maintaining infrastructure – from project selection to completion and evaluation. The results and observations that were arrived at are supported by evidence collected through the following mechanisms:

- quantifying the cumulative global infrastructure investment gap to 2040 through desktop research
- a global online survey of a random sample of ACCA members and CPA Canada members
- a desktop literature review of specialist publications to determine leading practices
- in-person roundtable discussions held with experts from four continents.

How these four areas were developed is detailed below.

ECONOMIC ANALYSIS

A quantitative approach was followed for the review of the G20 Global Infrastructure Hub's *Global Infrastructure Outlook report* (GHI and Oxford Economics 2018). This report uses economic forecasting to quantify the cumulative global infrastructure gap up to 2040. Chapter 1, 'Quantifying the Global Infrastructure Gap', provides some detail on the quantification of the investment gap, and articulates the challenge for this report. More information on the methodology of the economic analysis can be found in Appendix A.

GLOBAL SURVEY AND DEMOGRAPHICS

ACCA and CPA Canada jointly undertook a survey of a random sample of each body's membership. This survey used the perspectives of finance professionals to illuminate the nature of the global infrastructure gap, highlight the barriers to closing the gap, and clarify the diverging expectations of public- and private-sector actors in the use of public-

private partnerships (PPPs) in infrastructure projects. A copy of the survey is available in Appendix C.

The survey design and administration were consistent across both bodies, except for the addition of one question on infrastructure planning and sustainability considerations in the CPA Canada survey. Therefore, unless otherwise specified, all survey results cited in the report present the combined output from the CPA Canada and ACCA waves of the survey. The ACCA survey was in the field for two weeks in August 2018, and the CPA Canada survey for two weeks in October 2018.

Survey demographics

The combined total of survey respondents was 3,611, across 118² countries. Geographic splits in the survey data typically present output by world region. Every world region had at least 150 responses, except for South America, which is excluded from any figure showing results by geography. Finally, the

2 Six respondents gave 'Other' for their country of residence, thus it is not possible to identify whether they lived in the 118 countries or elsewhere.

Overall, more than one-in-three respondents (35%) worked in the corporate sector, while about 20% worked in the public or not-for-profit sectors.

joint survey ('the member survey') split respondents into two primary categories: 'generalists' and 'specialists', where specialist respondents stated that their work included at least one of the following areas: infrastructure policy, procurement, capital budgeting, project or operations management. Of the total sample, 1,966 respondents (54%) were categorised as specialists. The survey included a number of detailed, technical questions, which were asked only of specialists. Figures throughout the report clearly indicate which subset of respondents (generalists or specialists) answered a particular question.

The member survey includes the views of accountants working across all sectors, including respondents from accountancy firms, the corporate sector and the public sector. Overall, more than one-in-three respondents (35%) worked in the corporate sector, while about 20% worked in the public or not-for-profit sectors.

LITERATURE REVIEW

A detailed review of specialised literature on infrastructure projects globally was conducted. This review demonstrated the variety of methodologies used globally in quantifying the infrastructure gap, as well as providing a summary of leading practices in infrastructure planning, project selection, and public financing that help support the effective delivery of innovative and sustainable infrastructure policy.

The References section includes the reviewed literature.

IN-PERSON ROUNDTABLE DISCUSSIONS

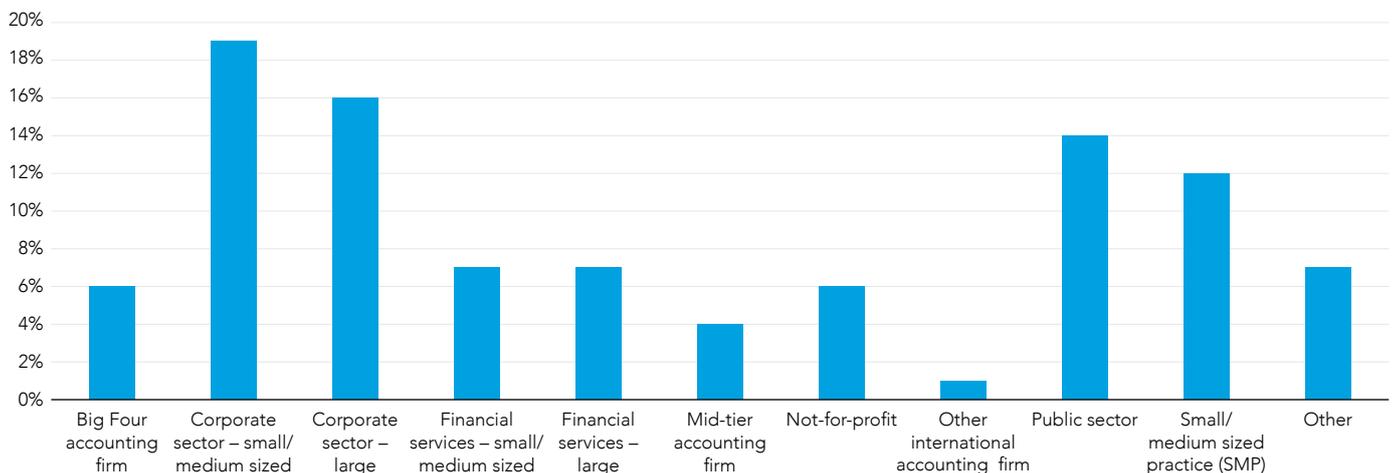
Finally, roundtable discussions were conducted with ACCA members and CPA Canada members in the UK, Canada, Sri Lanka, Nigeria, Trinidad & Tobago, Jamaica, and Malaysia, and focused on country-specific infrastructure challenges and solutions to show the international variation in infrastructure need, as well as highlighting what skills and perspectives accountants employ to help address the global infrastructure gap.

The roundtable discussions offered stakeholders an opportunity to share their insights and experiences on the current challenges to closing the global infrastructure gap, and their perspectives and experiences in the provision of infrastructure. In addition, the roundtables offered participants an opportunity to reflect on best practices with their peers.

Together, the literature review and roundtable discussions have provided evidence of the essential role accountants can play in helping to shrink the global infrastructure gap. A copy of the roundtable questions is available in Appendix C.

ACCA and CPA Canada would like to thank the Centre for Business and Economics Research (Cebr), an economic consultancy based in the UK, for completing the economic analysis quantifying the global infrastructure investment gap.

FIGURE 2: Sector breakdown of The Global Infrastructure Gap survey



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611



1. Defining the challenge: Quantifying the global infrastructure gap

Defining the global infrastructure gap qualitatively is relatively simple: the term is generally understood to denote the difference between required infrastructure and existing infrastructure. Defining the current global infrastructure gap quantitatively, however, is more complex (MGI 2016). There are a variety of methods used internationally to measure the infrastructure gap.

Reports by the McKinsey Global Institute (MGI 2013 and 2016) on the global infrastructure gap estimate that the world will need to invest US\$3.3 trillion annually in infrastructure to support the needs resulting from projected economic growth. The MGI methodology is highly sensitive to variations in economic growth, since the forecasted investment gap is based on maintaining the ratio of infrastructure stock to a country's gross domestic product (GDP). But assessing infrastructure need as a constant share of a country's GDP is a rather crude measure that could result in erroneous conclusions. For example, assume a country spends the same amount on infrastructure but boosts GDP through greater efficiency in the allocation of those investment resources. This would show as an increase in the infrastructure investment gap under the MGI approach (i.e., infrastructure spending would fall as a percentage of GDP), when in fact the efficiency gains would actually reduce the gap.

In working to improve infrastructure provision, the ultimate focus for any government should be minimising a recognised service gap, not reducing a notional investment gap – addressing a country's particular economic, social and environmental objectives (Fay et al. 2017). The roundtable discussion in Canada, a country with a negligible investment gap, highlighted the misalignment between infrastructure investment decisions and the actual service needs of the country, something that had been particularly challenging in First Nations communities. In short, this global challenge cannot be solved only by spending more money, but also by spending better – ensuring that all spending is targeted on real needs. At the same time, it is not possible to categorise effectively, on a global scale, all the national objectives underpinning the goal of closing service gaps.

Therefore, this report offers two approaches to the global infrastructure gap: the infrastructure investment gap and

the infrastructure service gap. The first relies on a dataset produced by the G20's Global Infrastructure Hub and sets an aspirational metric, which is benchmarked against a country's peers (GHI and Oxford Economics 2018). This quantified infrastructure investment gap shows what investment would be required for a particular country to move to the top 25th percentile of the peers in its income group. This works as an effective benchmark, where a country's gap can be closed over time. The second approach relies on the views of the specialist respondents to the member survey. The quality of infrastructure is assessed across seven different subtypes, demonstrating where service gaps exist for different world regions. The first approach provides a quantified output and aspirational target for countries seeking to meet infrastructure needs, and is described below. The results of the second approach, setting out the service gap, can be found in section 1.4 below, 'Finance professionals' perspectives on the global infrastructure service' gap.

Globally, the cumulative level of investment required to bring all countries in line with the best performing nations in their income group is estimated to be almost US\$88 trillion between 2018 and 2040.⁴

1.1 THE INFRASTRUCTURE INVESTMENT GAP (APPROACH 1): AN ANALYSIS OF THE GLOBAL INVESTMENT OUTLOOK

The Global Infrastructure Outlook report (GHI and Oxford Economics 2018), defines infrastructure investment as ‘Gross Fixed Capital Formation (GFCF) by the public and private sectors on fixed, immovable assets that support long-term economic growth’. This report takes a comprehensive view of countries’ infrastructure needs – including the social and economic infrastructure that would be captured under GFCF. This comprehensive view is echoed in the survey analysis, which covers seven sub-categories of infrastructure: power and energy, water and sanitation, road and highways, other transport (eg air and sea), ICT, railways, and core public service infrastructure (eg hospitals and schools). The research by the G20’s Infrastructure Hub estimates the amount of infrastructure investment needed for a diverse set of countries in each year from 2016 until 2040.³

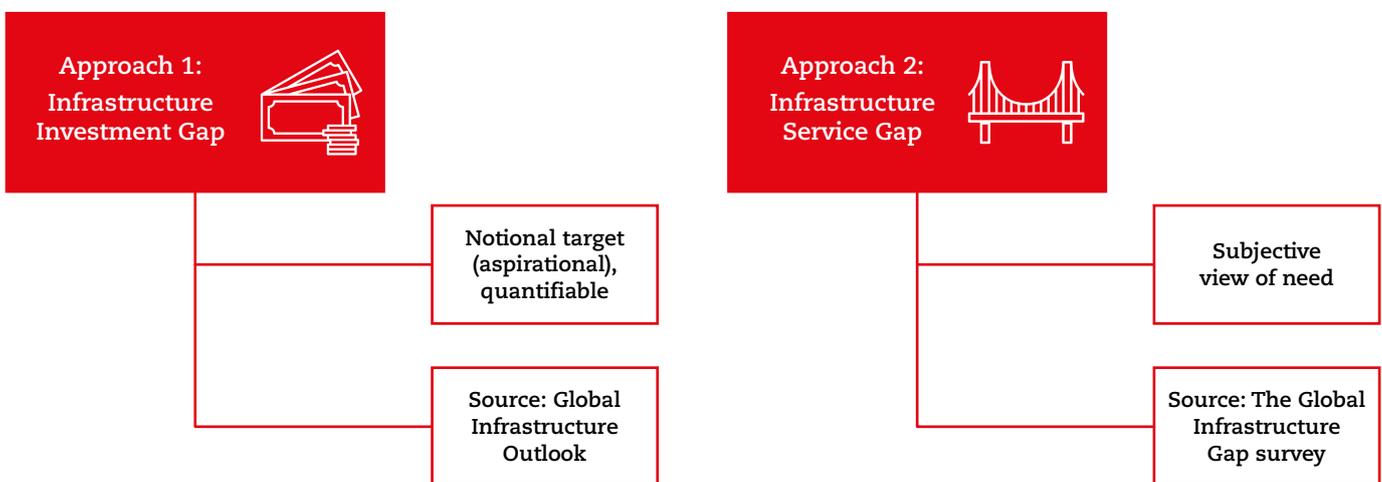
The Global Infrastructure Outlook report provides historic data from 2007 to 2015 and then projects these forward to 2040, with increased spending only occurring in response to changes in economic and demographic fundamentals. The difference between these estimates (ie the amount invested compared with the

amount needed) allows us to calculate the ‘infrastructure investment gap’ for each country. To improve understanding of this global challenge, the account below illustrates the size of this infrastructure gap at the global level. Further detail on the nature of the infrastructure investment being measured and the methodology used to calculate the gap are explained in Appendix A. Regional and national-level analysis of the investment gap can be found in Appendix B.

1.2 QUANTIFYING THE GLOBAL INFRASTRUCTURE INVESTMENT GAP

Globally, the cumulative level of investment required to bring all countries in line with the best performing nations in their income group is estimated to be almost US\$88 trillion between 2018 and 2040.⁴ Current trends indicate, however, that actual investment over the period is likely to undershoot this by US\$14 trillion. In 2018 alone, the global infrastructure gap is US\$409bn and will average US\$613bn per year over the entire period. In order to close this gap, total forecast spending would have to increase by 19% over current investment levels. In other words, for every five US dollars of infrastructure spending forecast across the world by 2040, governments and investors would need to find a further 95 cents in order to bring the global stock of infrastructure up to standard.

FIGURE 1.1: Comparison of different approaches to assessing infrastructure needs



3 For further detail please see the technical appendix of the Global Infrastructure Outlook (GHI and Oxford Economics 2018).

4 Figures from the G20 Global Infrastructure Outlook report (GHI and Oxford Economics 2018) are reported in 2015 US\$ prices and exchange rates unless otherwise specified.

Quantifying an infrastructure investment gap across world regions provides an aspirational target for governments looking to improve the provision of infrastructure in their country.

Between regions and countries there is a wide variation in performance in infrastructure provision and the capability of governments and private investors to meet future needs. The capacity of governments to respond to this challenge is discussed further in the next chapter of this report.

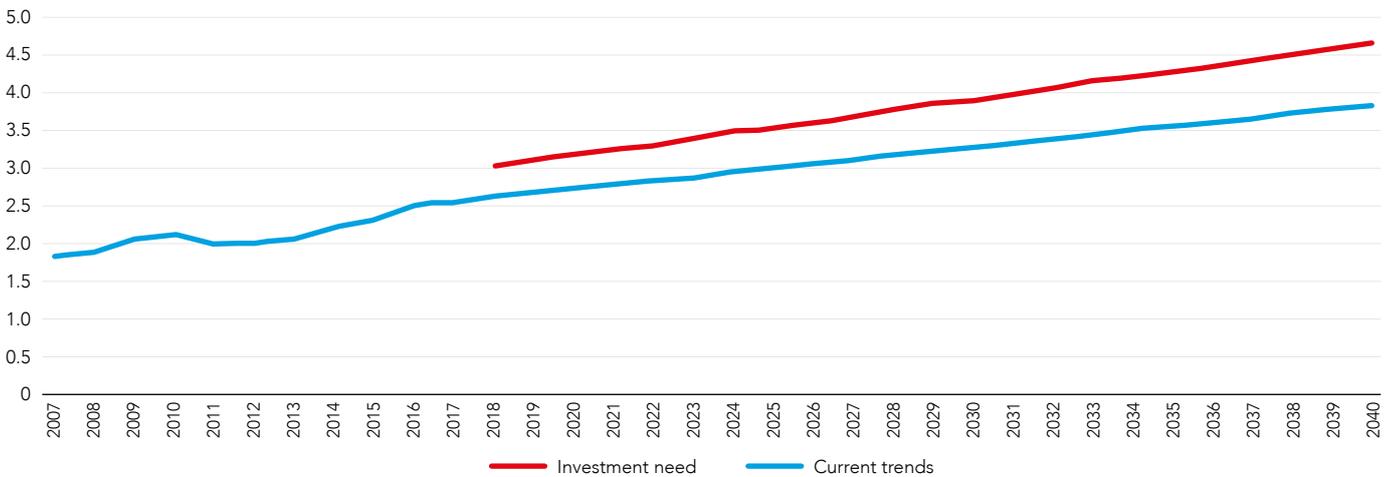
1.3 ANALYSIS OF THE GLOBAL INFRASTRUCTURE INVESTMENT GAP

Quantifying an infrastructure investment gap across world regions provides an aspirational target for governments looking to improve the provision of infrastructure in their country. It highlights global top performers, such as Singapore, Japan and Canada – which can be looked to for good practices.⁵ The investment gap view also reveals global laggards, such as Mexico, Myanmar and Brazil. Countries facing substantial and growing gaps may benefit from looking to their peers for good practice and novel methods of meeting infrastructure needs. Subsequent chapters explore how the skills and perspectives of accountants can help close the investment gap. Before turning to the role of accountants, this report sets out a second method for understanding infrastructure need: the infrastructure service gap.

1.4 FINANCE PROFESSIONALS' PERSPECTIVES ON THE GLOBAL INFRASTRUCTURE SERVICE GAP (APPROACH 2)

The *Global Infrastructure Outlook* report forecasts that the global infrastructure investment gap will reach US\$14 trillion by 2040 (GHI and Oxford Economics 2018). This economic analysis sets an aspirational global benchmark for meeting the world's infrastructure needs. At the same time, the ultimate objective in fulfilling a country's infrastructure need is not a notional investment figure; rather, it is closing a recognised service gap. Doing this requires that governments develop a vision of what a country seeks to achieve through the development and maintenance of its infrastructure. ACCA's previous work on Smart Cities argues that creating a vision for future municipal infrastructure requires a 'citizen-led, bottom-up approach' based on actual service needs (ACCA 2016). Zia Paton, a partner at PricewaterhouseCoopers (PwC) and participant in the roundtable discussion in Trinidad and Tobago, cited the country's 'Vision 2030' as an excellent framework for setting out the government's infrastructure priorities. She pointed out that: 'the plans set out in the Vision 2030 document appear to be

FIGURE 1.2: Global infrastructure investment need and current trends, 2015 US\$ trillions



Source: GHI and Oxford Economics 2018

5 See Appendix B for regional- and country-level statistics.

To supplement the economic analysis that produces the *investment gap*, the joint member survey explored the global infrastructure service gap.

exactly what we need,' but she sees the real challenge as 'converting that plan into action and aligning it with the various frameworks, people and Ministries we have in place: execution or implementation is where we tend to have challenges.'

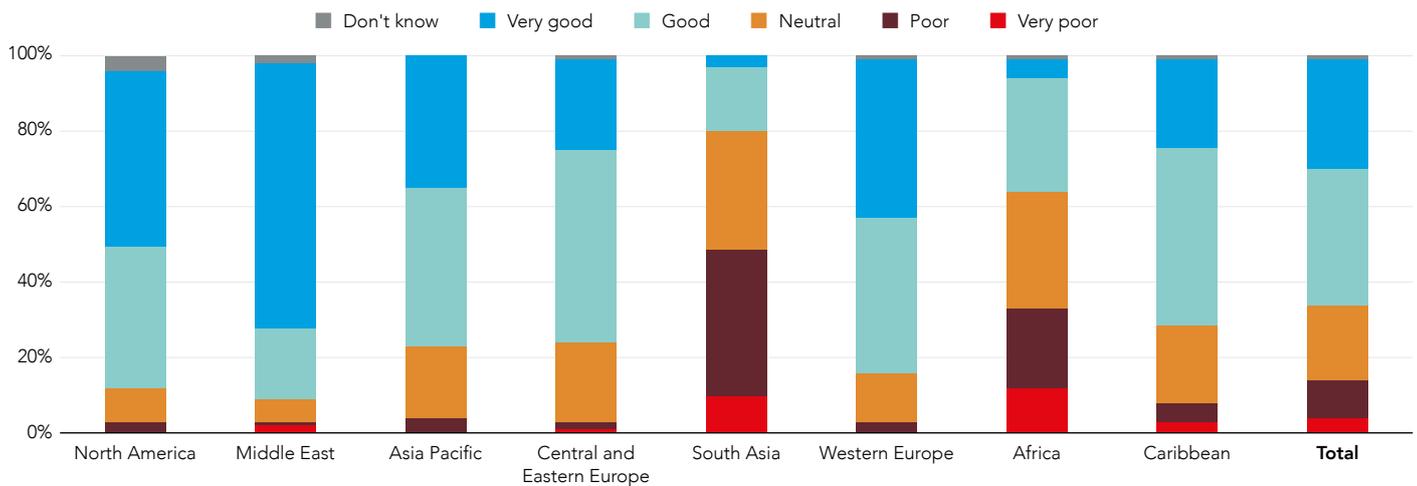
The following chapters demonstrate the essential role for the accountancy profession in transforming agreed national visions into a reality, through improving project selection (Chapter 3), financing decisions (Chapter 4), and project delivery (Chapter 5). To supplement the economic analysis that produces the *investment gap*, the joint member survey explored the global infrastructure service gap. This granular

approach captures the perspective of finance professionals from around the world, setting out which particular types of infrastructure are viewed as requiring improvement to meet service needs.

