

Institution: London South Bank University		
Unit of Assessment: 12 – Engineering		
Title of case study: Measuring Sustainable Development Goal (SDG) impact for infrastructure projects		
Period when the underpinning research was undertaken: 2018 – 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Simon Philbin	Director of the Nathu Puri Institute for Engineering and Enterprise	August 2018 – present
Period when the claimed impact occurred: January – August 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact (indicative maximum 100 words)		
<p>Achieving the United Nations' Sustainable Development Goals (SDGs) is difficult in many industries since targets have been set at the national level rather than project level. To rectify the problem, this research has created a range of models, processes and analytical tools to measure the impact of infrastructure projects. This allows SDGs to be measured at the project level and across economic, environmental and social requirements. Application of the results from the research study are being actively used by the Environment Agency to manage impact assessment across its GBP5,250,000,000 (£5.2bn) portfolio of infrastructure projects and by the Thames Tideway Project (GBP4,900,000,000 (£4.9Bn)).</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>Achievement of the United Nations' Sustainable Development Goals (SDGs) by the year 2030 is of paramount importance and the construction industry has a major role to play through enabling a measurable impact against the SDG targets. However, linking of infrastructure project success to SDG targets is problematic because the targets were designed to be at the national level and not at the project or programme level [R1]. Furthermore, while the so called 'triple bottom line' (i.e. economy, environment and society) approach to understanding sustainability remains important, there is a need to understand how this can translate to the full project lifecycle as well as a need for improved project governance. This is consistent with the findings of a key UN investigation (UN Roadmap for Localising the SDGs), which calls for localisation of SDGs and the need for cooperative governance to establish shared priorities.</p> <p>The research study was led by the Nathu Puri Institute (NPI) for Engineering and Enterprise at LSBU. The empirical research was conducted with collaborative partners and enabled development of a new framework, comprising a range of models, processes and analytical tools for use by government and industry. This approach provides a forward-looking method for the measurement of sustainability and wider impact on infrastructure projects. The framework supports the measurement of United Nations' SDGs at the project level [R1].</p>		
Research description		
<p>The research involved two main stages. The first stage comprised a mixed method that involved a survey of 350 engineers to derive quantitative data [R2] along with interviews with 40 CEOs and corporate Heads of Sustainability to capture qualitative data [R3]. The second stage involved the application of the main findings from the empirical stage to a case study involving the Environment Agency and the Thames Tideway Tunnel. This work was also informed by research that evaluated the scope to measure SDG performance for infrastructure projects at a</p>		

Water Utility Company (Anglian Water) [R4].

Findings

The survey of 325 engineers [R2] indicated four primary shortfalls for measuring SDGs on infrastructure projects, namely: Leadership; tools and methods; engineers' business skills in measuring SDG impact; and, how project success is too narrowly defined as outputs (such as time, cost and scope) and not outcomes (longer-term local impacts and stakeholder value). Moreover, the interviews with 40 senior executives [R3] from the UK identified that SDG measurement practices are embraced in principle, but are problematic in practice, and rarely does action match rhetoric across the engineering sector.

From the empirical evidence collected, the research study identified a 'golden thread' between best practice sustainability-reporting frameworks at the project level and those at the organisational level [R1]. In doing so, the research revealed that there is sufficient linkage to embed SDG impact targets into the design stage of an infrastructure project. Furthermore, the research study produced an innovative process model to link project delivery with strategic SDG impacts, which is called the '*Infrastructure SDG Impact-Value Chain*' (IVC). The IVC provides a holistic process to improve the measurement of sustainability on projects and programmes by guiding decision-makers in their investment choices through providing confidence that they are linked to specific SDG targets. The IVC was developed through the research described herein and builds on supporting theoretical constructs, including the *Theory of Change*, *Creating Shared Value*, *System-of-Systems* (applied to infrastructure), and the *Triple Bottom Line* (TBL). The utility of the IVC process model was initially investigated as part of the case study investigation of Anglian Water [R4] and its application has been further demonstrated in the MISI Project (see the following section on research impact).

3. References to the research (indicative maximum of six references)

The research was published in internationally leading journals including *Sustainability* (two articles), *Administrative Sciences*, and the *Proceedings of the Institution of Civil Engineers—Engineering Sustainability*. Several peer-reviewed papers were also published at leading international conferences.

