



Covid-19 Secure

Why was SDGToolkit developed?

2010-2020

London

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The George Boole Foundation Limited

The George Boole Foundation was established in 2010 as a non-profit organization dedicated to applied research and development of digital solutions to social and economic problems. The principal activity is the implementation of solutions to Sustainable Development Goals.

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Introduction

SDGToolkit is a product of many years of practical experience in the design, implementation, operations management and evaluation of projects. This was based on professional experience of associates of SEEL-Systems Engineering Economics Lab in project design, management and evaluation stretching back over 50 years. The fields of experience include natural resources and agriculture, biological sciences, manufacturing, processing and logistics as well as development economics, rural development, systems engineering and information technology.

The expansion in resources dedicated to internationally funded economic development projects since 1945 has been impressive but by the early 1990s something like 35% of internationally funded projects were failing to deliver objectives¹. By 2010 studies by the World Bank Independent Evaluation Group (IEG)² recorded very little change. A common and important factor amongst the many reasons for project failure, is poor project design procedures.

Open Quality Standards Initiative

In 2010, the George Boole Foundation established the Open Quality Standards Initiative (OQSI) to review existing project cycle management procedures and project evaluation criteria to identify the main gaps and to make recommendations by 2015 on practical solutions.

OQSI's main findings were as follows:

- At the initiation of this work the OQSI estimates that the annual international agency and private investment in economic development projects was \$210 billion³ of which \$75 billion had a marginal development impact because project objectives were not achieved.
- The rise in the range of disciplines required to cover the most significant factors in project design often results in gaps in required knowledge because institutions lack sufficient funding to set up complete teams⁴.
- Most projects are not designed and optimised but represent existing state-of-the-art presented in the form of a Log Frame and Gantt Chart but often proposals do not contain justifications for the actual design options selected.
- By basing funding on a single design option, represented in Log Frames, there is a tendency to fix the project budget which reduces flexibility in adjusting to the invariable changes in conditions during implementation. This has caused many projects to be unable to adjust to change, imposing a downgrading of performance indicators. In some cases, this causes delays and the cancellation of funding because of a failure to meet contracted task and deliverable schedules.

¹ Wappenhans, W., Review of performance of World Bank Project Portfolio, Internal Report, World Bank, 1992. This report was the result of a review of some 1800 current Bank projects in 113 countries for which the Bank had lent US\$138 billion. It was found that 37.5% of the projects completed in 1991 were deemed failures, up from 15% in 1981 and 30.5% in 1989. Bank staff also said that 30% of projects in their fourth or fifth year of implementation in 1991 had major problems. The worst affected sectors were Water Supply and Sanitation, where 43% of the projects were said to have major problems, and 42% in the Agriculture sector. .

² Cost-Benefit Analysis in World Bank Projects, IEG, 2010.

³ OECD data on private and international investment

⁴ OQSI and GBF, "The impact of trends in complexity on project performance", 2018

- All projects have very distinct phases over the project cycle:
 - Design
 - Implementation
 - Operations
 - Post funding operations
- Each phase has different bases or reference points that can be used as indicators upon which to base performance estimates. However, there were no international standards⁵ in project evaluation that respond to the practical needs of evaluation work over the whole project cycle.
- In many cases, proposal stage estimates of Economic Rates of Return (ERR) such as Cost-Benefit Analyses (CBA) and Internal Rates of Return (IRR) are incorrectly calculated.⁶
- By 2010 around 80% of funded projects had not been subjected to ERR estimates.
- In those cases where ERRs were applied, sometimes those stated to have been recorded at proposal stages were not available at the time of final evaluations.⁷
- Although the reason for not applying ERR is that in some projects market prices cannot be estimated and, in such cases, cost-effectiveness is more appropriate⁸, the OQSI⁹ found no evidence that the gaps in Cost-Benefit Analysis (CBA) were compensated by Cost Effectiveness Analyses (CEA).
- In 2010 there were no estimates of rates of return to the environment of project activities. Concern with these types of indicators arose with the 2015 launch of Agenda 2030's Sustainable Development Goals.
- As a result of project designs sometimes being overseen by different departments or even entities there is often an atomization in record keeping and when key individuals move from a project or organization some project memory is lost. This can create difficulties for those who are contracted to fill vacated positions to come up to speed as well as creating record gaps creating issues for evaluation work.
- A constant issue raised by donors and some stakeholders is that “lessons learned” as a result of monitoring and evaluation assignments (M&E) are quite often archived and not accessed by teams that follow, working on new projects¹⁰. As a result, performance failures tend to be repeated, for the same reasons as identified, in the projects that follow.
- The OQSI see that a “project memory” is a vitally important resource to help record design decisions, proposal stage financial evaluations as well as all of the other