Infrastructure service gap by world region

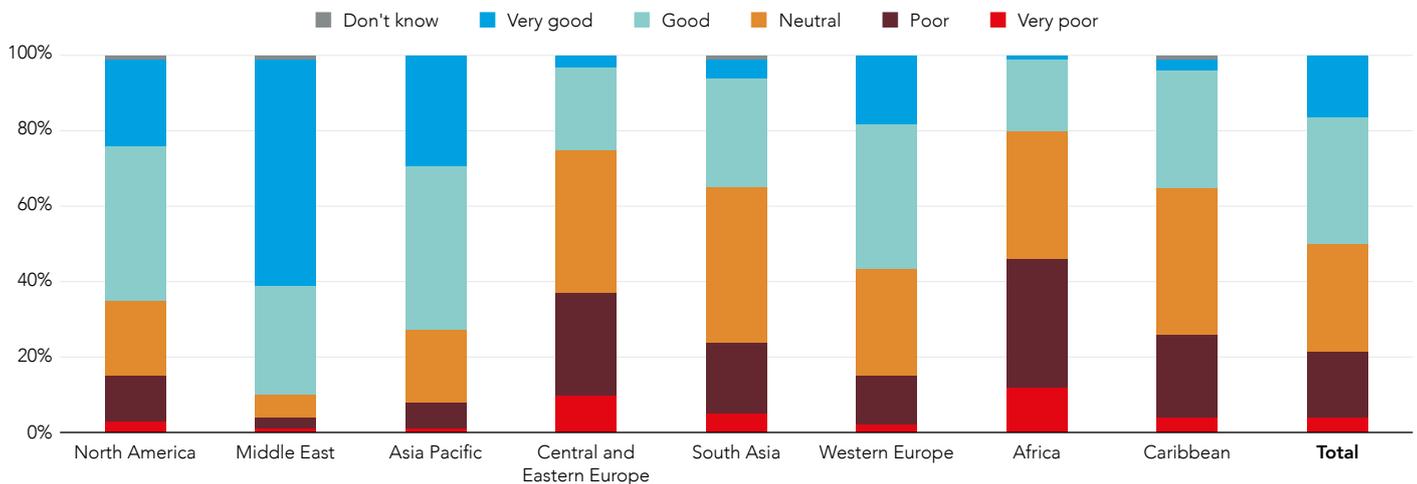
Respondents to the survey were asked to rank the current quality of seven types of infrastructure in their country – covering both social and economic infrastructure. Breaking down these results by world region demonstrates considerable variation in the current quality of each type of infrastructure. Figures 1.3, 1.4 and 1.5 show the results for three types of infrastructure: power and energy, roads and highways, and ICT. The world regional

FIGURE 1.3: Infrastructure quality – power and energy



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

FIGURE 1.4: Infrastructure quality – roads and highways



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

ICT is a unique form of infrastructure that includes significant non-physical components, and its provision must anticipate the future needs of the digital economy.

breakdowns for water and sanitation, railroad, and other transport infrastructure (eg, sea and air), and core public service infrastructure can be found in Appendix B, Figures B6, B7, B8, and B9. By analysing the specialist responses on each type of infrastructure, this report offers a view on the global and regional service gaps that exist in the provision of infrastructure.

The survey data shows that South Asia lags other world regions in the quality of its power and energy infrastructure, with only one in five (20%) of finance professionals in that region stating that power and energy provision in their country was good or very good. This compares with 65% of global respondents, who found the provision of power and energy to be good or better. Africa lagged in this area, with about one in three (35%) of Africa’s finance professional respondents stating that power and energy provision was very good or good. Unsurprisingly, 90% of the Middle Eastern respondents saw their power and energy infrastructure as good quality or above – with 71% stating that power and energy provision is ‘very good’.

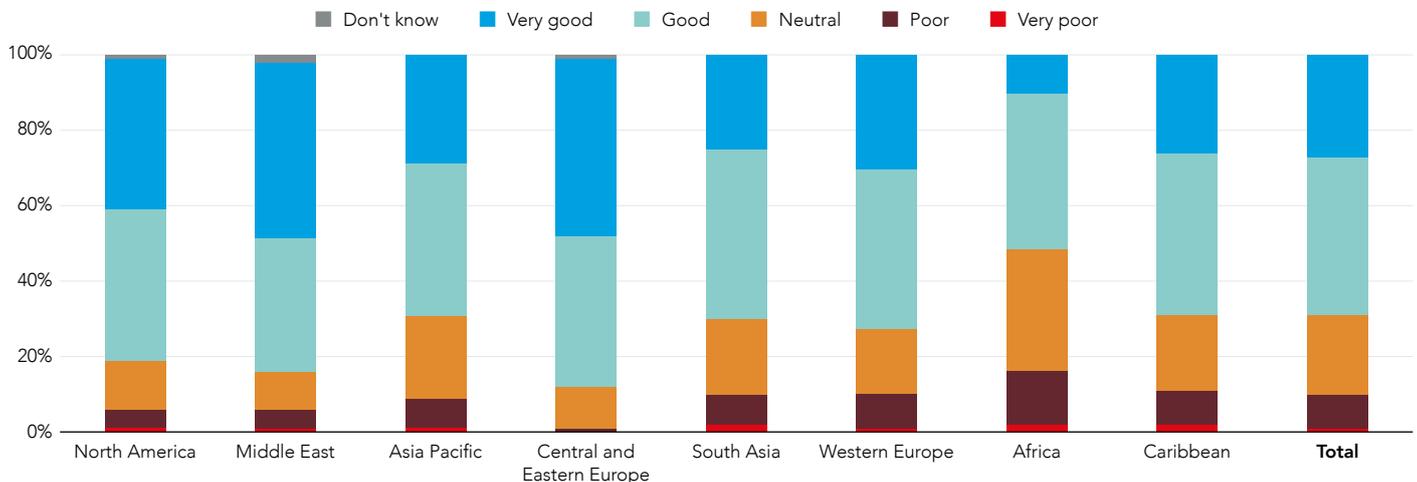
Central and Eastern European and African respondents were critical of the quality of their road infrastructure – with 37% and 46% respectively stating that their roads and highway infrastructure were poor or very poor. In comparison, a majority of survey respondents in the Middle East, North America, and Western Europe reported that the provision of

road and highway infrastructure in their countries was of good or very good quality. Globally, nearly half the finance professionals (49%) reported that that the quality of road and highway infrastructure in their countries was good or very good.

Globally, ICT was seen as the type of infrastructure with the highest quality. Clearly, ICT is a unique form of infrastructure that includes significant non-physical components, and its provision must anticipate the future needs of the digital economy. The quality of ICT infrastructure extends beyond initiatives such as the roll-out of ultrafast broadband; it includes public sector projects developing robust financial management and information systems to improve public services.

Besides significant non-physical components, ICT represents a comparatively new priority for many governments. The survey shows the African region lagging its peers, with only 51% of specialist finance professionals in the region ranking ICT as good or very good, compared with the global average of 69%. ICT was one of the few infrastructure types to receive a high score in central and Eastern Europe. This is understandable, because for many countries in this region other types of physical infrastructure, such as road and rail, were built under the Soviet Union. Significant investment in ICT infrastructure around the world occurred

FIGURE 1.5: Infrastructure quality – information and communication technology



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

Comparing specialists' perceptions of infrastructure quality by country shows particular service gaps emerging across the types of infrastructure.

after the fall of the Soviet Union and many new nation-states in Eastern Europe were able to pursue their own infrastructure investment priorities. Certain countries, such as Estonia, are now seen as world leaders in ICT and the provision of a digital public sector.

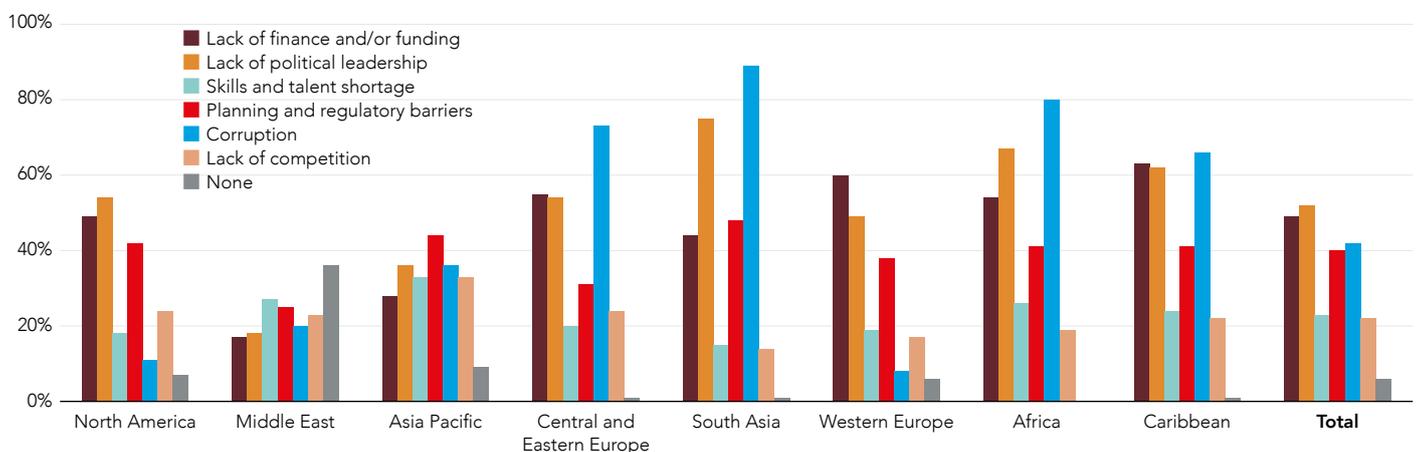
A comparison of regional infrastructure service gaps arising from the survey data

Comparing specialists' perceptions of infrastructure quality by country shows particular service gaps emerging across the types of infrastructure. For example, finance professionals in Africa and South Asia reported consistently poor levels of infrastructure across all the subtypes, with the notable exception of ICT. These results suggest that there are considerable service gaps that governments in this world region must address. In comparison, North American respondents had much higher overall scores, but showed a particular dip in their road and highway infrastructure, where only 64% of respondents reported that this infrastructure was of good quality. In the Caribbean region, specialist respondents isolated road and highway infrastructure and core public service infrastructure as key areas requiring intervention to reduce the service gap. Specialists in infrastructure policy in central and Eastern Europe cited core public service infrastructure and railway infrastructure as areas requiring further investment.

1.5 BARRIERS TO MEETING INFRASTRUCTURE NEEDS

Respondents to the member survey were also asked what they saw as the biggest barriers to meeting the infrastructure needs in their country. The results of this question showed significant variation by world region. For example, corruption was seen as a serious challenge in South Asia, Africa, Central and Eastern Europe, and the Caribbean – but was cited by 10% of respondents or fewer in North America and Western Europe. In comparison, a lack of political leadership ranked consistently high across world regions. This is a key barrier that is explored further in Chapter 3, Selecting Projects. The lack of finance or funding also ranked as a significant barrier in most regions, with an overall global average of 49% of respondents citing it as a barrier. The underlying causes for the lack of finance, as well as good practices in overcoming this barrier, are discussed in Chapter 4 on the central role of accountants in improving infrastructure project finance. Finally, planning and regulatory issues consistently arose as a barrier to meeting infrastructure need, with around 40% of respondents across the globe citing this as a key barrier. Chapter 5 of this report, which explores how accountants can support the efficient execution of infrastructure projects, sets out how the interface of public and private partners can often be confused and suboptimal, reducing the effective delivery of infrastructure.

FIGURE 1.6: Biggest barriers to meeting infrastructure needs



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

2. Capacity for infrastructure investment



For countries at different stages of development, the implications of infrastructure spending can also be markedly different. The annual rate of growth in output, typically much higher during the early phase of industrialisation, tends to slow as a country's economy matures. Smaller economies may therefore need to commit a relatively large share of their output to infrastructure investment in order to facilitate rapid growth.

Looking at infrastructure investment as a percentage of GDP can therefore be revealing as to governments' willingness or ability to make the necessary financial investment as well as the nature of the environment for private investment.

In 2015, the Asian economies funded the largest financial infrastructure investment, around US\$1.3 trillion. This is unsurprising given that Asia is the most heavily populated region. It is also a function of the commitment by certain countries to improving the region's infrastructure, and in 2015 the level of investment was the largest in relative terms, standing at 5.1% of GDP.

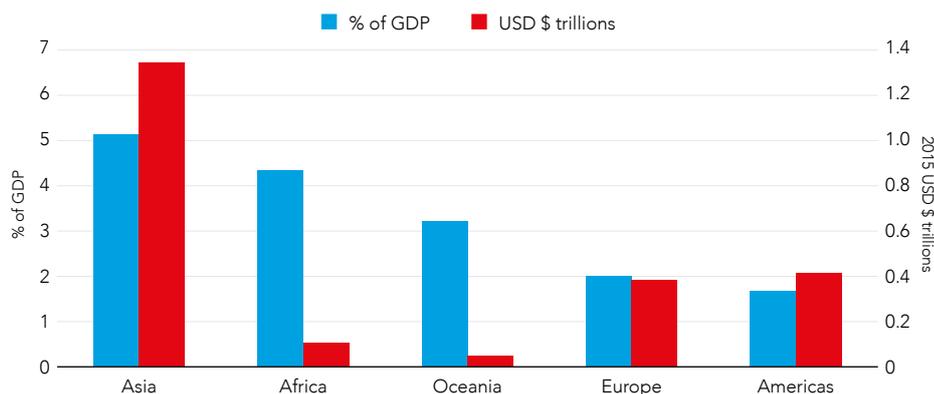
Africa was the region with the second-highest level of investment as a share of GDP in 2015, at 4.3%, but the continent trails its peers in absolute investment (US\$100bn). Europe and the Americas, both of which are dominated by their larger, more developed economies, dedicated far lower levels of funding to infrastructure investment relative to their GDP in 2015, at 2.0% and 1.7% respectively.

2.1 GOVERNMENTS' CAPACITY FOR INCREASING INFRASTRUCTURE SPENDING

Governments can directly fund an increase in expenditure on infrastructure through increases in either taxation or borrowing. The latter places a burden on future generations in the form of the higher taxation needed to fund the

repayment of the debt. The major constraints on a government's capacity for funding infrastructure are therefore a fairly complex mix of institutional, economic and social factors. The size of the tax base, how easily taxes can be evaded and political or cultural expectations about what constitutes a fair level of taxation all present practical

FIGURE 2.1: Regional infrastructure investment in US\$ trillions as a % of GDP, 2015



Source: GHI and Oxford Economics 2018

Table 2.1 presents summary statistics for the level of government debt and taxation across high-income, upper-middle-income, and low- and lower-middle-income countries.

barriers to raising revenues. Likewise, high taxes can have strong disincentive effects, discouraging certain activities and limiting the extent to which any change in the tax rate translates into higher revenues. Borrowing, on the other hand, is constrained by the credibility of the government in pledging to repay any debts and the depth and sophistication of domestic capital markets.

Table 2.1 presents summary statistics for the level of government debt and taxation across high-income, upper-middle-income, and low- and lower-middle-income countries. Using this data gives the distribution of tax and borrowing levels relative to GDP, allowing us to benchmark countries' capacity for further investment. The figures cover the 1995 to 2016 period in order to show variation across a range of different economic and political cycles.

Table 2.1 shows that among the high-income countries both the UK and Canada have relatively high levels of indebtedness, as measured by the OECD gross general government debt indicator (OECD 2019). Since the global financial crisis both countries have seen their debt levels pull away from the OECD average to stand at 111.7% and 114.7% of GDP, respectively. This puts both countries firmly in the upper quartile of indebted countries, even among the OECD countries, where levels of debt to GDP

are generally high. In both cases, tax revenues are marginally below the OECD average, however, suggesting there is some limited fiscal room for raising revenue. Political pressure in countries such as the UK may play a part in decisions about whether to raise taxes to generate additional revenue and, if so, whether to invest in capital expenditure over improving service provision through increased operating budgets.

China's debt as a share of GDP is estimated to fall below the average for the low- and middle-income countries, at 44.3%. Tax revenues are also somewhat higher than in most low and middle-income countries. As growth continues and the economy matures, Chinese governments may be able to widen the tax base in line with developed economy standards, bringing in significantly larger revenues. Still, the government remains well placed to invest in infrastructure. Malaysia, which has a larger infrastructure gap to overcome, is somewhat more indebted (54.5%), sitting above the median debt level for its peer group, although not particularly dangerously so. Conversely, tax revenue as a share of GDP (14.3%) is slightly lower than the median level for low- and middle-income countries of 14.7%. This suggests that without a move into higher growth and a broader tax base, the funding required to close the infrastructure gap is unlikely to materialise in Malaysia.

TABLE 2.1: Stock of debt and tax revenues as a share of GDP, selected countries

INCOME GROUP (WORLD BANK DEFINITION)	COUNTRY	INFRASTRUCTURE INVESTMENT AS A SHARE OF GDP, 2015	GENERAL GOVERNMENT DEBT AS A PROPORTION OF GDP	TAX REVENUE AS A SHARE OF GDP
High-income	UK	1.6%	111.7%	32.5%
	Canada	2.3%	114.7%	32.0%
Upper-middle income	China	7.0%	44.3%*	21.7%*
	Malaysia	3.6%	54.5%	14.3%
Low- and lower-middle income	Pakistan	1.7%	63.3%	16.4%*
	Nigeria	3.2%	19.6%*	3.5%*
	India	4.0%	68.9%*	11.0%

Source: World Bank, OECD, IMF, *CIA World Factbook

Some countries, such as China, find themselves in the privileged position of having significant fiscal room to support further investment, while also projecting a small infrastructure gap.

Pakistan has a relatively high level of government debt (63.3%), which is approaching the upper quartile of World Bank estimates. This presents real risks to fiscal sustainability, where pressure from the country's overseas debt obligations has raised the prospect of a debt crisis. Here, the high level of indebtedness may in part be due to rapid growth in infrastructure spending over recent years.

Among the case study countries, Nigeria stands out as having both the largest forecast infrastructure gap, at 0.9% of GDP in 2040, and the weakest tax revenue (3.5% of GDP). The inability of the government to raise revenue effectively is holding back its ability to invest in infrastructure, which in turn is holding back growth. The availability of significant oil reserves can provide an alternative source of revenue to general

taxation, especially when oil prices are high. But there are reasons (environmental and technological) for considering that peak oil prices may have been (or will soon be) reached. Therefore, the ability of Nigeria to finance its investment from other sources of income will be essential to closing the country's infrastructure gap.

This analysis demonstrates that there is significant country-level variation in the ability to respond to the global infrastructure gap (Table 2.2). Some countries, such as China, find themselves in the privileged position of having significant fiscal room to support further investment, while also projecting a small infrastructure gap. Others, such as Pakistan and Nigeria, will need to work within the limited fiscal room available for meeting their growing infrastructure needs.

TABLE 2.2: A typology of infrastructure gap responsiveness

	LIMITED FISCAL ROOM	GREATER FISCAL ROOM
Low infrastructure gap	'Small gap, Fiscally restricted' (eg Canada)	'Small gap, Fiscally flexible' (eg China)
High infrastructure gap	'Large gap, Fiscally restricted' (eg Pakistan, Nigeria)	'Large gap, Fiscally flexible' (eg Malaysia)



3. Selecting projects



Around the world, the multitude of industrial cranes signals the increase in infrastructure projects and the resulting demand on investment resources. Yet, what is not apparent is the variety of competing demands for infrastructure investment, such as the ageing of existing infrastructure, the need to adapt the built environment to respond to climate change, and the desire to initiate new, often ‘mega’, projects.⁶

The planning and selection process of the appropriate infrastructure project is particularly difficult given long asset lives and significant sunk costs that increase risk and uncertainty.

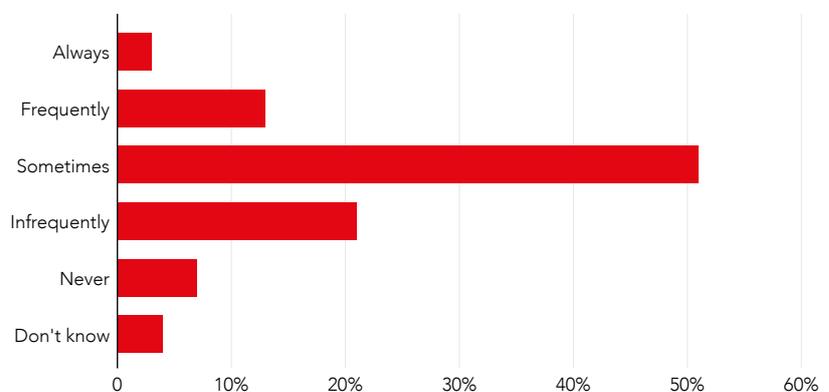
Given these common barriers, finance professionals from around the world offered a mixed review of their countries’ current selection process. Only 16% of respondents to the joint member survey claimed that their government always or frequently selects infrastructure projects that provide the most value to taxpayers, whereas a majority (52%) argued that their government only sometimes selects infrastructure projects of value to taxpayers. Almost one-in-three respondents (29%) indicated that they believed that governments never or infrequently select infrastructure projects that provide value to taxpayers (Figure 3.1).