[R1]. Mansell, P., Philbin, S. P., Broyd, T., & Nicholson, I. (2020). Assessing the impact of infrastructure projects on global sustainable development goals. *Proceedings of the Institution of Civil Engineers—Engineering Sustainability*, 173(4), 196-212, <https://doi.org/10.1680/jensu.19.00044>.

[R2]. Mansell, P., Philbin, S. P., & Konstantinou, E. (2020). Redefining the Use of Sustainable Development Goals at the Organisation and Project Levels—A Survey of Engineers. *Administrative Sciences*, 10(3), 55, <https://doi.org/10.3390/admsci10030055>.

[R3]. Mansell, P., Philbin, S. P., & Konstantinou, E. (2020). Delivering UN Sustainable Development Goals' Impact on Infrastructure Projects: An Empirical Study of Senior Executives in the UK Construction Sector. *Sustainability*, 12(19), 7998, <https://doi.org/10.3390/su12197998>.

[R4]. Mansell, P., Philbin, S. P., & Broyd, T. (2020). Development of a New Business Model to Measure Organizational and Project-Level SDG Impact—Case Study of a Water Utility Company. *Sustainability*, 12(16), 6413, <https://doi.org/10.3390/su12166413>.

4. Details of the impact (indicative maximum 750 words)

In late 2019 the case study stage of the research was initiated, and this was called the 'Measurement of Infrastructure SDG Impact (MISI) Project'. The project was based on a research collaboration led by the NPI team at LSBU along with the Institution of Civil Engineers (ICE), University College London (UCL) and the Building Research Establishment (BRE). The work was focused on consolidating the empirical research findings in order to provide a more coherent description of best practice in project management, engineering and infrastructure, and support the measurement of SDGs at the project level. The MISI Project involved academic, government and industry partners, including the Environment Agency and Thames Tideway,

working together to implement this new framework for measuring sustainability on infrastructure projects.

Impact at the Environment Agency

The MISI Project included a case study focused on improving the measurement of sustainability for the Boston Barrier in Lincolnshire, which is a flood protection scheme costing over GBP100,000,000 (£100m). The Barrier will provide an improved level of flood protection to over 20,000 homes and businesses, thereby protecting against tidal surges, such as the event in 2013 that flooded over 820 homes and businesses. The findings from the MISI Project are also being embedded across the wider Environment Agency.

“As a consequence of the MISI Project that builds on the previous research from LSBU, I am particularly pleased to see the linking of the portfolio level SDG measurement activity with the project level local issues and this represents a completely new way of measuring sustainability across major infrastructure projects. The objective to design the portfolio level approach with local project teams having ‘freedom within a framework’ is excellent. The development of processes, tools and knowledge by the MISI Project to support the Environment Agency embed the SDG measurement into our existing work is hugely helpful and represents a major step-change for us”.

“Following on from the MISI Project, we will be able to embed the knowledge that was generated by the project to support the measurement of SDG performance across our new portfolio of Environment Agency projects to be launched on 1st April 2021, which will total £5.2billion [GBP5,200,000,000] and include around 15 major projects in excess of £50million [GBP50,000,000]. Moreover, the approach to SDG measurement developed in the MISI Project will directly help us deliver our new sustainability strategy (known as eMission2030) and this will have huge positive impact that directly contributes to: saving lives; protecting hospitals, schools and homes; and regulating environmental impacts; as well as providing value for money for the UK Government”.

- Quote from the Deputy Director Allocation & National Programme Management, Environment Agency [S1].

Impact at Tideway

The Thames Tideway Tunnel is one of the largest infrastructure projects being delivered in Europe, with a budget of GBP4,900,000,000 (£4.9billion) and with the primary purpose to reduce sewage overflows into the River Thames. The MISI Project included extending the mapping of Tideway’s legacy commitments to the SDGs at the target level, which allowed these commitments to be clearly articulated according to the defined target areas of the SDG framework. Such legacy commitments include, for instance: Creating more than 4,000 direct sustainable jobs; using river transport to remove the majority (90%) of material excavated to create the main tunnel (this approach is more sustainable compared to removing the material via road transportation); and working with charity partners to employ one ex-offender per 100 workers on the project.