There is clearly room for improvement in how infrastructure projects are selected. To suggest how to improve the planning

and selection process, respondents to the joint member survey were asked to rate, in order of priority, what changes could be made to improve decision-making when planning and selecting

infrastructure projects. Figure 3.2 shows how respondents ranked the various options, from first choice to fifth, with smaller bars reflecting fewer respondents ranking that option in their top five.

FIGURE 3.1: Do you believe the government selects projects that provide the most value to the taxpayer?



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

⁶ ‘Megaprojects are large-scale, complex ventures that typically cost US\$1bn or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people’ (Flyvbjerg 2018).

A majority of respondents (55%) ranked either 'removing political decision-making' or 'putting in place mechanisms to reduce corruption' as their first choice.

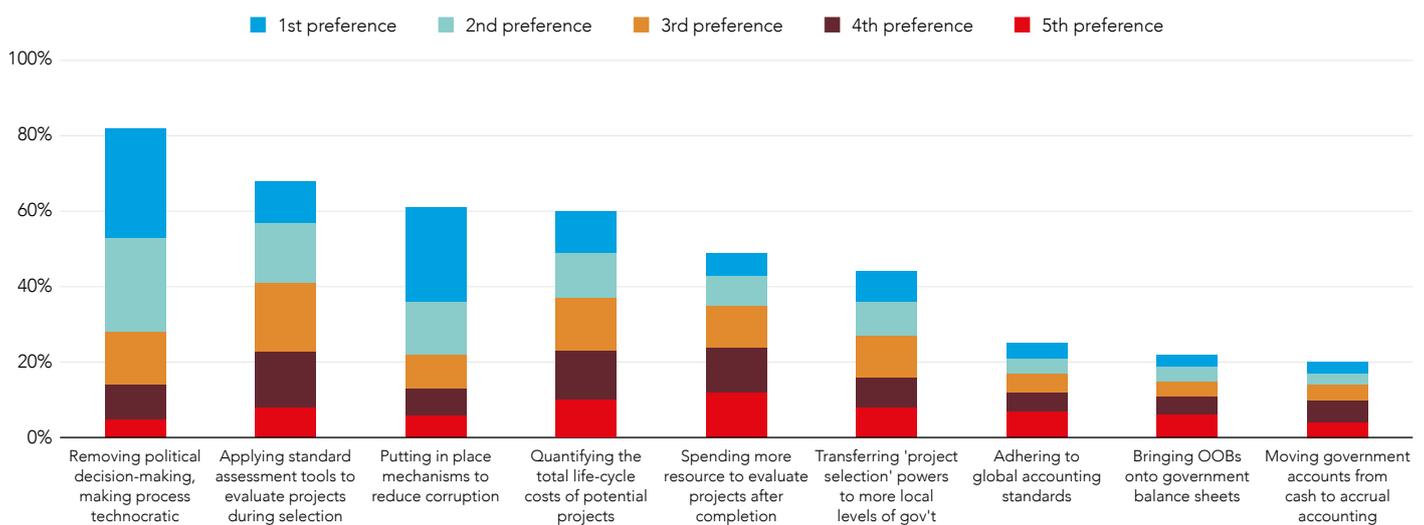
The results (Figure 3.2) show that 'removing political decision-making and making the process more technocratic' was the change most cited by finance professionals as likely to improve the planning and selection process. A majority of respondents (55%) ranked either 'removing political decision-making' or 'putting in place mechanisms to reduce corruption' as their first choice. This prioritisation aligned with the pervading sentiment voiced by participants in the Canadian roundtable, who argued that the government often plan and select projects that are likely to be popular among voters and will focus decision-making on the political cycle, which results in short-sighted project selection and planning processes that lack a long-term plan to address future needs.

The importance of putting in place mechanisms for reducing corruption, such as effective whistle-blowing legislation, also resonated in the roundtable discussions. A participant in Nigeria emphasised that 'if project selection was looked into as it should be, it would

definitely help us in reducing corruption and, hence, reduce the infrastructure gap'. Respondents also ranked highly 'quantifying the total life-cycle costs of a potential project' – with 22% selecting this as their first or second choice. Therefore, one of the key barriers to improving project selection is the bias towards short-term thinking and decision-making.

Another area needing improvement identified in the survey is the lack of a standard assessment method supporting the project selection process. The survey showed that 26% of respondents ranked 'implementing standard assessment tools to evaluate projects during selection' as either their top or second-highest choice. Below, we explore two such barriers, and how accountants play a role in addressing them: first, improving the project planning and selection processes, by using standards and tools to identify need and prioritisation; and second, the misalignment between the project life cycle and the political short-term thinking that often prevails in project selection.

FIGURE 3.2: Which of the following do you feel the government in your country should prioritise to make the best decisions when selecting infrastructure projects?



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

The constrained optimisation method is another tool that can be used for project selection, though it is usually reserved for complex and large projects that require mathematical optimisation before decisions are made.

3.1 BARRIER 1: LACK OF A STANDARD PROJECT SELECTION METHOD – FACTORING IN ‘NEED’ AND ‘PRIORITISATION’

A participant in the Trinidad & Tobago roundtable commented that planning and project selection is ‘hardly ever done on a needs basis. We do not complete a needs assessment when we’re building a road costing millions of dollars. What is the benefit that we are going to bring to society from that new infrastructure?’ Establishing a need is a key consideration in building the case for selecting a particular project. Although there are no international standards or regulations for infrastructure project selection, the *Guide to Project Management Book of Knowledge (PMBOK)* (Project Management Institute 2017) sets out a process whereby the ‘need’ for the project is identified first and classified as most important in the selection. This can be done by conducting a needs assessment or feasibility study and supports the reasons for ‘why’ the project is required. The ‘why’ may be stimuli such as a market demand, a business need, a customer request, a technological advance, a legal requirement, or a social/environmental need.

The PMBOK then delineates two broad methods for establishing the benefit or the ‘why’ of a project: the benefit measurement method and the constrained optimisation method.

The benefit measurement method

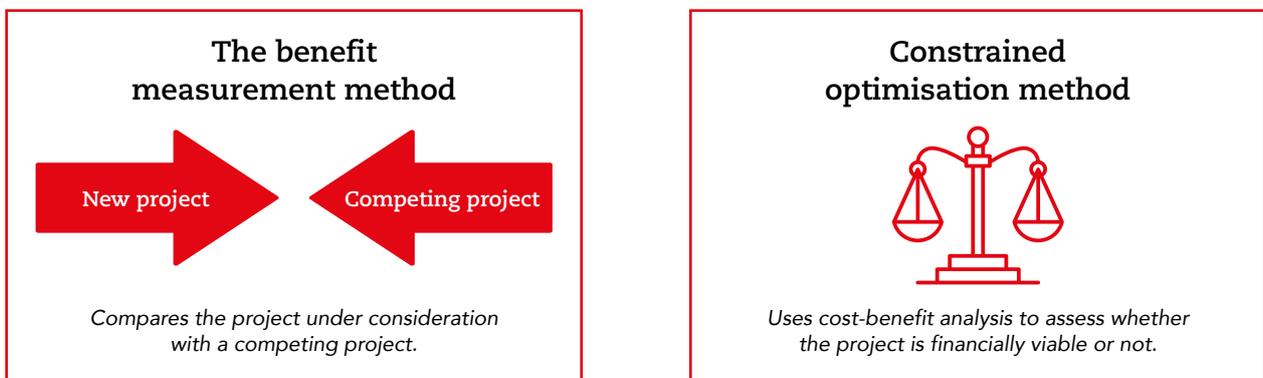
As a comparative approach, this method is based on the present value of estimated cash flows and uses techniques such as benefit/cost ratio, economic models, payback period, discounted cash flow, internal rate of return, and opportunity cost. This method is often used for small or less complex projects.

Constrained optimisation method

The constrained optimisation method is another tool that can be used for project selection, though it is usually reserved for complex and large projects that require mathematical optimisation before decisions are made. This method is widely used in finance and economics to find the minimum or maximum for a cost function where the cost changes depending on varying inputs. Many techniques are available that offer broader consideration for decision makers by examining the best and worst case scenarios and the probability of the project outcome.

The international roundtable participants highlighted that governments should ensure that the need for a particular project is clearly defined – the ‘why’, as the need will determine the appropriate source(s) of support. To do this they should implement a stage-gate process, such as the PMBOK, with standard tools and mechanisms in place for evaluating the project selection process, increasing transparency, and reducing corruption.

FIGURE 3.3: Two methods of need assessment



Alongside the technical methods available for isolating need and priority, accountants can produce a broader range of metrics to improve the projection selection process.

In practice, many governments do not have the resources or the capacity to carry out such assessments across all projects and usually, with the limited information available, they place emphasis on basic elements of project appraisal, which include 'rules of thumb' to confirm that:

- the need for the project is justified
- the project's objectives are clearly specified
- broad alternatives to the project are considered
- promising options are analysed
- project costs are fully estimated, and
- project benefits are assessed.

Even by applying the basic elements of project appraisal, prioritisation (or ultimately selecting the right project) can still be a constraint. The World Bank has developed an innovative and adaptable Infrastructure Prioritization Framework (IPF) (Marcelo et al. 2016) to assist governments in making the best use of their limited information in the interim until they are able to increase their capacity and resources for conducting a more informed and extensive analysis.

The IPF provides a stepping-stone approach to project prioritisation for government decision-making. This multi-criterial decision-support tool builds on existing and accessible data to help governments compare projects while promoting the building of analytical capacity and data for more extensive financial and economic analysis. It is seen as an extension to the current set of tools available to support project selection. It starts from a baseline of ad hoc / uninformed project selection (where technical project information is limited and subjective), to partial technical information (where some information and analysis is available), to a full selection by advanced project appraisal (where considerable technical information is available).

Alongside the technical methods available for isolating need and priority, accountants can produce a broader range of metrics to improve the projection selection process. For example, project planning and selection in Japan considers the effect of infrastructure investment on achieving regional equity, instead of selecting projects that give the highest direct economic return (International Transport Forum 2017). This approach prioritises more evenly spread economic development in a country, even where an optimisation model would suggest investment elsewhere.



Box 3.1: Sustainability and infrastructure: A Canadian case

The Canadian wave of the survey included a question on sustainability and infrastructure. 80% of Canadian respondents indicated that they believe that it is very important to adapt to the impacts of the changing climate, such as severe weather, in planning infrastructure projects.

It is important now, more than ever, to build resiliency into infrastructure investments. Roads, bridges, buildings, public transit and water and wastewater systems are at increasing physical risk from the impacts of climate change.

The Canadian government declared in the 2017 federal budget that it plans to invest CAD21.9bn in green infrastructure. Specifically, CAD2bn is dedicated to a Disaster Mitigation and Adaptation fund to support the federal, provincial/territorial and municipal infrastructure needed to address climate change. Canadian national building codes have been updated to integrate climate adaptation and

resiliency considerations resulting from significant disaster losses. Canadian insurance companies are experiencing the impact: the annual insured damage for 2016 was CAD4.9bn – a significant increase from the previous annual record of CAD3.2bn set in 2013. In 2016 the biggest claims arose from the Fort McMurray wildfires, which resulted in approximately CAD3.7bn in insured damage.

Any future costs of inaction will likely outweigh the incremental investments made today in enhancing and modifying infrastructure resiliency. Nonetheless, too often, there are challenges in making the business case for projects that incorporate adaptation measures. But as with most modifications, in the long run it is always easier and cheaper to build resilience considerations into asset development from the start rather than adding them later in response to a major event. ■

The member survey revealed the need to quantify the total life-cycle cost and remove political decision making, in order to improve project selection.

3.2 BARRIER 2: MISALIGNMENT OF THE INFRASTRUCTURE LIFE CYCLE AND THE POLITICAL CYCLE

The member survey revealed the need to quantify the total life-cycle cost and remove political decision making, in order to improve project selection. These two changes are likely prioritised because of the misalignment that commonly exists between the political cycle (often four to six years) and the total life cycle of an infrastructure asset (often over 20 years). This mismatch can generate two biases: a bias towards short-term decision-making, and a bias towards megaprojects over maintenance.

Short-term bias in project selection

New infrastructure investment is unavoidably long-term and this carries certain risks. At the stages of early planning and project selection, infrastructure decision-makers need to consider the forces shaping a country – such as social, demographic, and technological change – while providing sufficient flexibility to address unpredictable adjustments in need. These variables do not align well with the typically shorter political cycle, where there is often a preference for announcements of major projects that can be hard to execute in practice, or where fundamental requirements may be missing (eg unfeasible building requirements or little forecasted demand for use of the infrastructure). To counteract this bias, the UK's National Infrastructure Commission (NIC) was established in 2015 to produce analysis that is independent of government and to provide advice on major long-term infrastructure challenges – with the specific priority of linking long-term priorities with short-term action. The NIC publishes an annual National Infrastructure Assessment (eg NIC 2018) to establish infrastructure needs and priorities over many decades.

Having an independent body of experts recommending a stable set of priorities can reduce investment risk, as potential private sector partners will have certainty that a project aligns with a broader economic plan. Establishing a national plan based on agreed priorities is also good practice for reducing short-termism and improving legitimacy, but it can also add rigidity to project selection processes. Decision-makers must be careful to balance the benefits of a stable framework with maintaining flexibility to respond to a rapidly changing policy environment.

Bias towards mega-projects over maintenance

There can be considerable bias towards allocating resource to new (preferably high-profile) projects, rather than investing in the necessary maintenance of existing assets. There can be a natural reluctance to spend money on what a country already has and there is often political appeal in wishing to establish an individual legacy through the construction of a megaproject. Accountants are in a pivotal position to draw attention to the issue of prioritising backlog maintenance to ensure that assets remain in serviceable condition. As part of any needs assessments, careful consideration must be given to the condition of existing capital infrastructure and its ability to maintain the existing levels of service. To balance these demands, NHS Scotland publishes an annual assets and facilities report, which provides an overview of asset performance and planned future investment (see NHS Scotland 2018). This report offers good practices in quantifying and managing the backlog of maintenance, including setting out the total outstanding backlog of maintenance costs per square metre of the estate and the proportion of significant and high-risk maintenance. By identifying the maintenance backlog, NHS Scotland is able to take the appropriate action to mitigate a reduction in public service quality, while also prioritising repairs in line with the metrics established in the annual assets and facilities report.



Box 3.2: Accountants and climate-change adaptation planning: A Canadian case in point

As governments around the globe move to establish planned spending on infrastructure projects designed to adapt to climate change, it is essential that accountants have a role in project selection and planning to help make the business case for resiliency and to ensure adequate accountability.

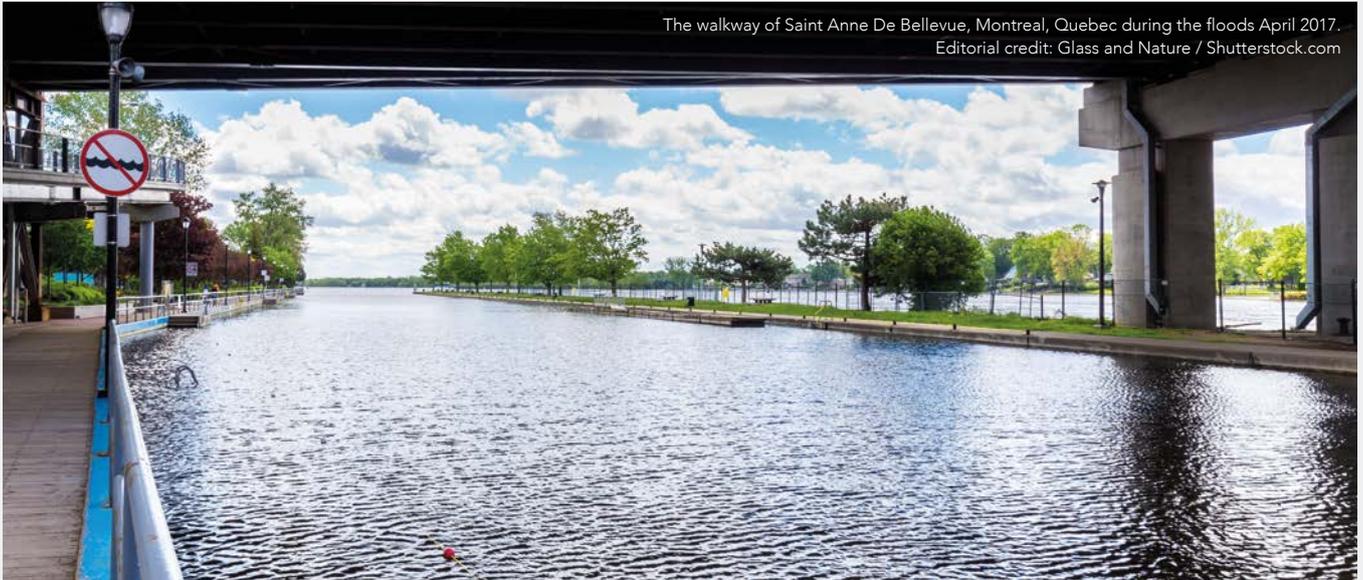
In Canada, the efficacy of this practice was illustrated when the City of Montreal developed its Climate Change Adaptation Plan. Accountants played an integral role in performing the cost-benefit analysis of embedding adaptation into municipal infrastructure decisions (CPA Canada, 2016).

‘A less costly option may be deemed adequate today, but could result in future costs’, explained a participant in the Canadian roundtable.

For example, if Montreal’s sewer pipes cannot withstand increased flooding predicted with climate change, sewer backups could lead to additional expenditures, such as clean-up costs and even legal liabilities.

‘Climate change is going to force cities and governments to put in place capital projects and other measures to prevent future losses or damages’, emphasised the participant.

Indeed, there has never been a more vital time for CPAs to get involved in infrastructure project selection. ■



The walkway of Saint Anne De Bellevue, Montreal, Quebec during the floods April 2017.
Editorial credit: Glass and Nature / Shutterstock.com

4. Financing projects

The economic analysis in this report demonstrates that, by 2040, the world will have accumulated an infrastructure gap of over US\$14 trillion. In response to this challenge, governments are adopting novel means of effectively funding and financing their public infrastructure – as well as turning to institutional investors, foreign direct investment and the private sector.

Accountants act as a critical interface between these actors, for example through effectively communicating and negotiating the terms of an infrastructure finance deal.

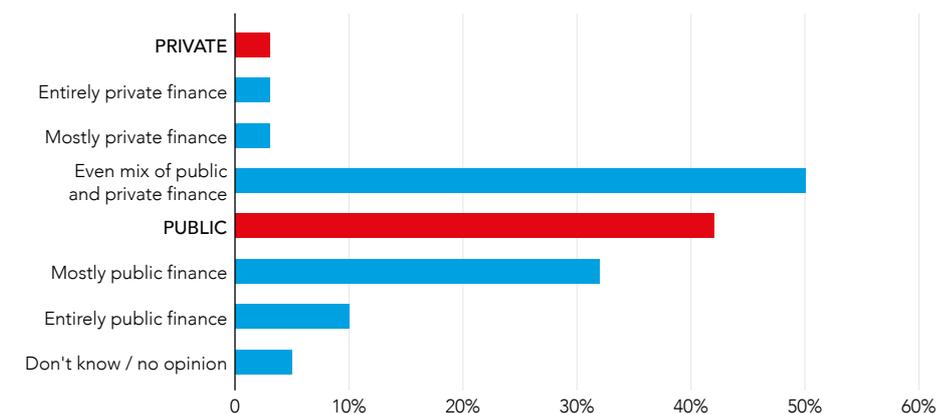
sector (IFG, 2017) and data from the *Project Finance and Infrastructure Journal* shows that global private finance deals amounted to over US\$930bn in 2017 (JGlobal 2018). Given this environment,

it is important for accountants to contribute their financial acumen and professional skills by providing a view on the best means of financing infrastructure projects (Figure 4.1).

4.1 THE MIX OF PUBLIC AND PRIVATE FINANCE FOR INFRASTRUCTURE

Respondents to the joint member survey shared the view that infrastructure in their countries should be financed by both the public and private sectors, with 85% stating that infrastructure should be financed by some mix of investment from both the public and private sectors. Half the total respondents (50%) suggested that there should be an even mix between public and private finance, while the second most common view was that infrastructure should be primarily financed by the public sector (42%). Some countries, such as the UK, plan for the majority of their future infrastructure investment to come from the private

FIGURE 4.1: How should infrastructure be financed in your country?



Source: The Global Infrastructure Gap survey; generalist respondents only; n: 1,645

Overall, finance and accounting professionals with a specialist background took a balanced view on the appropriate finance sources for infrastructure in their country.

Survey respondents with specific expertise in infrastructure ('specialists'⁷) provided a detailed breakdown on the suggested balance of public and private investment by each type of infrastructure.

Almost half (47%) of specialist respondents argued that ICT infrastructure should be either mostly or entirely financed by the private sector, while other transport – such as air or sea – ranked as the second highest subsector for private sector investment (36%) (Figure 4.2). There was a consistent view across the infrastructure subsectors that there should be an even mix of public and private investment, with between 33% and 46% of specialist respondents holding this view. Only three subsectors were seen to benefit from finance originating mostly or entirely from the public sector: these were water and sanitation, roads and highways,

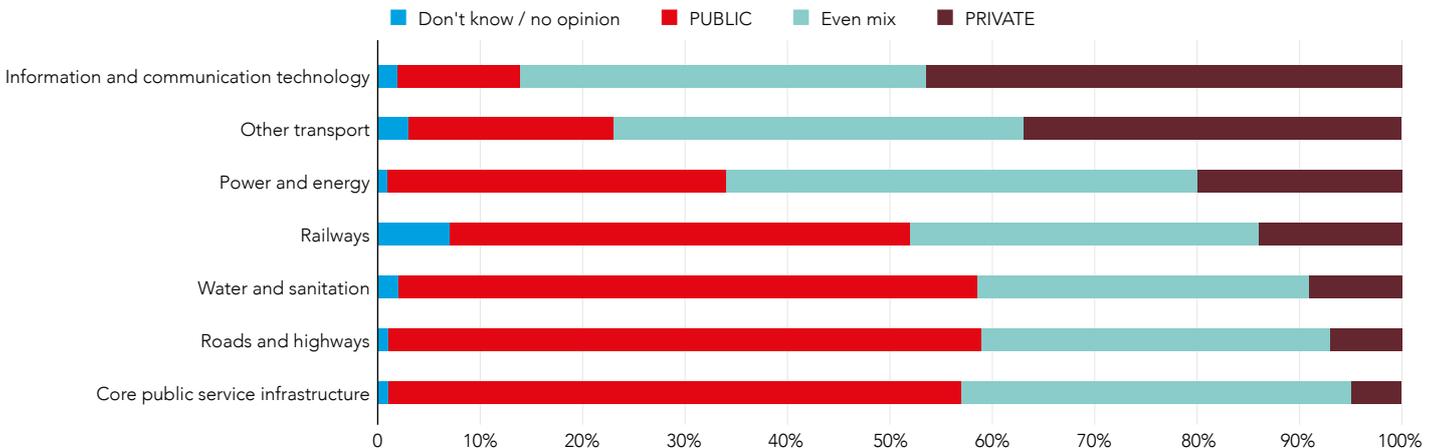
and core public service infrastructure. Core public service infrastructure, such as hospitals and schools, attracted the lowest private finance support.

Overall, finance and accounting professionals with a specialist background took a balanced view on the appropriate finance sources for infrastructure in their country.

4.2 KEY BARRIERS TO SECURING PRIVATE FINANCE FOR INFRASTRUCTURE

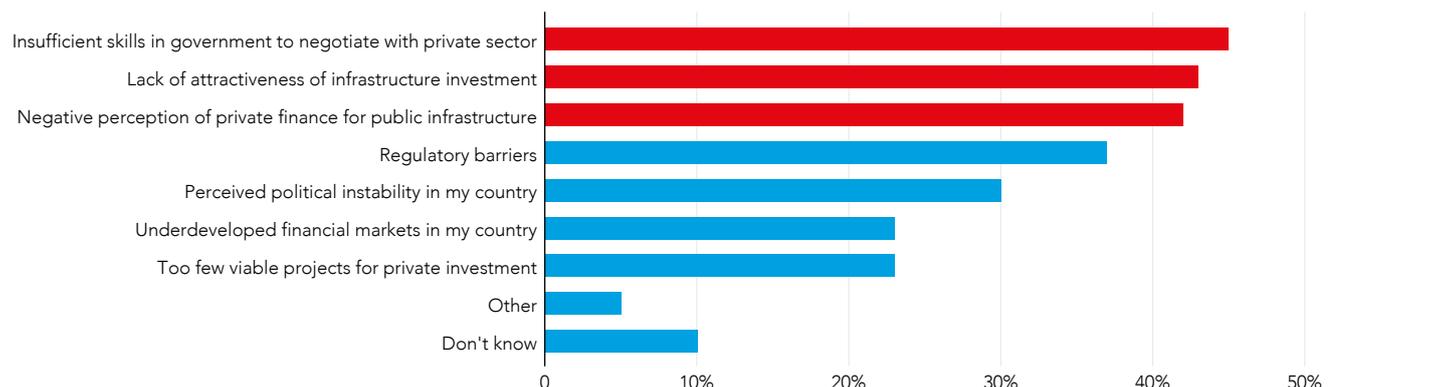
The member survey showed that 85% of respondents believed there should be some mix of public and private sector finance in their country's infrastructure. A key question, therefore, is what barriers limit the flow of private finance for public infrastructure?

FIGURE 4.2: How should infrastructure be financed in your home country, by infrastructure sub-sector?



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

FIGURE 4.3: What are the key challenges that the government faces in securing private finance?



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

⁷ Question 3 of the survey asked respondents if their work involved any of the following areas: infrastructure policy, procurement, capital budgeting, project management, or operations management.

Developing the skills in government to act as competent clients and negotiators will be essential in meeting the challenges of providing the right finance for infrastructure projects.

As seen in Figure 4.3, ACCA members and CPA Canada members identified three key barriers for governments working to secure private finance:

Barrier 1: the lack of attractiveness of infrastructure investment (42%)

Barrier 2: the negative perception of private finance for public infrastructure (43%), and

Barrier 3: insufficient skill in government to negotiate with the private sector (45% of respondents).

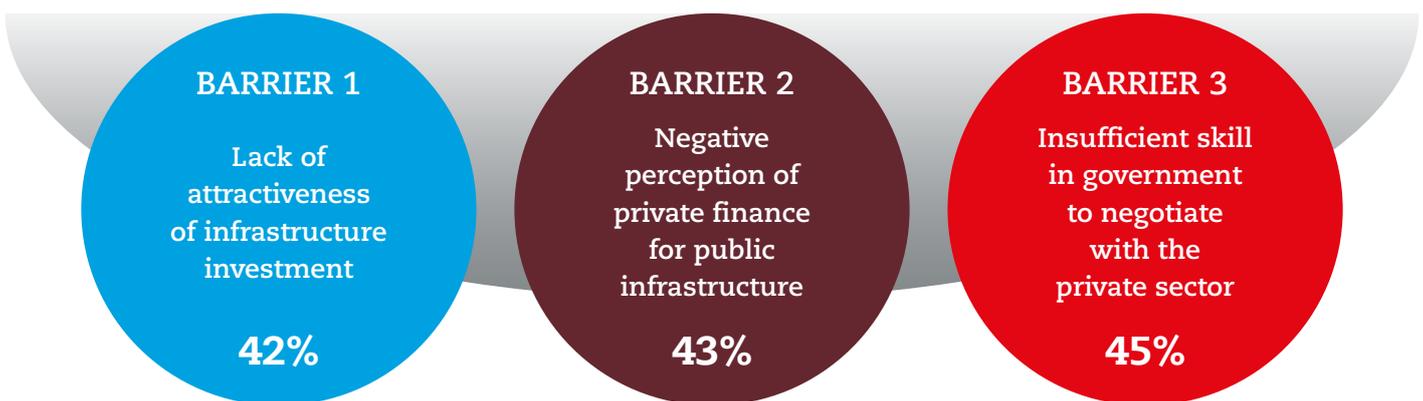
The distinction between ‘funding’ and ‘financing’ infrastructure (set out in the next section) helps explain the lack of attractiveness of infrastructure investment, and what accountants might do to reduce this problem. The higher cost, and perceived private gain from public goods, is a significant factor in the negative perception of private finance investing in public infrastructure. The UK National Audit Office published a report in January 2018 calling out the high rates of return enjoyed by private investors participating in the Private Finance Initiative (Morse 2018). Therefore, accountants must take centre stage in

demonstrating the higher cost of private capital, managing the transfer of risk between sectors, and building an evidence base for selecting the right financing model to support an infrastructure project.

Finally, developing the skills in government to act as competent clients and negotiators will be essential in meeting the challenges of providing the right finance for infrastructure projects. For example, there is growing recognition that gold-standard public finance takes account of more than debt stocks and cash flows (eg debt to GDP ratio and tax receipts) and instead needs to consider net wealth, particularly public assets. Cultivating the skills in government to produce a public sector balance sheet and applying this perspective to the finance selection process will help policymakers maximise the value of their assets and make better infrastructure finance decisions.

The remainder of this chapter will discuss these barriers, in order to inform areas where public sector accountants can make a difference in closing the infrastructure gap.

FIGURE 4.4: Key barriers in financing infrastructure projects



Investment in infrastructure offers the opportunity for private investors to benefit from stable, long-term, low-risk returns that are tied to a physical asset.

4.3 BREAKING DOWN BARRIER 1 BY CLOSING THE FUNDING GAP

Distinguishing between funding and financing

It is important to make a clear distinction between the ‘funding’ and ‘financing’ of infrastructure projects. When a private sector institution, such as a bank or pension fund, finances a public infrastructure project, it is providing the upfront money to allow for the design, building and operation of that project, whereas ‘funding’ is how an infrastructure project is ultimately paid for (Institute for Government 2018).

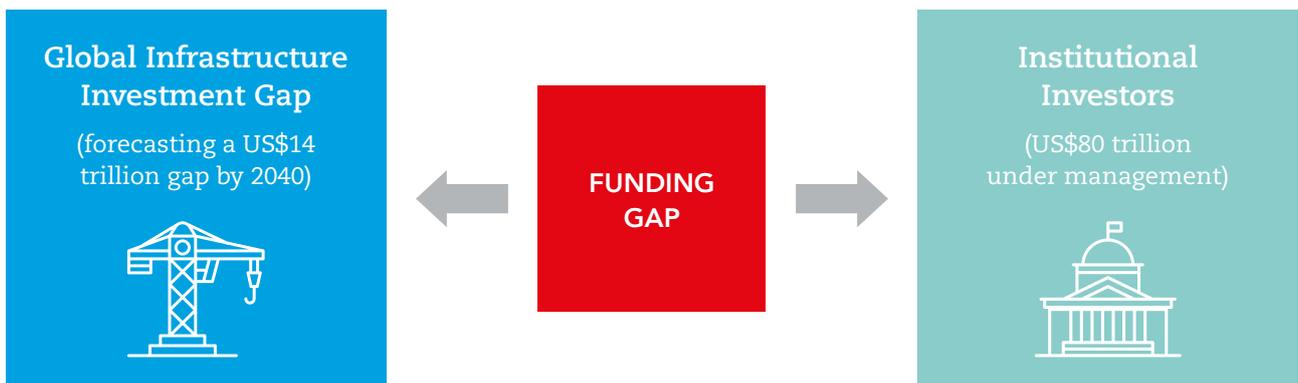
Global capital markets can help plug the global infrastructure gap. Institutional investors, with an estimated US\$80 trillion in assets under management (Fages et al.), seem ideal partners for providing the required finance to reduce the size of the forecasted global infrastructure gap. Their risk appetite and the duration of their liabilities match the needs of typical infrastructure projects that will often have life cycles – from design to decommission – that can span many decades.

Investment in infrastructure offers the opportunity for private investors to benefit from stable, long-term, low-risk returns that are tied to a physical asset. A key challenge in connecting this pool of private capital with the demand for infrastructure projects is the funding gap. Broadly, there are three ways of funding (‘ultimately paying for’) an infrastructure project:

- general taxation
- user charges (eg toll roads), and
- novel forms of funding (eg value capture and civic crowdfunding).⁸

This distinction explains why, even where private investors have expressed interest in public infrastructure and while the global infrastructure gap grows, the response has been relatively muted (McKinsey 2016a). Private investors understandably require a stream of revenue to support their upfront outlay, but many potential (even ‘shovel ready’) projects do not include the long-term funding arrangements to support private finance.

FIGURE 4.5: The funding gap



⁸ Refer to Institute for Government 2018 for an overview of the advantages and disadvantages of different infrastructure funding options.

General taxation and government capital allocations provide an important foundation for funding public infrastructure, while user charges can provide a stream of revenue (eg road tolls) – subject to demand risks.

Innovative models of funding infrastructure

General taxation and government capital allocations provide an important foundation for funding public infrastructure, while user charges can provide a stream of revenue (eg road tolls) – subject to demand risks. There are also emerging models that are helping to plug the funding gap. Rent capture is attracting attention as a method of funding transit (see Box 4.1 on the MTR Corporation in Hong Kong for an example). In addition, civic crowdfunding, a novel form of funding, is spreading in popularity. A report from Catapult Future Cities (2017) found that 10% of local governments in the UK now make use of some form of civic crowdfunding to transform their communities. Spacehive – a UK crowdfunding platform – has attracted over £11 million in funding since 2012 to fund over 550 local projects, including building new community centre facilities (Spacehive 2019). Platforms such as Spacehive connect grant providers, local governments and residents that collectively contribute to projects, as well as providing a service to verify that a project is viable and has received the required government permissions. In 2017 the Mayor of London committed £400,000 to Spacehive projects (O’Dowling-Keane 2017). As governments face constrained budgets, public sector

finance officials can play a central role in supporting these novel forms of infrastructure funding by establishing what proposals are financially viable, in order to help plug the infrastructure gap.

The role of the accountant in addressing the funding gap

Beyond these novel funding models, accountants can play an important role by helping to identify the most efficient funding models, while also taking a leading role on the negotiation with potential private sector investors and representing the public interest through their high ethical standards.

Clearly, the funding gap is a factor in ‘the lack of attractiveness of infrastructure investment for private investors’ identified in the member survey. Finance professionals should consider a number of factors in formulating effective business cases that can attract private sector finance (eg in articulating the ‘private sector incentive’). The financial viability of the project needs to be balanced against affordability for users and access to public goods and services. Accountants must consider how they can develop and communicate the private sector incentive for investing in priority projects, while also supporting the public interest and providing taxpayers with value for money.



Box 4.1: Hong Kong’s MTR Corporation – fully funded infrastructure through value capture



Hong Kong has applied a novel form of infrastructure funding that has attracted global attention. MTR Corporation is majority owned by the Hong Kong government and manages a passenger rail system that makes a profit. It manages to generate revenue in excess of 180% of its operating cost.

One factor in MTR’s financial success has been its ‘Rail plus Property’ model, where the corporation captures some of the positive externalities of its transit operations by developing and renting the land surrounding its rail stations.

Hong Kong is particularly suited to this form of funding, with its dense population and high real estate costs, which have allowed MTR to create sustainable revenue streams from the development of the land surrounding its stations (Leong 2016; MTR Corporation 2017). ■

By the nature of the public sector, there are many competing short-term needs for public capital investment, where necessary infrastructure investment must compete with other public spending priorities.

4.4 BREAKING DOWN BARRIER 2 BY ACCOUNTING FOR THE HIGHER COST OF PRIVATE CAPITAL

Running infrastructure projects efficiently for citizens also requires that accountants provide decision-makers with the best advice possible in selecting the appropriate source of project finance.

The UK is a global leader in the use of private finance and has over 700 operational private finance deals – with total projected future charges arising from these deals of almost £200bn (Morse 2018). In 2018, The UK’s National Audit Office published a report examining the rationale, costs and benefits of private finance for public sector projects (Morse 2018). The report’s analysis of Department for Education data showed that the cumulative cost of privately financed projects can exceed the public sector

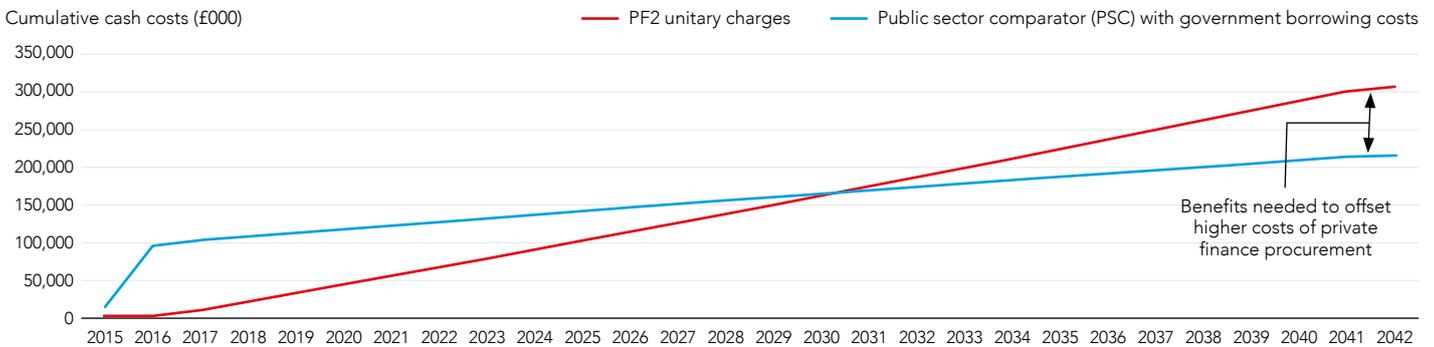
finance costs by 40% over the life of an infrastructure project. The broader benefits of private finance, for example transferring risk away from government, must therefore outweigh the higher total life-cycle cost of private capital.

Off balance sheet liabilities in public sector accounting

The UK is not alone in making use of private finance to provide the upfront capital for public infrastructure. The accounting rules set by the European System of Accounts excludes liabilities from public sector balance sheets if the private sector bears most of the project’s risks and rewards. The types of risk contributing to this test include construction risks (eg cost and time overruns) and demand risks (eg forecasted and actual use of the infrastructure asset) (Atkins et al. 2017). Liabilities not included

FIGURE 4.6: Estimated cash flows of a privately and publicly financed project

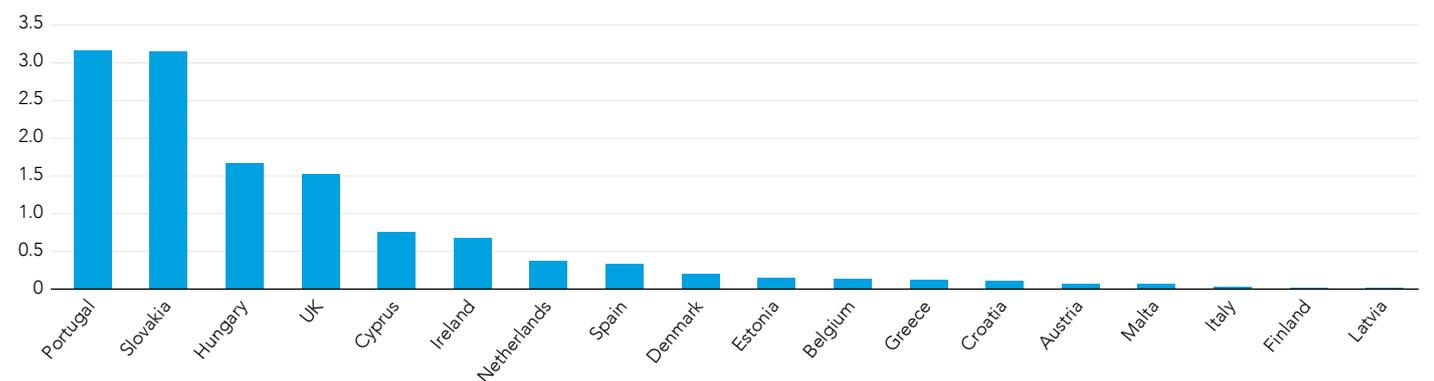
The cumulative cash costs of a group of PF2 schools are around forty per cent higher than the costs of a project financed by government borrowing



- Notes
- 1 Cost estimates taken from data prepared by the Department for Education to compare costs of a group of privately financed (PF2) schools with a public sector comparator (PSC).
 - 2 Interest costs for the PSC have been modelled using an amortising loan with an interest rate of 2.5%. The 20-year government borrowing costs were 2.5% at the time of financial close of this project and the average life of the project debt was less than 20 years.

Source: Education Funding Agency; National Audit Office analysis. Reproduced from Morse 2018.

FIGURE 4.7: Off balance sheet PPPs as % of GDP



Source: ACCA and CPA Canada analysis of Eurostat 2018

Accountants in the public sector must play a critical role in managing both these benefits, while also collecting reliable data to measure whether private finance provides good value for money.

on the public sector balance sheet are known as off balance sheet (OBS) liabilities. Data from Eurostat shows that other European countries have amassed considerable OBS liabilities – with outliers such as Portugal and Slovakia maintaining OBS liabilities in excess of 3% of GDP (Eurostat 2018).

An incentive for using private finance can arise through the combination of fiscal rules, such as the EU's Fiscal Compact requiring governments to meet debt reduction targets (European Commission 2017), and the ability to keep certain liabilities off the balance sheet through private finance. Governments will be encouraged to use private finance, even when it ultimately costs more than traditional public finance, when this generates the fiscal illusion of adhering to fiscal rules while at the same time building and operating necessary infrastructure. In addition to the fiscal illusion, these treatments limit the transparency of infrastructure finance by shielding some politicians and the public from understanding the true cost of infrastructure investment in a particular country.