“The development of the processes, tools and insights from the MISI Project can directly be utilised across the Thames Tideway Tunnel to ensure we are adequately capturing SDG performance for this major infrastructure project. Further to developing the Impact Value Change analysis for Tideway, we extended the mapping of our legacy commitments to the SDGs at target level and developed further our SDG narrative”.

“We developed a sustainable finance communication strategy to attract and retain investors and aligned the reporting with the relevant SDGs. To this end, the work we have done on the MISI Project helped enhance the way we communicate our work on the SDGs, both in our Annual Report and in our Sustainable Finance Report. This has been well received by various stakeholders”.

- *Quotes from the Group Treasurer of Tideway [S2].*

Impact with wider stakeholders

The United Nations Global Compact Network UK was involved with the MISI Project since it commenced in late 2019. They have been jointly investigating how infrastructure projects impact the UN SDGs.

“The outputs of the MISI Project, which builds on earlier research from LSBU, has made it clear to us that significant progress on measuring the SDG performance of infrastructure projects has been secured”.

- *Quote from the Executive Director, UN Global Compact Network UK [S3].*

The Infrastructure and Projects Authority (IPA) in the UK Government’s Cabinet Office was involved with the MISI Project since its inception. The IPA is keen to understand how major UK Government projects impact the SDGs.

“The UK Government is committed to the Net Zero target and the SDGs provide an additional lens to structure our investment decisions to ensure maximum value from our infrastructure. At the IPA we recognised at an early stage that the MISI Project had significant potential to help all projects with their contribution to the SDGs”.

- *Quote from the Director Project Delivery, Infrastructure and Projects Authority, UK Government [S4].*

The Institution of Civil Engineers (ICE) is a collaborative partner to the underpinning research study, which resulted in impact being delivered through the MISI Project.

“The outputs of the MISI Project, which builds on earlier research from LSBU, has made it clear to us and our community of ca. 100,000 members across 150 plus countries that major progress on measuring the SDG performance of infrastructure projects has been made in a short timeframe”.

- *Quote from the Director General and Secretary, Institution of Civil Engineers [S5].*

The significance of the SDG focused research on infrastructure projects at LSBU has also been recognised in an article in “*The Source - Magazine of the International Water Association*” [S6]:

“In a survey carried out last year, around 90% of engineers, academics and policy-makers felt it was very important to be able to make SDG connections in projects, but only 30% felt they had the appropriate tools and approaches.

This is according to Paul Mansell, who carried out the survey. He has been developing a tool to help incorporate SDGs in water projects, as a doctoral researcher under Professor Simon Philbin at London South Bank University. Development has included applying the model to an Anglian Water case study”.

More recently, the Building Research Establishment (BRE) published a key document to highlight the relationship between BREEAM (which is a leading international sustainability assessment tool used in the construction and built environment sector) and the SDGs [S7]. This report developed a new SDG hierarchy and reporting levels for the goals through the project level, thereby highlighting the direct and indirect correlations between the indicators and scheme criteria. The work was adapted from the underpinning research undertaken by LSBU and collaborative partners.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[S1]. Letter of support from the Deputy Director Allocation & National Programme Management, Environment Agency, 24th September 2020 (available upon request).

[S2]. Letter of support from the Group Treasurer of Tideway, 27th October 2020 (available upon request).

[S3]. Letter of support from the Executive Director, UN Global Compact Network UK, 2nd September 2020 (available upon request).

[S4]. Letter of support from the Director Project Delivery, Infrastructure and Projects Authority, UK Government, 15th October 2020 (available upon request).

[S5]. Letter of support from the Director General and Secretary, Institution of Civil Engineers, 1st September 2020 (available upon request).

[S6]. Hayward, K. (2019). UK utility activity through the SDG lens, *The Source - Magazine of the International Water Association*, <https://www.thesourcemagazine.org/uk-utility-activity-through-the-sdg-lens/>.

[S7]. BRE - Building Research Establishment (2020), *The Built Environment and Future Sustainability - The relationship between BREEAM and the Sustainable Development Goals*, https://files.bregroup.com/breeam/sdg/BREEAM_SDB_A4%20BRE_115430_0720_web.pdf.