Insufficient flexibility between capital and operational budgets can cause further challenges. This is particularly the case where a public sector entity can attribute the unitary charge⁹ from a private finance deal to its operational budgets, in cases where the capital budget includes insufficient funding for a required project. By the nature of the public sector, there are many competing short-term needs for public capital investment, where necessary infrastructure investment must compete with other public spending priorities – such as the growing operational costs of health care and education. But over time, high unitary charges can crowd out operational budgets and prevent future governments from providing quality public services.

Why use private finance for public infrastructure?

Given all these concerns, it is unsurprising that in the October 2018 Budget Speech the UK Chancellor confirmed that the government would not sign any new Private Finance Initiative (PFI) contracts (Plimmer 2018). Given this environment, it is worth asking: *what is the genuine rationale for private finance in public infrastructure?*

Two key benefits can justify the use of private finance for public infrastructure: the appropriate transfer of risk from the public to the private sector in the building and running of the infrastructure; and efficiencies achieved through the use of private sector money in the financing, building and operation of public infrastructure. Accountants in the public sector must play a critical role in managing both these benefits, while also collecting reliable data to measure whether private finance provides good value for money. The next chapter explores findings from the member survey on how best to manage the relationship between public and private actors involved in infrastructure projects.

At the early stages of a project's conception, accountants are also critical in selecting the right type of finance, where they can provide a transparent assessment of the best finance option based on sound principles (eg value for money, affordability for users and distribution impacts). Previous ACCA research shows the high level of trust in the ethical behaviour of accountants. Ethics and Trust in a Digital Age (ACCA 2017) found that 9 in 10 professional accountants agree that ethical behaviour helps to build trust in the digital age. And almost all C-suite executives (95%) assert that the accountant's ethical behaviour helps the organisation build trust with internal and external stakeholders. Accountants can offer a collective good through this privileged position of trust by providing sound, transparent advice on the best finance option for a particular infrastructure project.

⁹ The recurring payments by governments for privately financed projects.

The barrier to attracting private finance for infrastructure most cited in the member survey was that governments have insufficient skill to negotiate effectively with the private sector (45%).

4.5 BREAKING DOWN BARRIER 3 BY PROFESSIONALISING THE PUBLIC SECTOR FINANCE FUNCTION

The barrier to attracting private finance for infrastructure most cited in the member survey was that governments have insufficient skill to negotiate effectively with the private sector (45%). This issue was echoed in the roundtables, with participants in Trinidad and Tobago stating that there was a clear need to differentiate professional accountants from those who had no real professional training: *‘terms are used very loosely in this country as to an accountant and most times you would mean “bookkeeper”’*. Others in Malaysia noted that *‘many accountants nowadays lack the right specialisation of skills, in terms of having foresight to anticipate what costs...come into play [in an infrastructure project]’*. Clearly, there are skills gaps in government that need to be addressed through professionalisation and upskilling, if infrastructure is to be properly financed.

Finance professionals offer a net wealth perspective

Knowing what the country owns and what it owes is a basic requirement for reducing its government’s information deficits, which will allow for improved decision-making in financing infrastructure. The professional management of assets and the development of an asset register are two examples of how accountants can take the lead in improving government decision-making. In the UK roundtable discussion, David Smith, associate partner at EY UK, also acknowledged the essential role of accounting standards

‘Accountants’ work now goes beyond compliance, but compliance is our firm foundation. Speaking from experience, we have global accounting rules that do not necessarily align jurisdiction by jurisdiction, but the rules are there for a reason. If there’s deviation or rejection of accounting standards for infrastructure projects at any stage, then that is a clear red flag’.

Global studies are documenting how the benefits of accrual accounting are leading to broad global adoption. For example, the 2018 International Public Sector Financial Accountability Index forecasts that, within the next five years, 65% of governments will report on an accrual accounting basis – with particularly high levels of adoption in Africa, Asia, Latin America and the Caribbean (IFAC and CIPFA 2018).

The professionalisation of the finance function is essential in maximising the value of a country’s assets. There is growing recognition that gold-standard public finance practice takes account of more than debt stocks and cash flows (eg debt to GDP and tax receipts) and instead needs to consider net wealth, where the right policies can maximise the return on public assets. This approach requires the adoption of full accrual accounting and the production of a public sector balance sheet. Improving the skills available to government to develop a public sector balance sheet, and appreciating the full balance sheet impact of a new project, will be an important step in allowing public sector accountants to act as competent clients of, and negotiators with, the private sector.

The professionalisation of the finance function is essential in maximising the value of a country's assets.

The adoption of this net wealth perspective changes the typical rankings of public financial capability. In late 2018, the IMF Fiscal Monitor published a report (IMF 2018) which estimated that, globally, governments had public assets worth over 200% of GDP. Applying this analysis can also support good public financial management in a country, with the IMF report showing that countries with a strong balance sheet pay lower interest on debt and have shorter and shallower recessions.

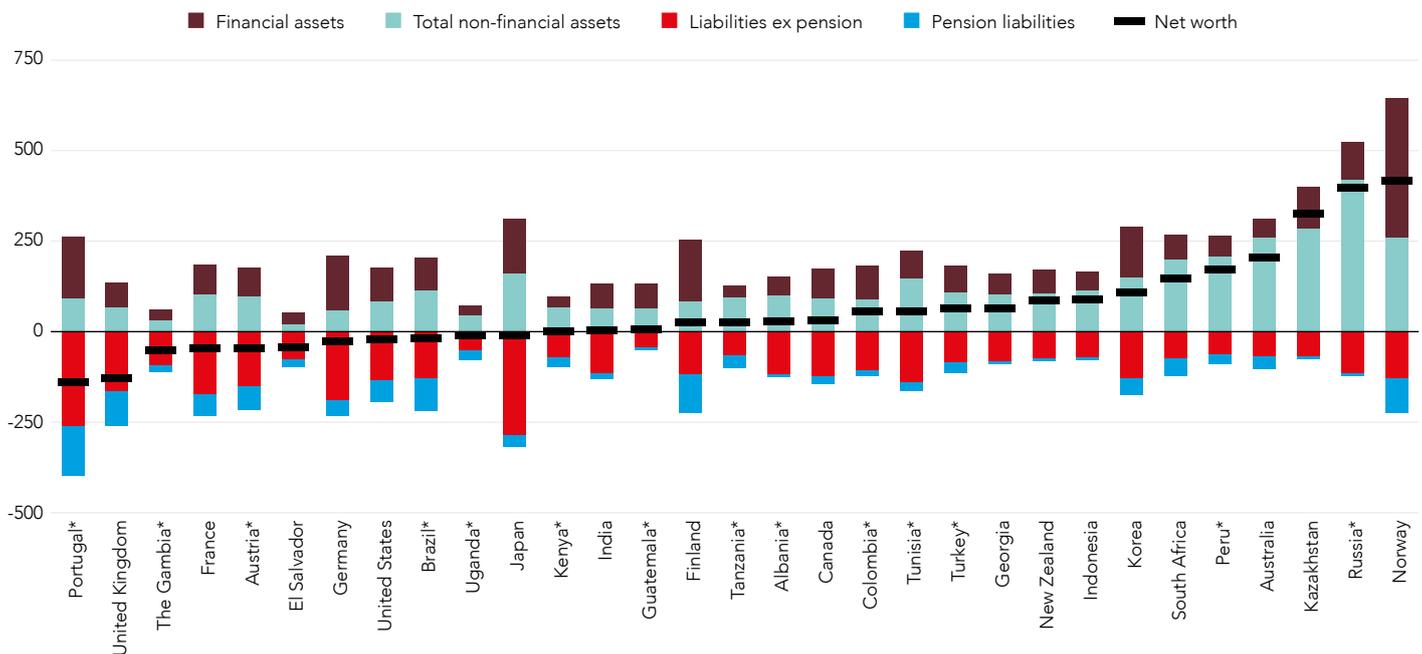
Figure 4.8 shows the result of adopting a net wealth view of a nation's financial position. Using this lens, Japan – with a notoriously high public-debt-to-GDP ratio – has a net wealth position near zero. Other countries, such as the UK and Portugal, have substantial negative public equity in excess of 100% of GDP.

Maximising the value of public assets and the intertemporal balance sheet

Dag Detter, a former director of Sweden's Ministry of Industry, argues that taking a net wealth perspective with the aim of producing small improvements in the return on public assets would allow for a doubling in infrastructure investment (Detter and Folster 2017). The competing argument to this view is that many public assets are not marketable, as policy objectives (eg running a public school) do not typically align with generating financial returns.

The New Zealand government seeks to address this issue by classifying its assets and liabilities as social, financial and commercial – where commercial assets have more scope for financial returns. New Zealand has taken the lead in public

FIGURE 4.8: Public sector balance sheets (% of GDP)



Source: IMF staff estimates.

*Based on a single year of data, in most cases compiled as part of the Fiscal Transparency Evaluation: Albania, 2013; Austria, 2015; Brazil, 2014; Colombia, 2016; The Gambia, 2016; Guatemala, 2014; Kenya, 2013; Peru, 2013; Portugal, 2012; Tanzania, 2014; Tunisia, 2013; Turkey, 2013; Uganda, 2015.

Where public assets do present commercial opportunity, accountants must be at the forefront of proper public commercial asset management.

financial management practices, not just through this classification, but also by producing an intertemporal balance sheet (see Table 4.1). The country currently maintains a strong net worth position in excess of 40% of GDP, but analysis by the New Zealand Treasury shows that the current policy framework will produce recurring deficits that are forecasted to reduce the nation’s net worth to almost –57% of GDP over the next 40 years. Accountants producing this analysis provide decisions-makers with a better long-term view of their policy decisions and can help improve the sustainability of public finances. This fits with the maxim that ‘you manage what you measure’ and governments that invest in their finance functions to develop a public sector balance sheet will be better placed to understand the implications of a particular infrastructure project on the nation’s net wealth.

If the public sector finance function is professionalised, accountants working in the public sector will be able to lead the development of the required governance structures to maximise the value of public assets. And where public assets do present commercial opportunity, accountants must be at the forefront of proper public commercial asset management. By providing independent professional management for public assets, governments will be well placed to maximise the value of their assets and minimise the cost of liabilities. The member survey shows that reducing political influence in project selection was ranked as the number one issue for improving outcomes. Allocating more decision-making authority to independent, professional accountants will be an important step in the effective commercial management of public assets.

TABLE 4.1: New Zealand: Intertemporal balance sheet, 2016
(Percentage of GDP)

	ASSETS	LIABILITIES	NET WORTH
Social	57.5	7.1	50.5
Financial	33.2	50.5	-17.3
Commercial	20.1	12.0	8.1
Static balance sheet	110.8	69.5	41.3
Fiscal	1,381.9	1,480.0	-98.1
Intertemporal balance sheet	1,492.7	1,549.5	-56.8

Source: New Zealand 2017 Investment Statement; IMF 2018



Box 4.2: New South Wales Treasury, Asset and Liability Committee

The state of New South Wales in Australia has established an Asset and Liability Committee to maximise the value of their assets and properly manage the state’s liabilities.

By using this total balance sheet perspective, the New South Wales Treasury has been able to unlock AU\$33bn for new social and economic infrastructure projects.

This initiative was recorded as part of a series undertaken by ACCA and the International Federation of Accountants (IFAC), documenting good practices in public financial management from around the world. To learn more, scan the QR code to hear more about this initiative in NSW.





5. Delivering projects: the public-private relationship

Common challenges with infrastructure project selection and financing outlined in the previous chapters may persist through the project delivery phase: a shortfall in public capital budgets due to short-term decision-making, changing political governance, and the ‘mega’ risks associated with ‘mega’ projects. For these reasons, public-private partnerships (PPPs) are often chosen for the delivery of public infrastructure projects.

5.1 DEFINING PPP

In the context of public infrastructure projects, a PPP is a contractual agreement between a public sector entity and a private entity (or group) to provide a public asset or service (World Bank 2018b). Unlike traditional procurement – where all the risk will ultimately sit with the government – PPPs will explicitly set out the allocation of risk for a project. Importantly, the scope of private sector involvement can vary substantially, including requiring private sector partners to:

- design and build a project
- design, finance and build a project, or
- design, finance, build, operate and maintain a project.

Asset ownership is another relevant consideration in establishing the terms of a PPP. A project can feature public or private sector ownership of the infrastructure, and can include provisions to transfer ownership after a set period (eg a private sector partner operates a toll road for 20 years and thereafter transfers ownership of the road back to the public sector).

The roundtable discussion rightly identified the variety of responsibilities that the private sector can adopt in

a PPP. For example, a participant in the Canadian roundtable identified that the ‘private sector needs to bring more to the government table than just money; it needs to offer expertise or opportunity that the government would not otherwise have’.

5.2 KEY BARRIERS TO GETTING THE PPP RELATIONSHIP ‘RIGHT’

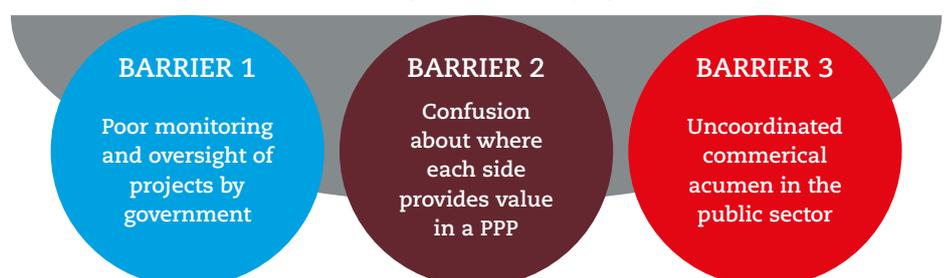
The public-private relationship is evolving, and getting the terms of this relationship right will be critical for the provision of social and economic infrastructure in the future. The roundtable discussions with infrastructure experts highlighted three key barriers to this, where there was a particular focus on the need to develop the right relationship between public and private sector actors – as getting this

relationship right would support the timely and efficient delivery of infrastructure projects (Figure 5.1).

The roundtable participants identified poor monitoring and oversight by government as a key challenge in delivering infrastructure projects. The member survey demonstrated that there was considerable disagreement about where each party in a PPP agreement provides value in delivery. Finally, the roundtable participants stated that the public sector was often lacking the commercial acumen required to manage an infrastructure PPP effectively.

Below, this chapter examines these barriers in greater detail and reviews recommendations for overcoming each one.

FIGURE 5.1: Key barriers in delivering infrastructure projects



Both developed and developing countries need to consider whether they are providing sufficient monitoring across the entire project life cycle to maximise the value of their contracts.

5.3 BREAKING DOWN BARRIER 1 BY ENGAGING THE PROFESSIONAL ACCOUNTANT TO PROVIDE PROJECT LIFE-CYCLE MONITORING AND OVERSIGHT

Successful project selection, financing and procurement will be of little effect if an infrastructure PPP suffers from poor contract management. Managing project risk effectively – as well as controlling for scope and budget ‘creep’ – requires the public sector to act as a competent client by providing effective monitoring and oversight of a project at every stage, from design to operation of the infrastructure.

Unfortunately, these governance structures are often lacking in many countries, with a participant in the Sri Lankan roundtable discussion noting that ‘projects [will] kick off, but there is no one to monitor them on an ongoing basis. This can lead to cost overruns’. Written evidence by the Chartered Institute of Purchasing and Supply (2013) to the UK House of Commons’ Public Administration Select Committee echoed this point. In this evidence, the Institute submitted that: ‘procurement skills tend to focus on the call for competition to award the contract rather than on the whole procurement cycle which includes pre-procurement and contract/supplier management’. Both developed and developing countries need to consider whether they are providing sufficient monitoring across the entire project life cycle to maximise the value of their contracts.

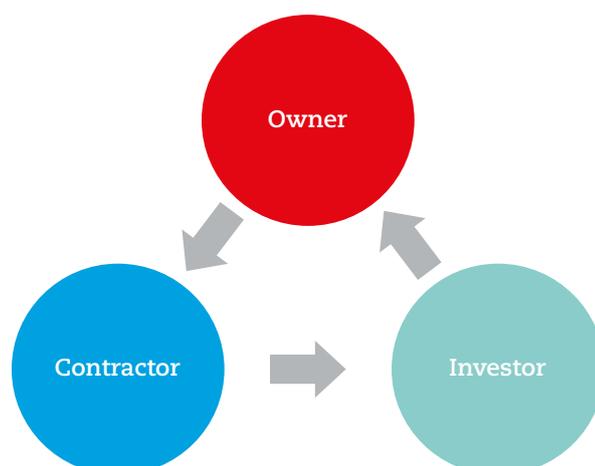
Chapter 1, section 1.5, showed that corruption was one of the top barriers to meeting infrastructure need in certain

regions – with 89% of survey respondents in South Asia citing this as a key barrier. A roundtable participant in Trinidad and Tobago asserted that proper monitoring of project performance was essential for mitigating corruption, particularly ‘having something that can support the accountants in countries with no whistle-blowing policy’. In addition, Abiodun Akanbi from the Nigerian roundtable commented that ‘the accountant has huge responsibility in measuring the actual performance of contractors to be able [to] efficiently deliver infrastructure’. The accountant needs to be at the forefront of providing the public sector assurance that the project is being delivered as contracted and according to the project plan. Clearly, accountants in the public sector have a critical role to play in effective contract management – particularly by measuring project progress against agreed terms at key milestones in the delivery process.

Reducing moral hazard in the PPP relationship

Eriksson and Lind (2015) describe moral hazard as ‘post-contractual opportunism’. There are three key parties that need to be considered in an infrastructure PPP: the owner, the contractors building the infrastructure, and the investor. Depending on the structure of the PPP contract any of these roles could be taken on, to varying degrees, by the government or a private partner. Given the limited oversight and governance of many PPPs cited in the roundtable discussions, the agents of a PPP project (ie the contractors) will often have the incentive to reduce costs by cutting corners in the project’s execution.

FIGURE 5.2: Possible parties to a PPP



Comparing the results from each sector in Figure 5.3 shows that there was broad agreement on how the private sector adds value to infrastructure projects.

These three stakeholders, shown in Figure 5.2, will often have different motivations. For example, the owner might want to increase the scope of the contract after it is agreed. For this reason, accountants must assess the risks, balance the costs and schedule, and proactively communicate with all stakeholders to support the success of the project.

Allocating risk to reduce moral hazard

A CPA Canada roundtable participant rightly identified that ‘the key areas of interface [between the public and private sector] are between the risks retained by the public sector and their impact on the private sector’s ability to deliver on their contractual commitments’. Getting this allocation of risk right can significantly improve the prospects that a PPP project will be completed on time and on budget, as the right risk balance will act as an incentive to meet contractual obligations (Mann 2018).

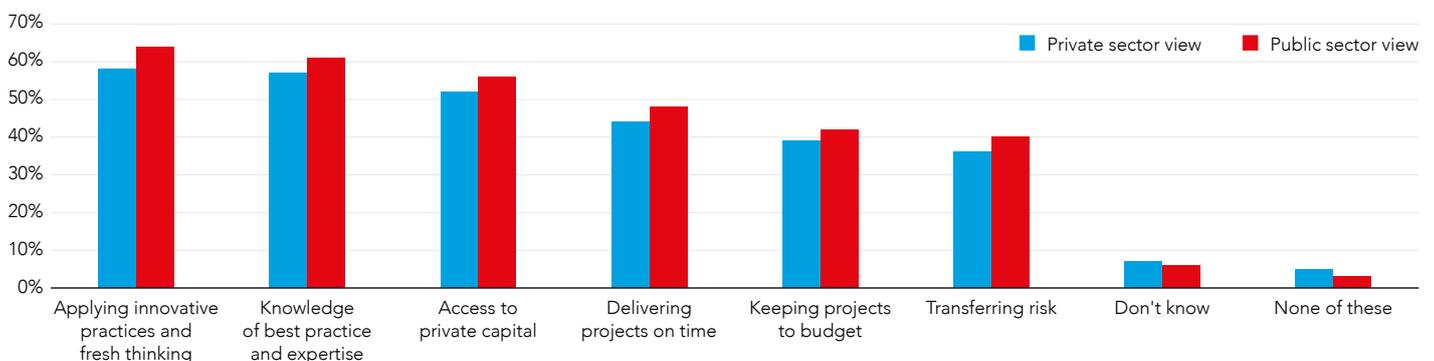
Accountants play a clear role here. The professional team delivering a project will be aided by an accountant’s expertise of risk management – particularly the accountant’s ability to allocate risk appropriately between the parties in order to minimise moral hazard. Although the size and nature of the public sector suggests that it is better placed to bear risk, skilled finance professionals will seek to balance the allocation of risks to the private parties such that they maintain the incentive to perform contractual obligations to a high quality standard.

5.4 BREAKING DOWN BARRIER 2 BY IMPROVING THE INCENTIVES AND RECONCILING DIFFERING VALUE ASSUMPTIONS

The member survey compared the perceptions of public and private sector accountants, revealing areas where differing assumptions exist between these parties. The survey divided respondents into those working in the public sector and those in the private sector. Each group was asked in what ways the other sector *provided* and *received* value in PPP infrastructure projects. Comparing these results demonstrates where the public and private sectors had a similar view on the purpose of a PPP relationship and where their assumptions on the purpose of the relationship differed (Figure 5.3). These insights are helpful in highlighting divergent views on the role of each sector, where incorrect assumptions can harm the ability of a PPP to deliver a project.

Comparing the results from each sector in Figure 5.3 shows that there was broad agreement on how the private sector adds value to infrastructure projects. The ordering of the responses was the same for professionals across the two sectors, with the majority of respondents from both sides agreeing that the private sector contributes to the partnership through its knowledge of best practice, the application of innovation, and access to private capital. Interestingly, respondents from both sectors were less likely to see risk transfer as an area where the private sector provides value. The

FIGURE 5.3: Where does the private sector add value in delivering infrastructure?



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

There was considerable divergence in opinion between sector respondents as to the areas where the public sector provided value in an infrastructure PPP (Figure 5.4).

comparison of perceptions also showed that public sector respondents were slightly more positive about the overall value that private sector actors bring to the relationship.

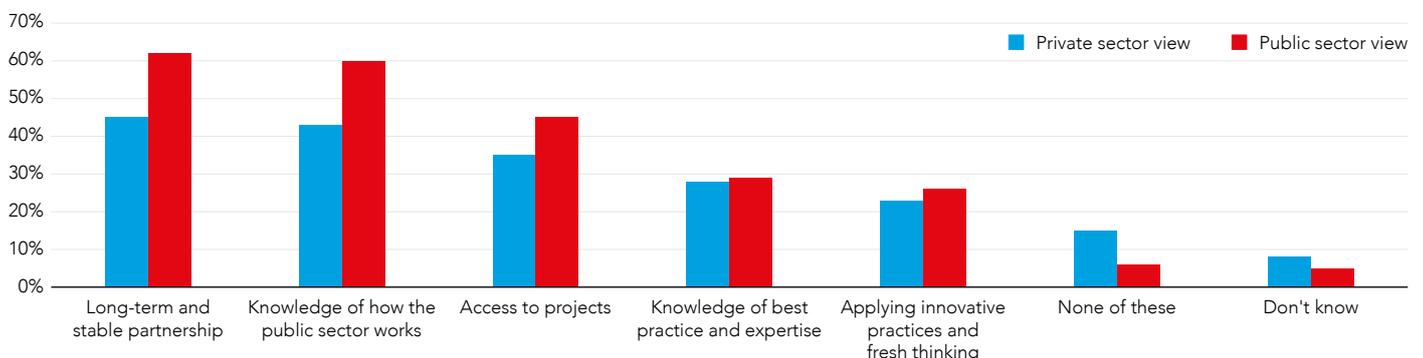
There was considerable divergence in opinion between sector respondents as to the areas where the public sector provided value in an infrastructure PPP (Figure 5.4).

Public sector respondents were much more likely to argue that they provided both a 'long-term and stable partnership' (62%) and knowledge of how the public sector works (60%), than their private sector colleagues (45% and 43%, respectively). Finance professionals from the public sector were also more likely to claim that they provided the private sector with access to projects (45%), compared with 35% in the private sector. At the same time, there was an agreement that the public sector was less likely to offer knowledge of best practice and innovation to a PPP relationship. Therefore, both sides took a largely similar view of the origin of knowledge and expertise, but the public sector respondents were more optimistic about the value they provided as a financial partner in infrastructure projects. Understanding this divergence of viewpoint is helpful in identifying the

assumptions about how each party adds value to an infrastructure PPP contract – and suggests that public sector actors overestimate the value of the financial arrangements on offer to private sector partners.

The UK Guarantees Scheme (UKGS) offers an example of a good practice that could help improve the private sector incentive for entering PPPs, and partially reconciles the differing assumptions of value between both sectors. The UK Infrastructure and Projects Authority states that the UKGS: 'supports private investment in UK infrastructure projects. It works by offering a government-backed guarantee to help infrastructure projects access debt finance where they have been unable to raise finance in the financial markets. The UKGS can issue up to £40 billion of guarantees and is open to at least 2026' (UK Government 2017). This long-term commitment guarantees the payment of principal and interest on infrastructure debt and is intended to support 'nationally significant' projects. If well implemented, schemes like this can encourage additional private sector involvement in the provision of infrastructure – but should be balanced against the need to reduce the risk of moral hazard discussed earlier in this chapter.

FIGURE 5.4: Where does the private sector receive value from the public sector in delivering infrastructure?



Source: The Global Infrastructure Gap survey; all respondents; n: 3,611

To ensure that an infrastructure project is successful, strong commercial acumen is essential; team members require ‘business savvy’: a keen understanding of the market in which the project is being undertaken.

5.5 BREAKING DOWN BARRIER 3 BY FACILITATING PUBLIC SECTOR ACCESS TO BUSINESS EXPERTISE

To ensure that an infrastructure project is successful, strong commercial acumen is essential; team members require ‘business savvy’: a keen understanding of the market in which the project is being undertaken. Nonetheless, as Ajith Lekshmanan, a participant in the UK roundtable, pointed out:

‘For a lot of these projects the [public sector] organisation may just be doing it the one time. It’s a one-off; and these experts that we are going to [in the private sector], they’ve got a whole pool of people doing similar things year after year, day after day in this country and other countries. The skills required are quite specialist and to train a member of staff [in the public sector] to do it just for the one time that you might be using it, is not cost effective’.

A public sector entity might manage a large-scale infrastructure project and gain valuable expertise in the process but that expertise may not be accessible to other public sector entities for leveraging in their own infrastructure projects. In the public sector, project-delivery expertise thus exists in silos. It is often the private partners in a PPP who, through repeated projects, acquire the commercial acumen and therefore potentially hold the expert ‘reins’.

Centralisation of public sector skills may facilitate removal of this barrier. For example, the UK Civil Service has created Centres of Excellence that seek to pool the pockets of expertise that exist in the public sector, such that any organisation within the public sector can refer to these centres and draw on their specialist skill and thus act as a competent client. The professional accountant offers specialist skill and should certainly be a key player in any centre of excellence. In fact, the accountant’s role as an expert team member in such centres may provide, as stated by a participant in the Malaysian round table, “better marketing of how the profession contributes to society, to encourage professionals to continue doing the right thing and be proud of it.”

Centralisation of skills will not, however be the answer for all governments. Others might seek to encourage cross-department/ministry collaboration to facilitate effective knowledge transfer of commercial acumen across the public sector. In both cases, collaboration is essential for effective knowledge transfer, and as previously outlined, the professional accountant, with an understanding of life-cycle considerations and with professional frameworks for sound professional judgement and ethics, is well-equipped to coordinate such collaboration.



6. The role of the accountant in bridging the gap

6.1 CURRENT INFRASTRUCTURE PROJECTS: THE MISSING TEAM MEMBER

The successful provision of public infrastructure requires governments to have the right professional team in place. And yet, a clear message resounded from the international roundtable discussions: a key player is often missing from the infrastructure project team – the accountant. A representative at the Malaysian roundtable echoed the sentiment expressed by other participants worldwide: that accountants are often only invited to comment on infrastructure projects that have already been selected, ‘So, the harm has been done’.

As pointed out by a participant in the UK roundtable, the role of the accountant has evolved over the years from a focus on ‘guidelines, parameters, tick boxes, and flowcharts’ to a much ‘wider awareness’. Certainly, the fact that accountants around the globe work within diverse segments of the economy and serve in key roles such as CEO and CFO, and as consultants attests to that ‘wider awareness’. The role of the accountant is at the centre of the planning process, and not only in the areas of infrastructure policy. The accountant can put the ‘numbers’ on ideas and concepts, by applying consistent methodology to ensure they are evaluated against other options for meeting policy goals.

Future infrastructure projects: the essential team member

The previous chapters examined the barriers associated with three fundamental phases of infrastructure projects: project selection, project financing, and project delivery. With modern qualifications that facilitate barrier removal in each of these phases, the accountant plays an essential role in bridging the global infrastructure gap.

The international roundtable participants highlighted the following core competencies.

a) Planning and selection of projects

The accountant:

- develops strategy, identifies goals/objectives and ensures they can be achieved (giving consideration to financial constraints and potential monetary gains)
- sets frameworks and uses standard assessment tools, to ensure accountability and transparency, and prioritisation according to evidence of need
- questions project assumptions and assesses alternative scenarios
- employs mechanisms to ensure ethical behaviour and to eliminate corruption, while offering sound risk assessment

- supports organisations’ holistic decision-making in a way that accounts for the impact of climate change on strategy, risk, and operational and financial performance, thus enhancing organisational resilience.

b) Financing projects

The accountant:

- considers sustainable finance options, including climate-change adaptation and resiliency needs
- assesses financial viability and identifies long-term impact and strategies for risk mitigation
- acts as a visionary, by providing sound life-cycle advice to decision makers and giving them better understanding of the long-term financial difference between maintaining services and enhancing services, and of how the latter can create greater cost pressures over time
- supports clearer and more objective public discourse, increases public awareness of risks, and supports taxpayers’ better understanding of the value of projects.

c) Delivering projects and oversight

The accountant:

- implements the required monitoring and oversight

Accountants offer important competencies to any business team in any sector. But in the face of possible misconceptions of the role of accountants, what is the way forward onto the professional infrastructure team?

- allocates project risk between parties of a PPP to reduce moral hazard
- is supported by several frameworks (eg ICAS 2012; KPMG 2013) for professional judgement and ethics that promote the use of logic, flexibility, consistency, reliability, relevant evidence, unbiased information, and alternative framing to avoid precipitous decisions; and that promote a balance of experience, knowledge and emotion.

6.2 NEXT STEPS TOWARD THE INFRASTRUCTURE TEAM

Accountants offer important competencies to any business team in any sector. But in the face of possible misconceptions of the role of accountants, what is the way forward onto the professional infrastructure team? The international roundtable participants made the following recommendations.

- Increase awareness of the accountant's qualifications as a strategic business adviser and as an essential member of the professional infrastructure team, alongside the engineers and architects.
- Equip accountants to voice arguments that are compelling both to political leaders and to the general public.
- Offer elected officials the opportunity to gain financial training from accountants so that they understand the true costs and are better equipped to act as financial ambassadors.
- Establish an accountant-informed certification process for project selection.
- Develop and implement clearer governance structures and decision-making processes that involve the finance function.
- Institute whistle-blowing protection legislation for accountants internationally.



7. Recommendations based on observed good practice

To tackle the growing global infrastructure gap, this report offers a variety of observations and international good practices. Below is a summary of the recommendations arising from the report's analysis, demonstrating the variety of functions and actions in which accountants can lead to help close the infrastructure gap.

7.1 SELECTING PROJECTS

Chapter 3 demonstrated that the lack of standard assessment tools and ineffective political decision-making hampered project selection. To help address these challenges, some countries establish expert-led bodies to forecast infrastructure need and make recommendations to government as to which projects to build. Governments should also balance maintenance and new infrastructure spending by disaggregating expenditure on maintenance and new projects, while prioritising the backlog of maintenance to ensure that assets remain in serviceable condition.

To improve decision-making further, accountants should collect better data on the service potential of existing infrastructure, as well as the performance of past projects. Together, these data will allow accountants to offer new insights to inform the project selection process. To reduce the bias towards large projects over maintenance, governments should disaggregate expenditure on infrastructure to report both maintenance and new project spend.

This report found that there is no standard project selection process for infrastructure projects used by governments around the world and that the underlying need – or service gap – is not well established or proven. Therefore, accountants must take the lead in applying selection standards, such as the Project Management Body of Knowledge (Project Management Institute 2017) guide and the World Bank's Investment Project Financing (World Bank 2016) policy, to structure decision-making better and move beyond short-term thinking and biases.

There is also a growing need to build climate change risk into long-term planning and the decision-making on project selection. The Montreal, Canada case example (see Chapter 3, Box 3.2) shows how accountants should produce cost-benefit analysis and business cases to embed adaptation and resilience into municipal infrastructure decisions.

In summary, governments should:

1. Establish expert-led bodies to forecast infrastructure requirements and recommend projects on the basis of need.
2. Collect reliable data on the service potential of existing infrastructure and on the performance of past projects.
3. Disaggregate expenditure on infrastructure to report both maintenance and new project spend.

Accountants should:

4. Take the lead in applying standard selection tools to determine the need for, and priority of, a project.
5. Advise on the distributional impact, and regional growth outcomes, of selecting particular projects; good practice in this area can be found in Japan.
6. Embed adaptation and resilience into the project-selection process.

Governments should direct supreme audit institutions to monitor the interaction of off balance sheet liabilities and fiscal targets.

7.2 FINANCING INFRASTRUCTURE PROJECTS

Chapter 4, on financing infrastructure, highlights three key barriers: closing the funding gap, accounting for the higher cost of private capital, and the need to professionalise the public sector finance function.

This report identifies emerging and good practices from around the world that help reduce the funding gap. Decision-makers should consider innovative solutions to closing the funding gap, such as a value capture and civic crowdfunding. For example, the MTR Corporation in Hong Kong demonstrates that implementing a transport model that captures the positive externalities of new transit can make some public infrastructure self-funding (see Box 4.1).

To ensure value for money in infrastructure policy, accountants must advise public sector decision-makers on how to make efficient capital allocations. A real challenge in this respect is the interaction of fiscal targets and off balance sheet (OBS) liabilities. Chapter 4 showed that some countries, such as Portugal and the UK, have accumulated significant OBS liabilities. Therefore, countries' supreme audit institutions should monitor the interaction of OBS liabilities and fiscal targets. At the same time, finance officials in government should advocate a more holistic approach to maintaining fiscal discipline, beyond a few top-line indicators such as debt to GDP or public sector net borrowing.

To improve the efficient allocation of public funds, long-term infrastructure plans should be aligned with the annual budget process that sets out capital and operating budgets. Effective capital budgeting can improve public finances, such that departments or ministries do not need to rely on flexibility of unitary charges to meet infrastructure needs.

Many national accounts operating on a cash basis treat investment in public infrastructure as a cost, instead of recognising a new asset on the public sector's balance sheet. Governments should adopt full accrual accounting and maintain a public sector balance sheet. Public sector accountants should also conduct a balance sheet review to maximise the value of public sector

assets. Officials in New South Wales, Australia were able to unlock an additional AUS\$33bn to invest in public infrastructure by adopting a total balance sheet perspective (see Chapter 4, Box 4.2). Accountants should disaggregate public assets in the balance sheet to include commercial, social and financial assets. This information will be especially effective for identifying underused commercial assets, but it is also important to be aware of overall value for money for citizens when selling an asset (eg selling a public asset that was previously free to use, but will now attract a user charge imposed by the private sector owner).

New Zealand has taken the lead in public financial management practices, not just through the adoption of accrual accounting, but because their public sector accountants produce an intertemporal balance sheet (see Chapter 4, Table 4.1) (Government of New Zealand 2018). Accountants producing this analysis provide decisions-makers with a better long-term view of their policy decisions and can help improve the sustainability of public finances.

In summary, governments should:

7. Consider innovative solutions for closing the funding gap, such as a value capture, civic crowdfunding and other revenue funding schemes.
8. Direct supreme audit institutions to monitor the interaction of off balance sheet liabilities and fiscal targets in order to improve the efficient allocation of public sector funds.
9. Align long-term infrastructure plans with the annual budget process, in order to minimise the use of higher-cost private finance to achieve capital budget flexibility.
10. Adopt full accrual accounting and maintain a public sector balance sheet to support decision-making on infrastructure policy.

Accountants should:

11. Advocate a more holistic approach to maintaining fiscal discipline to avoid poor financial decisions driven by 'fiscal illusions'.
12. Conduct a balance sheet review to maximise the value of public sector assets.

Professional bodies can also contribute to the improvements in public sector expertise by facilitating knowledge transfer between the public and private sector through thought-leadership events and roundtable discussions.

13. Produce an intertemporal balance sheet to improve long-term decision-making and support the sustainability of public finances, as is done, for example, in New Zealand
14. Produce disaggregated assets in the balance sheet, to include commercial, social and financial assets – in order to improve the return on public assets.

7.3 DELIVERING INFRASTRUCTURE PROJECTS AND THE PUBLIC-PRIVATE RELATIONSHIP

Chapter 5 highlights three key barriers to implementing infrastructure projects: poor monitoring and oversight of projects by government; confusion as to where each side provides value in a PPP; and lack of commercial acumen in the public sector.

To address these barriers and successfully deliver infrastructure projects, governments need to look to accountants to implement the necessary monitoring and oversight of their PPP relationships. There is also a clear need for effective mechanisms for reducing corruption, which was cited as a key action in the member survey. The implementation of effective whistle-blowing legislation and the professionalisation of the public sector finance function will allow public servants to challenge unethical behaviour that can derail infrastructure projects.

Chapter 6 demonstrated that moral hazard can limit the probability that infrastructure PPPs will be completed on time, on budget, and to an acceptable level of quality. The allocation of risk between the partners in a PPP can play a central role in reducing this moral hazard by putting the right incentives in place for the contractor. Therefore, professional teams delivering infrastructure should rely on an accountant's expertise of risk management to minimise moral hazard, by allocating risks fairly between the parties.

Public sector negotiators should reflect on the assumptions identified in the member survey and consider that private finance professionals were less likely than their public sector counterparts to view the public sector as a stable partner or as a sector that provided access to long-term projects. To mitigate this mismatch, governments should consider introducing guarantee schemes for nationally

significant infrastructure projects in order to encourage additional private sector involvement in the provision of infrastructure.

As a result of the varied commercial acumen in the public sector, governments should consider establishing centres of excellence to coordinate public sector expertise in contract management, so that any organisation within the public sector can draw on that specialist skill when negotiating a PPP contract.

Professional bodies can also contribute to the improvements in public sector expertise by facilitating knowledge transfer between the public and private sector through thought-leadership events and roundtable discussions.

In summary, governments should:

15. Enact effective whistle-blowing legislation and professionalise the public sector finance function to allow public servants to challenge unethical behaviour that can derail infrastructure projects.
16. Establish centres of excellence that coordinate public sector expertise in contract management, which allows any organisation within the public sector to draw on the specialist skill when negotiating a PPP contract.
17. Consider introducing guarantee schemes for nationally significant infrastructure projects in order to encourage additional private sector involvement in infrastructure projects. This will help address the assumptions identified in the member survey, which showed that private finance professionals were less likely to view the public sector as a stable partner.

Accountants should:

18. Implement proper monitoring and oversight for all projects.
19. Advocate embedding themselves in the professional teams delivering infrastructure by highlighting their expertise of risk management.

Professional bodies should:

20. Act as facilitators of knowledge transfer between the public and private sector, through thought-leadership events and roundtables.



Conclusion

The global infrastructure investment gap is set to grow to US\$14 trillion by 2040 and this figure sets the benchmark for meeting the world's infrastructure needs.

In reality, however, the challenge in fulfilling a country's infrastructure need is not achieving a notional investment figure but, rather, establishing a government vision for closing a recognised service gap by either maintaining existing infrastructure assets and or by building new projects.

Currently, governments lack adequate resources and the capability to make systematic infrastructure decisions because they are not able to harness the benefits of the investment and mitigate the significant risks associated with infrastructure project execution. Bringing the accountant to the centre of the decision-making process for infrastructure projects can mitigate these pitfalls. The particular skills and perspective of the finance professional can mean the difference between success and failure, through improvements in project selection, securing financing, delivery and oversight of the projects.

As the next generation of infrastructure projects are planned, financed, built and operated, the accountant must be brought to the centre of the decision-making process. The accountant must be employed across the entire life cycle of future infrastructure projects, as a critical member of the professional team, if the world is to address the global infrastructure gap.

Appendix A:

Detailed methodology for establishing the infrastructure investment gap

This appendix examines the key features of the G20 Global Infrastructure Outlook methodology (GHI and Oxford Economics 2018) in order to summarise how the global, regional and national estimates of the infrastructure gap, used in Chapter 1 of this report, were determined. For a complete understanding of the original work, the Global Infrastructure Outlook report has a comprehensive treatment of the analytical process

A1. DEFINITION OF INFRASTRUCTURE

The Global Infrastructure Outlook report defines infrastructure investment as 'Gross Fixed Capital Formation' (GFCF) by the public and private sectors on fixed, immovable assets that support long-term economic growth' (GHI and Oxford Economics 2018). GFCF is a wider definition of investment than just that for infrastructure and so the calculations included for the purposes of this report exclude land and any moveable assets, such as IT equipment. The definition does, however, include both the development of new assets and spending on the replacement or maintenance of existing assets.

A2. CURRENT INVESTMENT TRENDS

Current investment was calculated for a total of 50 countries using data from multinational data sources such as the OECD or Eurostat, where possible. If the required data was not available from these sources then national statistics were used to create a comparable estimate. Failing that, data was imputed using econometric techniques. The Global Infrastructure Outlook report was completed during 2016 and includes the most up-to-date datasets collected, providing values to 2015, so the forecast years begin at 2016 and continue to 2040. Before 2016 no infrastructure gap was estimated, so the charts in Chapter 1 and Appendix B reflect current trends only to 2016.

For each country and sector the stock of infrastructure per head was calculated and a set of explanatory factors were determined for each sector, eg population density, structure of the economy. These explanatory variables were projected forwards on the basis of national economic and demographic forecasts, to estimate infrastructure investment under current trends for each country.

A3. INVESTMENT NEEDS

The extent to which each country dedicates resources to infrastructure investment was adjusted for the quality of infrastructure using indicators from the World Economic Forum Global Competitiveness Report (Schwab 2018).

The 'quality-adjusted' performance measures were then compared across countries, using the performance of countries at the 75th percentile among those of similar income levels as the benchmark. The investment-need scenario indicated the extent of infrastructure investment, by sector and country, which would be required to meet this benchmark level. Income groups were based on three World Bank definitions: low- and lower-middle income, upper-middle income, and high income. For countries that were already positioned above the 75th percentile (ie the target), the objective in the years ahead is to sustain relatively high levels of investment and maintain their strong performance. As a result, the minimum value for the investment gap is 0% – where those countries in the upper quartile must maintain their performance and their peers' target is to attempt to catch up.

Appendix B:

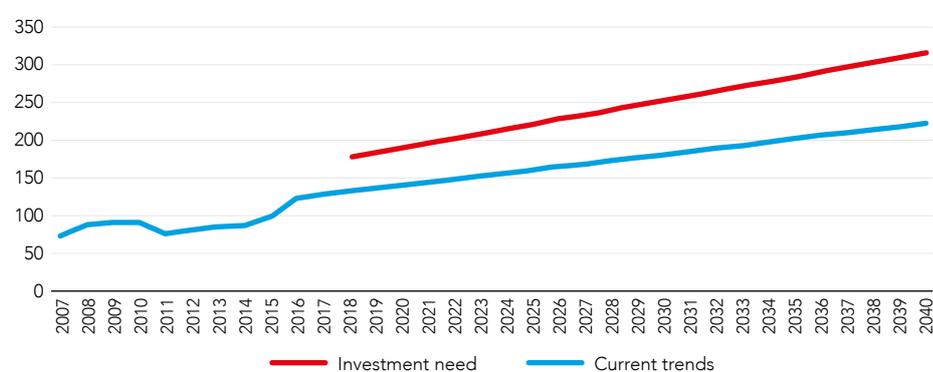
Regional breakdown of the global investment gap and additional service gap analysis

The following account offers a regional breakdown and description of the global infrastructure investment gap, covering Africa, the Americas, Asia, Europe, and Oceania.

B1. AFRICA

In 2018 an estimated US\$132.8bn was spent on infrastructure in Africa. Meanwhile, US\$177.7bn of investment is estimated to be required in the region, putting the infrastructure investment gap at US\$45.5bn. Cumulatively, between 2018 and 2040 the infrastructure investment gap is expected to stand at US\$1.59 trillion, with the amount of infrastructure investment needed expected to be 39% higher than under current trends.

FIGURE B1: Investment need and current trends in Africa, 2015 US\$ billions



Source: GHI and Oxford Economics 2018

TABLE B1: Projected infrastructure investment and gaps among African countries, 2018–40, 2015 prices

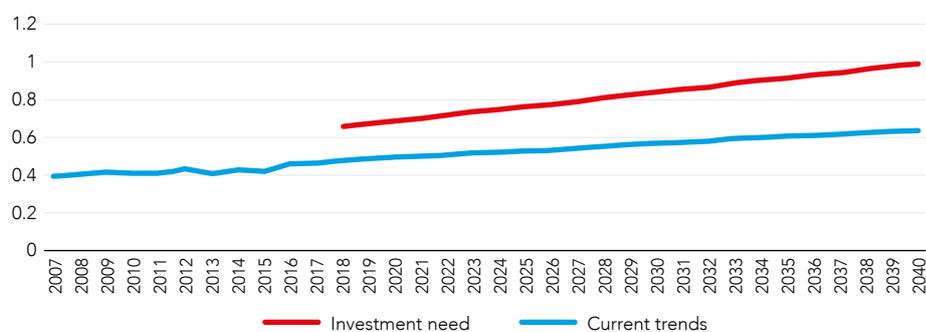
COUNTRY	INFRASTRUCTURE INVESTMENT, USD BILLIONS	INFRASTRUCTURE INVESTMENT GAP, USD BILLIONS	DIFFERENCE BETWEEN INVESTMENT NEED AND INVESTMENT FORECAST
Angola	\$251.4	\$92.0	37%
Benin	\$19.9	\$13.4	67%
Cote d'Ivoire	\$61.4	\$12.9	21%
Egypt	\$418.6	\$218.2	52%
Ethiopia	\$421.5	\$146.7	35%
Ghana	\$68.5	\$42.1	61%
Guinea	\$16.7	\$14.0	84%
Kenya	\$174.2	\$37.1	21%
Morocco	\$196.7	\$34.8	18%
Nigeria	\$616.8	\$210.3	34%
Rwanda	\$29.5	\$9.6	33%
Senegal	\$57.8	\$18.1	31%
South Africa	\$269.6	\$144.2	53%
Tanzania	\$194.3	\$109.5	56%
Tunisia	\$50.2	\$20.6	41%

Source: GHI and Oxford Economics 2018

B2. AMERICAS

In 2018 it was anticipated that an estimated US\$477.1bn would be spent on infrastructure in the Americas. In the same year investment need was forecast to be 38% higher at US\$657.0bn and over the full 2018 to 2040 period the infrastructure investment gap is expected to grow to US\$6.126 trillion. This implies that infrastructure need will be 48% higher than actual investment over the period, given the current trend in the Americas.

FIGURE B2: Investment need and current trends in the America, 2015 US\$ trillions, 2018–40



Source: GHI and Oxford Economics 2018

TABLE B2: Projected infrastructure investment and gaps among nations in the Americas, 2018–40, 2015 prices

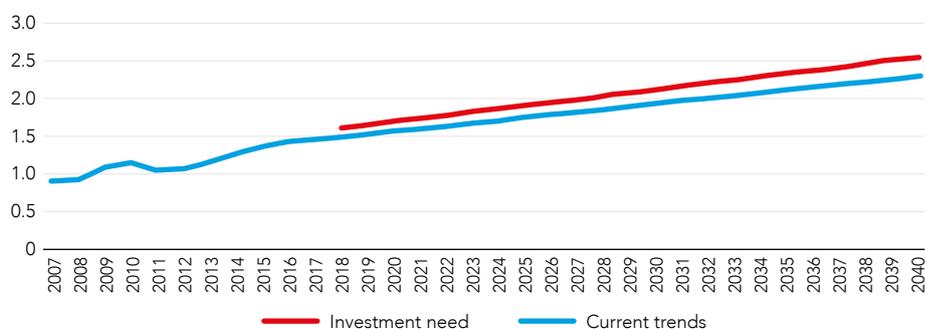
COUNTRY	INFRASTRUCTURE INVESTMENT, USD BILLIONS	INFRASTRUCTURE INVESTMENT GAP, USD BILLIONS	DIFFERENCE BETWEEN INVESTMENT NEED AND INVESTMENT FORECAST
Argentina	\$422.0	\$339.2	80%
Brazil	\$1,420.7	\$1,126.6	79%
Canada	\$1,124.3	\$19.4	2%
Chile	\$197.8	\$49.9	25%
Colombia	\$223.1	\$94.9	43%
Ecuador	\$74.3	\$52.3	70%
Mexico	\$487.4	\$515.3	106%
Paraguay	\$54.6	\$16.5	30%
Peru	\$307.2	\$67.5	22%
US	\$7,963.7	\$3,608.9	45%
Uruguay	\$45.8	\$9.1	20%

Source: GHI and Oxford Economics 2018

B3. ASIA

Among all nations, the top four countries by investment need (China, India, Japan and the US) account for over half of global need; three of these countries are found in Asia. Despite this, the infrastructure gap is lower in percentage terms across Asia than the other regions and across the 2018 to 2040 period Asian countries would need to increase spending by around 10% to meet their projected investment need. The sheer size of the continent means that, while relatively small as a proportion of current spending, this level of underinvestment creates an infrastructure investment gap of US\$4.3 trillion over the same period.

FIGURE B3: Investment need and current trends in Asia, 2015 US\$ trillions, 2018–40



Source: GHI and Oxford Economics 2018

TABLE B3: Projected infrastructure investment and gaps among Asian countries, 2018–40, 2015 prices

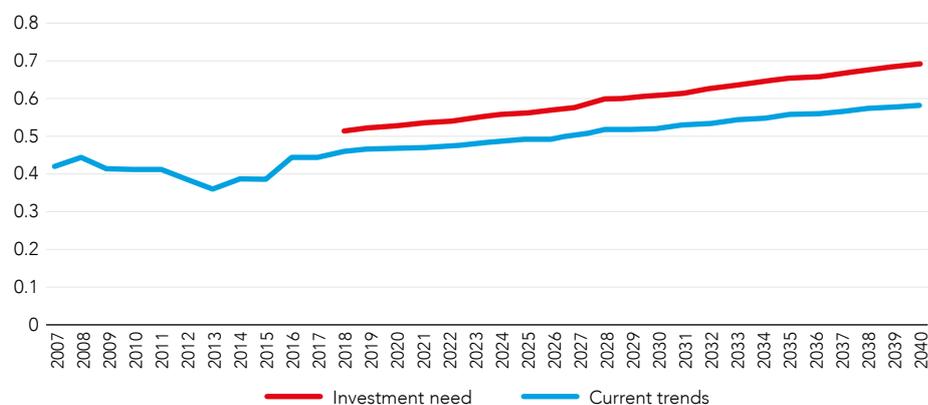
COUNTRY	INFRASTRUCTURE INVESTMENT, USD BILLIONS	INFRASTRUCTURE INVESTMENT GAP, USD BILLIONS	DIFFERENCE BETWEEN INVESTMENT NEED AND INVESTMENT FORECAST
Azerbaijan	\$86.2	\$7.6	9%
Bangladesh	\$393.1	\$182.1	46%
Cambodia	\$56.0	\$26.6	48%
China	\$24,885.8	\$1,830.7	7%
India	\$3,704.5	\$499.5	13%
Indonesia	\$1,544.5	\$66.7	4%
Kazakhstan	\$195.5	\$79.2	41%
Japan	\$3,481.0	\$86.8	2%
Jordan	\$59.1	\$16.8	29%
Malaysia	\$358.8	\$72.5	20%
Myanmar	\$105.0	\$106.4	101%
Pakistan	\$335.1	\$117.9	35%
Philippines	\$403.1	\$65.3	16%
Saudi Arabia	\$465.4	\$108.9	23%
Singapore	\$87.8	\$0.3	0%
South Korea	\$1,276.7	\$38.6	3%
Thailand	\$367.7	\$95.0	26%
Turkey	\$532.8	\$384.1	72%
Vietnam	\$474.1	\$96.8	20%

Source: GHI and Oxford Economics 2018

B4. EUROPE

Total spending on infrastructure in Europe was forecast to be US\$457bn in 2018, in contrast to a projected requirement of US\$512bn. This investment gap of 11% is projected to grow to US\$1.89 trillion or 16% of the total infrastructure investment needed over the period 2018–40.

FIGURE B4: Investment need and current trends in Europe, 2015 US\$ trillions, 2018–40



Source: GHI and Oxford Economics 2018

TABLE B4: Projected infrastructure investment and gaps among European countries, 2018–40, 2015 prices

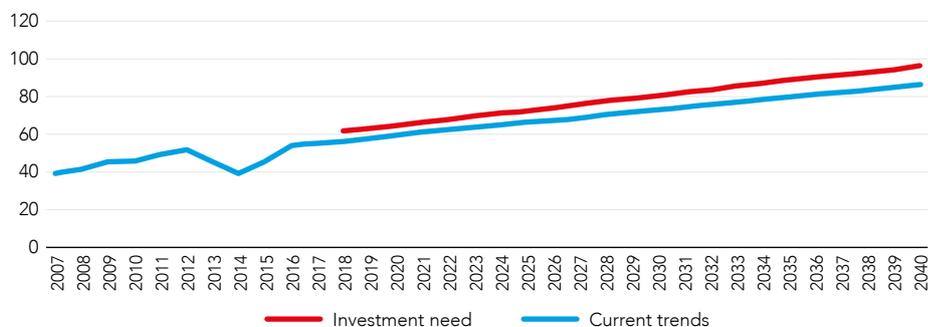
COUNTRY	INFRASTRUCTURE INVESTMENT, USD BILLIONS	INFRASTRUCTURE INVESTMENT GAP, USD BILLIONS	DIFFERENCE BETWEEN INVESTMENT NEED AND INVESTMENT FORECAST
Croatia	\$59.1	\$10.1	17%
France	\$1,682.3	\$9.6	1%
Germany	\$1,354.4	\$0.7	0%
Italy	\$1,144.9	\$353.0	31%
Poland	\$514.3	\$86.5	17%
Romania	\$210.3	\$10.4	5%
Russia	\$988.7	\$689.2	70%
Spain	\$997.7	\$53.8	5%
UK	\$1,549.6	\$140.3	9%

Source: GHI and Oxford Economics 2018

B5. OCEANIA

Despite the large area covered by the Oceania continental region, its relatively small population means the total infrastructure investment need is less than for the other regions. A further US\$1.8 trillion total spending is likely to be required between 2018 and 2040, although on current trends a shortfall of US\$171bn is forecast to emerge over the same period. This would represent an infrastructure gap of 10%.

FIGURE B5: Investment need and current trends in Oceania, 2015 US\$ billions, 2018–40



Source: GHI and Oxford Economics 2018

TABLE B5: Projected infrastructure investment and gaps among countries in Oceania, 2018–40, 2015 prices

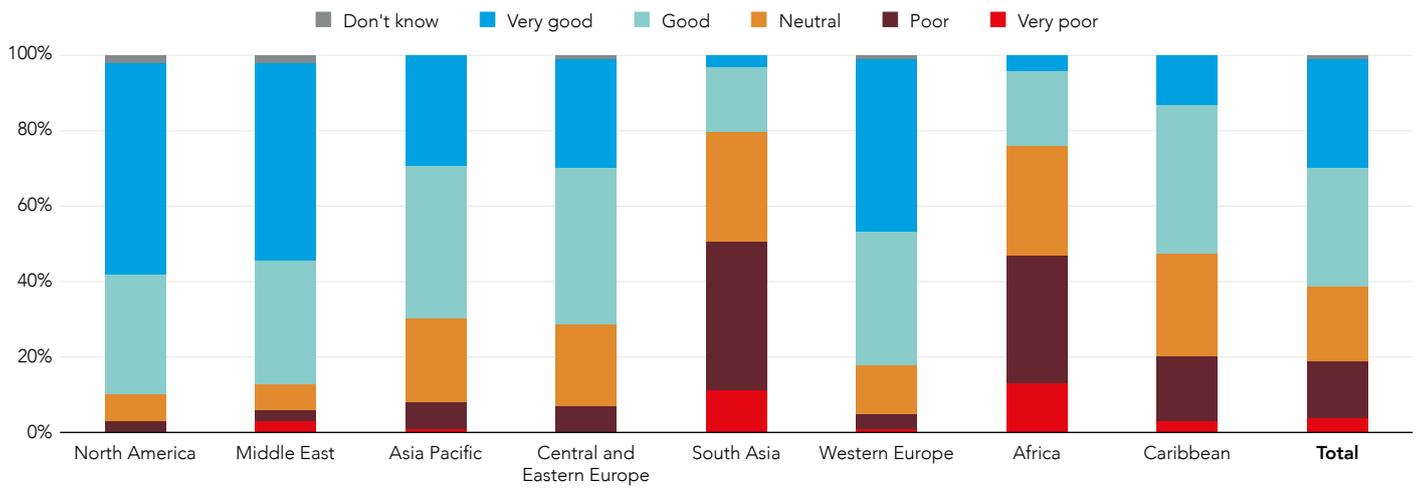
COUNTRY	INFRASTRUCTURE INVESTMENT, USD BILLIONS	INFRASTRUCTURE INVESTMENT GAP, USD BILLIONS	DIFFERENCE BETWEEN INVESTMENT NEED AND INVESTMENT FORECAST
Australia	\$1,446.2	\$149.9	10%
New Zealand	\$152.2	\$16.6	11%

Source: GHI and Oxford Economics 2018

B6. ADDITIONAL INFRASTRUCTURE SERVICE GAP FIGURES, BY WORLD REGION

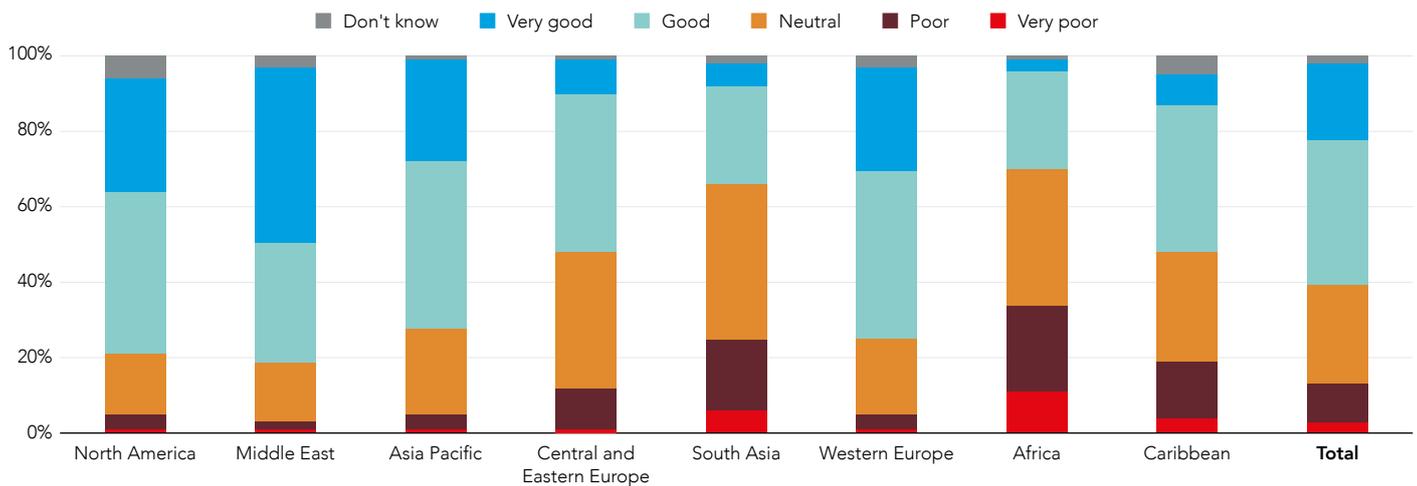
The following charts compare the views of finance professionals on the remaining four sub-types of infrastructure not included in the main report: water and sanitation, other transport (eg ports and airports), railways, and core public infrastructure (eg hospitals and schools).

FIGURE B6: Infrastructure quality – water and sanitation



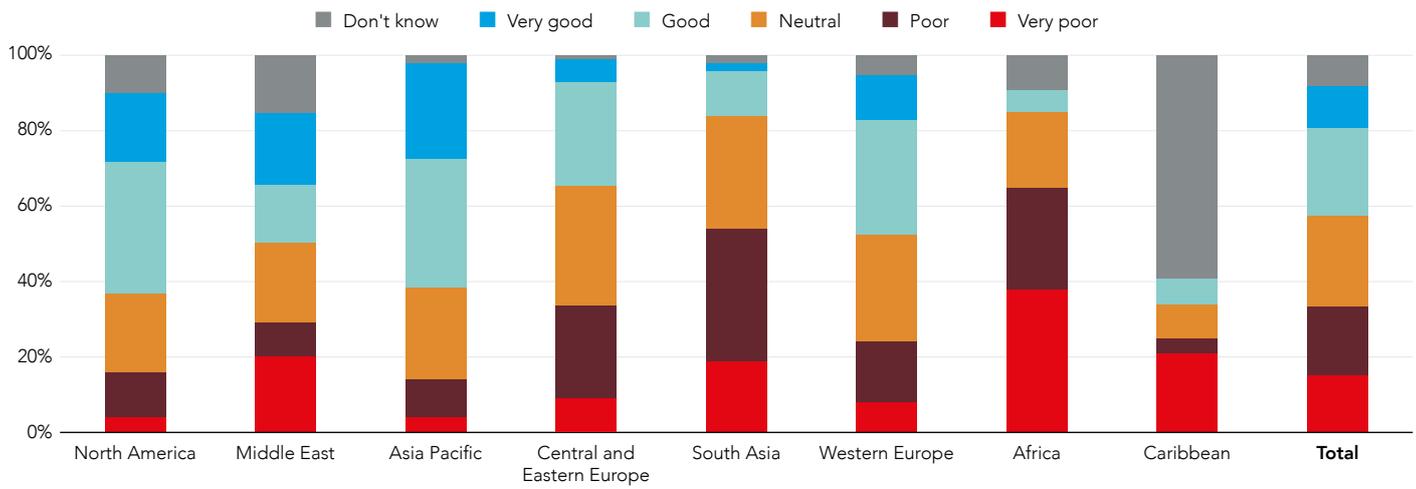
Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

FIGURE B7: Infrastructure quality – other transport



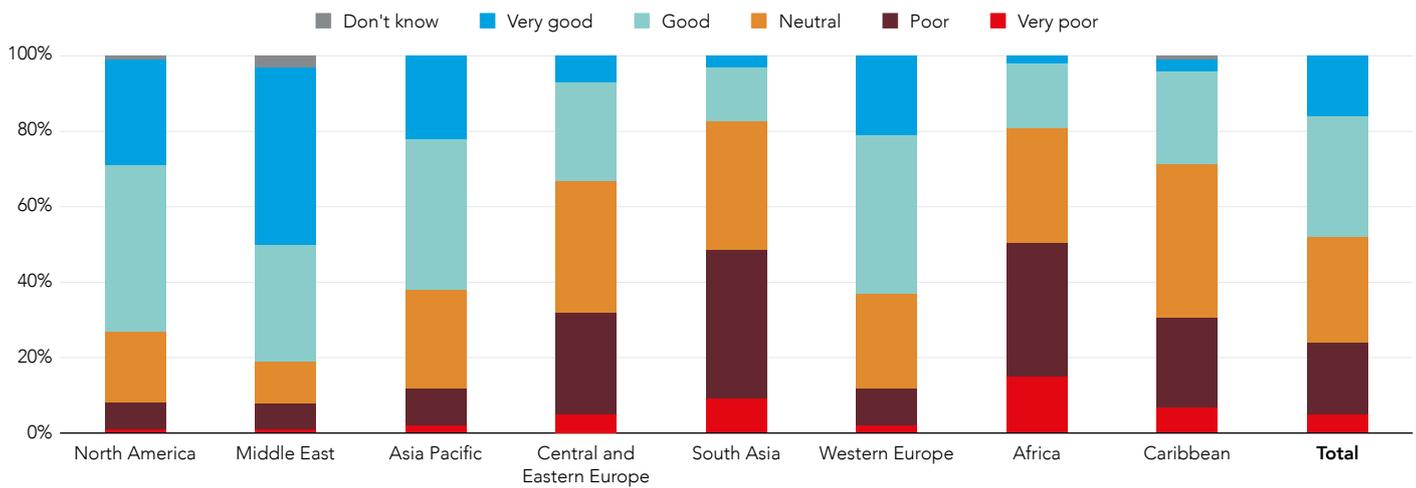
Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

FIGURE B8: Infrastructure quality – railways



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

FIGURE B9: Infrastructure quality – core public service infrastructure



Source: The Global Infrastructure Gap survey; specialist respondents only; n: 1,966

Appendix C:

The Global Infrastructure Gap Survey and Roundtable Discussion Guide

MEMBER SURVEY

Q1

What is your current employment status?

Full-time or part-time an accounting or finance role
Full-time or part-time work in a non-accounting role
Not currently in employment*
Self-employed
Retired*

* Response treated as 'generalist'

Q2 [If employed]

In which sector do you work? Please tick the one box that best fits your sector.

Big Four accounting firm
Corporate sector - small / medium sized
Corporate sector – large
Financial services - small / medium sized
Financial services – large
Mid-tier accounting firm
Not-for-profit
Other international accounting firm
Public sector
Small or medium-sized practice (SMP)
Other (please specify)

Q3 [If employed]

Does your work involve any of the following?

Infrastructure policy, Procurement, Capital budgeting,
Project management or Operations management?
Yes (respondent categorised as a 'specialist')
No (respondent categorised as a 'generalist')

Q4

How would you describe the quality of each type of infrastructure in the country where you live?

Power and energy
Water and sanitation
Roads and highways
Railways
Other transport (e.g., air and sea)
Information and communication technology
(e.g., internet access and mobile service)
Core public service infrastructure
(e.g., hospitals, schools, emergency services)

Scale

1 – Very poor
2 – Poor
3
4 – Good
5 – Very good
Don't know

Q5

What are the biggest barriers in meeting the infrastructure needs in your country?

Lack of finance and/or funding
Lack of political leadership
Skills and talent shortage
Planning and regulatory barriers
Corruption
Lack of competition
Other, please specify
None

Q6a [To generalists]

Over the next 5 years, do you feel the infrastructure in your country will:

Significantly deteriorate
Deteriorate
Remain the same
Improve
Significantly improve
Don't know

Q6b [To specialists]

Over the next 5 years, do you feel that each of these types of infrastructure in your country will:

Power and energy
Water and sanitation
Roads and highways
Railways
Other transport (e.g., air and sea)
Information and communication technology
(e.g., internet access and mobile service)
Core public service infrastructure
(e.g., hospitals, schools, emergency services)

Scale

Significantly deteriorate
Deteriorate
Remain the same
Improve
Significantly improve
Don't know

Q7

Do you feel the government selects projects that provide the most value to the taxpayer?

Never
Infrequently
Sometimes
Frequently
Always
Don't know

Q8

Which of the following do you feel the government in your country should prioritise to make the best decisions when selecting infrastructure projects? Please select up to five which you feel are the most important, and rank them by order of importance.

Please drag and drop your selections from the left box to the right box, and order with most important at the top, and least at the bottom.

- Adhering to global accounting standards
- Removing political decision-making, making the process technocratic (i.e., decisions by experts)
- Putting in place mechanisms to reduce corruption
- Moving government accounts from cash to accrual accounting
- Bringing OOBs (Obligations Off Balance-Sheet) onto government balance sheets
- Quantifying the total life-cycle costs of potential projects
- Spending more resource to evaluate projects after completion
- Applying standard assessment tools to evaluate projects during selection
- Transferring 'project selection' powers to more local levels of government (i.e. devolution)
- Other, please specify

Q8a [To CPA Canada respondents only]

How important is it that infrastructure planning include the following sustainability considerations?

- Efficient use of energy including, where appropriate, renewable sources of energy
- Adapting to the impacts of a changing climate such as severe weather events
- Minimizing environmental impacts on the surrounding community by, for example, locating near accessible public transit
- Reducing or eliminating the production of waste, hazardous by-products or other environmental externalities
- Assessing the potential of, and taking every reasonable step to reduce or eliminate the likelihood of an environmental accident (such as a pipeline spill, for example)

Scale

- 1 - Not important at all
- 2 - Not very important
- 3
- 4 - Quite important
- 5 - Very important
- 6 - Don't know

Q9a [To generalists]

How should infrastructure be financed in your country?

- Entirely public finance
- Mostly public finance
- Even mix of public and private finance
- Mostly private finance
- Entirely private finance
- Don't know / no opinion

Q9b [To specialists]

How should infrastructure be financed in your country? (e.g. a sovereign wealth fund provides the money upfront to build a road).

- Power and energy
- Water and sanitation
- Roads and highways
- Railways
- Other transport (e.g., air and sea)
- Information and communication technology (e.g., internet access and mobile service)
- Core public service infrastructure (e.g., hospitals, schools, emergency services)

Scale

- Entirely public finance
- Mostly public finance
- Even mix of public and private finance
- Mostly private finance
- Entirely private finance
- Don't know / no opinion

Q10

What are your views on the role of foreign direct investment in building and maintaining infrastructure in your country?

- Very concerned
- Some concern
- Neutral
- Positive
- Very positive
- Don't know

Q11

What are the key challenges that the government faces in securing private finance? Select all that apply.

- Too few viable projects for private investment
- Regulatory barriers
- Perceived political instability in my country
- Underdeveloped financial markets in my country
- Insufficient skills in government to negotiate with the private sector
- Negative perception of private finance for public infrastructure
- Lack of attractiveness of infrastructure investment
- Don't know
- Other, please specify

Q12a [Asked of those working in Public sector]

Where do you feel the private sector particularly adds value in delivering infrastructure projects in your country? Select all that apply.

- Knowledge of best practice and expertise
- Applying innovative practices and fresh thinking
- Delivering projects on time
- Keeping projects to budget
- Access to private capital
- Transferring the risks of delivering infrastructure projects from the public sector to the private sector
- None of these
- Don't know

Q12b [Asked of those working in Private sector]

Where do you feel the public sector particularly adds value in delivering infrastructure projects in your country? Select all that apply.

- Access to projects that provide stable, low risk returns
- Knowledge of how the public sector works
- Long-term and stable partnership
- Knowledge of best practice and expertise
- Applying innovative practices and fresh thinking
- None of these
- Don't know

Q13a [Asked of those working in Public sector]

Where do you feel the private sector receives value from the public sector in delivering infrastructure projects in your country? Select all that apply.

- Access to projects that provide stable, low risk returns
- Knowledge of how the public sector works
- Long-term and stable partnership
- Knowledge of best practice and expertise
- Applying innovative practices and fresh thinking
- None of these
- Don't know

Q13b [Asked of those working in Private sector]

Where do you feel the public sector receives value from the private sector in delivering infrastructure projects in your country? Select all that apply.

- Knowledge of best practice and expertise
- Applying innovative practices and fresh thinking
- Delivering projects on time
- Keeping projects to budget
- Access to private capital
- Transferring the risks of delivering infrastructure projects from the public sector to the private sector
- None of these
- Don't know

Q14

Where are you primarily based?

[Dropdown list]

Q15

What best describes your gender identity:

- Female
- Male
- Prefer not to say
- Prefer to self-describe

ROUNDTABLE DISCUSSION

1) Understanding the infrastructure gap

- a) What's the current quality of infrastructure in your country?
 - i. Why is it like this?
- b) How is your business or organization affected by the current quality of infrastructure in your country? Please provide examples.

2) How accountants can make a difference

- c) In your experience, where do you see accountants making the greatest difference in delivering infrastructure in your country? Please give examples where possible.
- d) Do you feel that your country has particular good practices in meeting infrastructure need?

3) Selecting projects

- e) How often do you think governments select the right projects in your country?
- f) What should governments consider when making decisions about infrastructure?

4) Financing projects

- g) Which types of infrastructure are appropriate for private finance or operation? [i.e. energy, water, roads, railways, other transport, information and communication technology, core public service infrastructure]
 - i. Which ones are more suited to private finance?
 - ii. Private operation?
- h) What do you think about foreign direct investment (FDI) building new infrastructure in your country?

5) Interface of public and private

- i) What skills do governments need to effectively negotiate contracts with the private sector?
 - i. Are any of these skills absent?
- j) When the public and private sectors partner to complete and operate infrastructure (for example, through a Public-Private Partnership),
 - i. What does the private sector add to the partnership?
 - ii. What does the public sector add to the partnership?

6) Final

- k) Over the next 5 years, do you think the infrastructure in your country will improve, stay the same, or deteriorate?
 - i. Why is that the case? / What are the key challenges in meeting the infrastructure needs in your country over the next 5 years?

References

- ACCA (2016), *Smarter Cities, Simpler Cities: Accounting for the City of the Future: Spotlight on India* <https://www.accaglobal.com/content/dam/ACCA_Global/Technical/Future/pi-smarter-cities-simpler-cities.pdf>, accessed 4 February 2019.
- ACCA (2017), *Professional Accountants – the Future: Ethics and Trust in a Digital Age* <https://www.accaglobal.com/content/dam/ACCA_Global/Technical/Future/pi-ethics-trust-digital-age.pdf>, accessed 5 February 2019.
- Atkins, G., Davies, N. and Kidney Bishop, T. (2017), *Public versus Private: How to Pick the Best Infrastructure Finance Option* <https://www.instituteforgovernment.org.uk/sites/default/files/publications/Institute_for_Government_Infrastructure_Finance_Option_Public_Private_November_2017_Web_Final.pdf>, accessed 5 February 2019.
- British Broadcasting Corporation (2015) Spain's Ciudad Real airport sold at auction for €10,000 [online article], <<https://www.bbc.co.uk/news/world-europe-33578949>>, accessed 6 February.
- Catapult Future Cities (2017), *Civic Crowdfunding: A Guidebook for Local Authorities*, <<https://futurecities.catapult.org.uk/wp-content/uploads/2017/03/Civic-guidebook-.pdf>>, accessed 5 February 2019.
- Central Intelligence Agency (2019), *The World Factbook*, <<https://www.cia.gov/library/publications/the-world-factbook/>> access 7 February 2019.
- Chartered Institute of Purchasing and Supply (2013), Written evidence submitted by CIPS to the Public Administration Select Committee, <<https://publications.parliament.uk/pa/cm201314/cmselect/cmpubadm/123/123vw12.htm>>, accessed 5 February 2019.
- Chartered Professional Accountants of Canada (2016), Adaptation Case Study #6: City of Montreal, <<https://www.cpacanada.ca/en/business-and-accounting-resources/other-general-business-topics/sustainability/publications/montreal-adapting-to-climate-change>>, accessed 5 February 2019.
- Detter, D. and Folster, S. (2017), *The Public Wealth of Cities: How to Unlock Hidden Assets to Boost Growth and Prosperity* (Brookings Institution Press).
- Eriksson, P.E. and Lind, H. (2015), *Moral Hazard and Construction Procurement: A Conceptual Framework*, <<https://www.diva-portal.org/smash/get/diva2:783674/FULLTEXT01.pdf>>, accessed 5 February 2019.
- European Commission (2017), *Communication from the Commission: The Fiscal Compact – Taking Stock*, <https://ec.europa.eu/info/publications/fiscal-compact-taking-stock_en>, accessed 5 February 2019.
- Eurostat (2018), 'Liabilities Related to PPPs Recorded Off-Balance Sheet of Government', downloadable from <<https://data.europa.eu/euodp/en/data/dataset/ZxMF0OGutCjy7pgQJdtaiw>>, accessed 5 February 2019.
- Fages, R., Beardsley, B., Bromstrup, I., Donnadieu, H., Macé, B., Pardasani, N., Schmitz, L., Sheridan, B., Taglioni, G. and Xu, Q. (2018), *Global Asset Management 2018: The Digital Metamorphosis* <<https://www.bcg.com/en-gb/publications/2018/global-asset-management-2018-digital-metamorphosis.aspx>>, accessed 5 February 2019.
- Fay, M., Andres, L.A., Fox, C., Narloch, U., Straub, S. and Slawson, M. (2017), *Rethinking Infrastructure in Latin America and the Caribbean, 2017* <<https://openknowledge.worldbank.org/bitstream/handle/10986/26390/114110-REVISED-PUBLIC-RethinkingInfrastructureFull.pdf>>, accessed 5 February 2019.
- Flyvbjerg, B. (2018), *Oxford Handbook of Megaproject Management* (Oxford: Oxford University Press).
- GHI (Global infrastructure Hub) and Oxford Economics (2018), *Global Infrastructure Outlook*, Downloadable from <<https://outlook.gihub.org/>>, accessed 4 February 2019.
- Government of New Zealand (2018), 'He Puna Hao Patiki: 2018 Investment Statement', <<https://treasury.govt.nz/publications/investment-statement/he-puna-hao-patiki-2018-investment-statement-html>> accessed 5 February 2019.
- ICAS (Institute of Chartered Accountants of Scotland) (2012), *A Professional Judgement for Financial Reporting*, <<https://www.icas.com/technical-resources/a-professional-judgement-framework-for-financial-reporting>>, accessed 6 February 2019.
- IFAC and CIPFA (2018), *International Public Sector Financial Accountability Index*, <<https://www.ifac.org/system/files/uploads/IFAC-IFAC-CIPFA-Public-Sector-Index-2018-Status.pdf>>, accessed 5 February 2019.
- IJ Global (2018), *H1 Infrastructure and Project Finance League Table Report*, <<https://ijglobal.com/uploads/H1%202018%20League%20Tables%20Report.pdf>>, accessed 5 February 2019.
- IMF (International Monetary Fund) (2018), *Fiscal Monitor: Managing Public Wealth*, downloadable from <<https://www.imf.org/en/Publications/FM/Issues/2018/10/04/fiscal-monitor-october-2018>>, accessed 5 February.
- Institute for Government (2018), 'Funding Infrastructure' [webpage], <<https://www.instituteforgovernment.org.uk/explainers/funding-infrastructure>>, accessed 5 February 2019.
- International Transport Forum (2017), *Strategic Infrastructure Planning: International Best Practice*, <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/601897/Strategic_Infrastructure_FINAL_for_web_v2.pdf>, accessed 4 February.
- KPMG (2013), *Elevating Professional Judgment in Auditing and Accounting: The KPMG Professional Judgment Framework*, <http://www.drillie.com/a544/kpmg/jdgmt/KPMG_ProfJudgment_Monograph.pdf>, accessed 6 February 2019.
- Leong, L. (2016), 'The "Rail plus Property" Model: Hong Kong's Successful Self-financing Formula' [website article], <<https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/the-rail-plus-property-model>>, accessed 5 February 2019.
- Mann, H. (2018), 'The High Cost of 'De-Risking' Infrastructure Finance' [website article], <<https://www.project-syndicate.org/commentary/world-bank-ppp-de-risking-by-howard-mann-2018-12>>, accessed 5 February 2019.
- Marcelo, D., Mandri-Perrott, C., House, S. and Schwartz, J.Z. (2016), *An Alternative Approach to Project Selection: The Infrastructure Prioritization Framework* <<http://pubdocs.worldbank.org/en/844631461874662700/16-04-23-Infrastructure-Prioritization-Framework-Final-Version.pdf>>, accessed 4 February 2019.
- MGI (McKinsey Global Institute) (2013), *Infrastructure productivity: How to save \$1 trillion a year*, <<https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/infrastructure-productivity>>, accessed 6 February 2019.
- MGI (2016), *Bridging Global Infrastructure Gaps*, <<https://www.mckinsey.com/~media/McKinsey/Industries/Capital%20Projects%20and%20Infrastructure/Our%20Insights/Bridging%20global%20infrastructure%20gaps/Bridging-Global-Infrastructure-Gaps-Full-report-June-2016.ashx>>, accessed 4 February 2019.
- Morse, A. (2018), *PFI and PF2: Report by the Comptroller and Auditor General*, <<https://www.nao.org.uk/wp-content/uploads/2018/01/PFI-and-PF2.pdf>>, accessed 5 February 2019.

MTR Corporation (2017), *Annual Report 2017: Ten-Year Statistics*, <https://www.mtr.com.hk/archive/corporate/en/investor/10yr_stat_en.pdf>, accessed 5 February 2019.

NHS Scotland (2018), *NHS Scotland Assets and Facilities 2017: Annual Report*, <<https://www.gov.scot/publications/annual-state-nhsscotland-assets-facilities-report-2017/>>, accessed 5 February 2019.

NIC (National Infrastructure Commission) (2018), *National Infrastructure Assessment*, <https://www.nic.org.uk/wp-content/uploads/CCS001_CCS0618917350-001_NIC-NIA_Accessible.pdf>, accessed 4 February 2019.

O'Dowling-Keane, A. (2017), 'Sadiq Khan Joins Crowd of Thousands with £400,000 in Backing for Londoners' Local Project Ideas' [website article] <<https://about.spacehive.com/sadiq-khan-joins-crowd-of-thousands-with-400000-in-backing-for-londoners-local-project-ideas/>>, accessed 5 February.

OECD (Organisation for Economic Cooperation and Development) (2019) Databank, tax revenue <<https://data.oecd.org/tax/tax-revenue.htm>>, government debt <<https://data.oecd.org/gga/general-government-debt.htm>>, accessed 7 February 2019.

Plimmer, G. (2018), 'Death Knell Sounded for PFI Contracts' [online article], *Financial Times*, <<https://www.ft.com/content/55eb374e-dba5-11e8-8f50-cbae5495d92b>>, accessed 6 February.

Project Management Institute (2017), *Guide to Project Management Book of Knowledge*, <<https://www.pmi.org/pmbok-guide-standards/foundational/pmbok>>, accessed 4 February 2019.

Schwab, K. (2018), *Global Competitiveness Report* <<http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>>, accessed 5 February 2019.

Spacehive (2019), 'Make Your Local Area Better' [website], <<https://www.spacehive.com/>>, accessed 5 February 2019.

UK Government (2017), UK Guarantees Scheme Guidance, <<https://www.gov.uk/guidance/uk-guarantees-scheme>>, accessed 5 February 2019.

World Bank (2018a), *Private Participation in Infrastructure, Annual Report 2017*, <http://ppi.worldbank.org/~media/GIAWB/PPI/Documents/Global-Notes/PPI_2017_AnnualReport.pdf>.

World Bank (2018b), *Procuring Infrastructure: Public-Private Partnerships Report*, downloadable from <<https://pppknowledgelab.org/documents/5453>>, accessed 5 February 2019.

World Bank (2019) World Bank Open Data, tax revenue <<https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS>>, government debt <<https://data.worldbank.org/indicator/GC.DOD.TOTL.GD.ZS>>, accessed 7 February 2019.

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