⁵ OECD DAC Evaluation Criteria during the course of this review period (2010-2015) had not been updated to adjust for the needs of sustainable development projects and no specific guidance on how to apply criteria was available. In particular no distinctions between how criteria are applied in each project phase where tasks are different. OQWSI, “*The relevance of DAC criteria for the evaluation of development assistance*”, 2018

⁶ World Bank IEG 2010

⁷ WB IEG 2010, and OQSI and GBF, “*The impact of trends in complexity on project performance*”, 2018

⁸ WB IEG 2010

⁹ OQSI and GBF, “*The impact of trends in complexity on project performance*”, 2018

¹⁰ WB IEG 2010 and OQSI and GBF, “*The impact of trends in complexity on project performance*”, 2018

decisions and decision outcomes. A Project Memory should maintain immutable records of all activities and decisions concerning any project.

- The international economic development environment changed significantly between 1960 and 2010 in terms of the number of thematic specializations or disciplines required to design projects, ranging from law, engineering, sociology, health, ecology and economics¹¹. As a result, the generic project cycle management system, centred on the LFA was an inadequate basis for project design records.
- One of the suggested and adopted solutions by many was the concept of the Theory of Change (TOC) which concentrated on solution options, risk assessment and sustainability. However, with the increasingly complex cross-relationships of factors contributing to project success, the need for increasing numbers of specialists meant some organizations did not have, or could not afford to assemble, teams with the required mix of expertise and experience. As a result, TOC outcomes naturally tended to be strongly biased towards the design team capabilities.
- Many TOC analyses lacked appropriate methods to secure quantitative and comparable measures.
- By 2010 no attempts had been made to create adequate quantitative analytical tools to provide the guidance and precise domain-specific analyses required within each discipline or domain.
- The existing horizontal generic project cycle management guidelines and lack of vertical domain analytical tools meant that it was difficult to identify and design optimised projects.
- In general, different projects executed by specific agencies or overseen by donors are not organised as portfolios and for this reason portfolio analysis from the standpoint of comparing the performance of projects is weak. In terms of allocation of scarce financial resources this represent source of inefficiency.
- Many senior administrators were of the opinion that projects in different operational domains cannot be reasonably compared in terms of performance. This is because the standardization of data sets is weak with different domains having different data sets and design procedures. This is a natural consequence of processes involved being different.

The OQSI proposal

The OQSI proposal made in 2015 was designed to prevent the proposed generic project cycle management procedure component from losing its relevance as a result of the increasing complexity of require design decision analysis. This has been the problem with existing systems which had changed little since the 1970s.

The OQSI proposal was designed to ensure an accommodation of the system to the advance in knowledge in each domain relevant to project design.

¹¹ OQSI and GBF, *"The impact of trends in complexity on project performance"*, 2018

Therefore, the specific proposal was that the procedural and evaluation criteria gaps could be removed by replacing the conventional project cycle approaches with:

- a generic horizontal due diligence design procedure (3DP) composed of a sequence of logical steps covering all relevant factors
- the provision of vertical domain specific analytical tools (ATs) to complete the necessary calculations or assessments required at each step in the logical procedures.
- The accumulation of ATs according to new gaps in knowledge represents a domain knowledge resource that improves over time leading to improvements in design quality
- The importance of a Project Memory to record all activities, decisions and decision results covering:
 - Design
 - Implementation
 - Operations
 - Post funding operations
- A Project Memory needs to be split between an Accumulog¹² (immutable records accumulated over the whole cycle) and real time dynamic data that needs to be adjusted e.g. simulations of comparative design options before the selection of the final proposed design.
- All systems should possess facilities to conduct internal evaluations of performance at least on completion of each task (activity). For this to be possible there needs to be a standardised set of evaluation criteria and method of applying these in each phase of the project cycle.
- The cost of entry and operations should be minimised through a *.mobi-type no-software-just-a-browser” operation and by reducing the need for international travel and accommodation costs by maximising the utility of remote services to local teams.
- Insurgent and terrorist activities in certain countries have targeted project and public offices and personnel including NGOs and hotels where international technical support teams are staying; this trend seems to be increasing. Therefore, security can be increased by enabling all team members to work together but in as distributed, rather than concentrated localised, fashion.
- Data security and integrity should be protected by maintaining all project portfolio data in a Project Memory including Accumulog segmentation in a remote database in a central server farm with short back up cycles, ensuring that no loss of data can occur as a result of accidents and any attacks including direct attempts at hacking customer data sets.
- Preferably each client should have access to a dedicated server to permit specific configuration changes according to client requirements.

¹² Accumulogs were first identified in 1985 by H. W. McNeill a Senior Scientific Officer at the European Commission Information Technology & Telecommunications Task Force as an essential element of any learning and recall system. It is a database segment that can be locked so as to become immutable with similar operational objectives to block chain technology. Further information Accumulog.com

- Training is a vital aspect of ensuring the that introduction of this approach will have the desired impacts.

This structure is designed to prevent the generic due diligence procedure from failing to cover key factors because such gaps are filled by the development and implementation of additional appropriate analytical tools. The amount of domain knowledge will accumulate as a function of the number and quality of analytical tools added to the collection available to users of the system.

Although OQSI avoided the term AI (Artificial Intelligence) the population of analytical tools represents a significant digital logical resource attuned to the specific professional analyses relevant for each domain. As a result, with time, the system can build up an increasing expertise across a widening range of domain knowledge as a decision analysis system.

In 2015, the OQSI proposal was accepted by the Foundation and between 2015 and 2020 a due diligence design procedure was specified and implemented as a operational module and some 60 analytical tools designed and implemented. Over 200 analytical tools have been identified as of potential interest and the process of design and implementation continues.

In 2015, Agenda 2030 was launched with 17 Sustainable Development Goals.

In 2019 the Sustainable Development Report highlighted three main areas of failure to achieve rates of necessary improvement in performance. The report stated that the mechanisms applied to macroeconomic management resulted in a negative correlation between the type of economic growth achieved and three critical Sustainable Development Goals. These are:

- Income disparity – it continues to rise (SDG-10)
- Sustainable production and consumption – they continue to decline (SDG-12)
- Climate change actions – temperatures continue to rise (SDG-13)

As a result, several additional analytical tools were added to SDGToolkit under the series name Options Benefit Analysis (OBA) to add the specialized knowledge areas required to ensure that project designs result in:

- Reduced real income disparity
- Raised sustainability
- Lower carbon footprints.

The OBA series is configured to add rates of return to the environment analyses to balance economic rates of return analyses. Additional OBA ATs are in the process of development.

SDGToolkit

During 2015 to 2020 SDGToolkit was designed and implemented based on the OSQI proposed operational structure.

All software modules were based on OQSI specifications so as to maintain coherence between the due diligence design procedural requirements and any other analytical tool logic.

Users of SDGToolkit secure a robust project design system with a growing capability across a range of applications domains.

The system has a real time on-demand analysis and reporting system on any aspect of any project activity using the Project Memory which also supports a portfolio-wide capability of comparative analysis of any number of projects.

Costs

To minimize entry and operational costs no additional software is required beyond a browser.

No Software
Just a browser

As the domain knowledge resources are increased the need for international travel and accommodation for technical service visits will be reduced. Studies suggest that these costs can be reduced in the first transition to SDGToolkit by around 40% and then with rising user competence by increments, leading to an eventual reduction in excess of 60%. This makes SDGToolkit an excellent option for low income country practitioners.

As a major step in reducing the costs of SDGToolkit, it is proposed that SDGToolkit be provided free of charge under Sustainable Development Facility grants lasting over a 5 years training and technical support period to ensure impact.

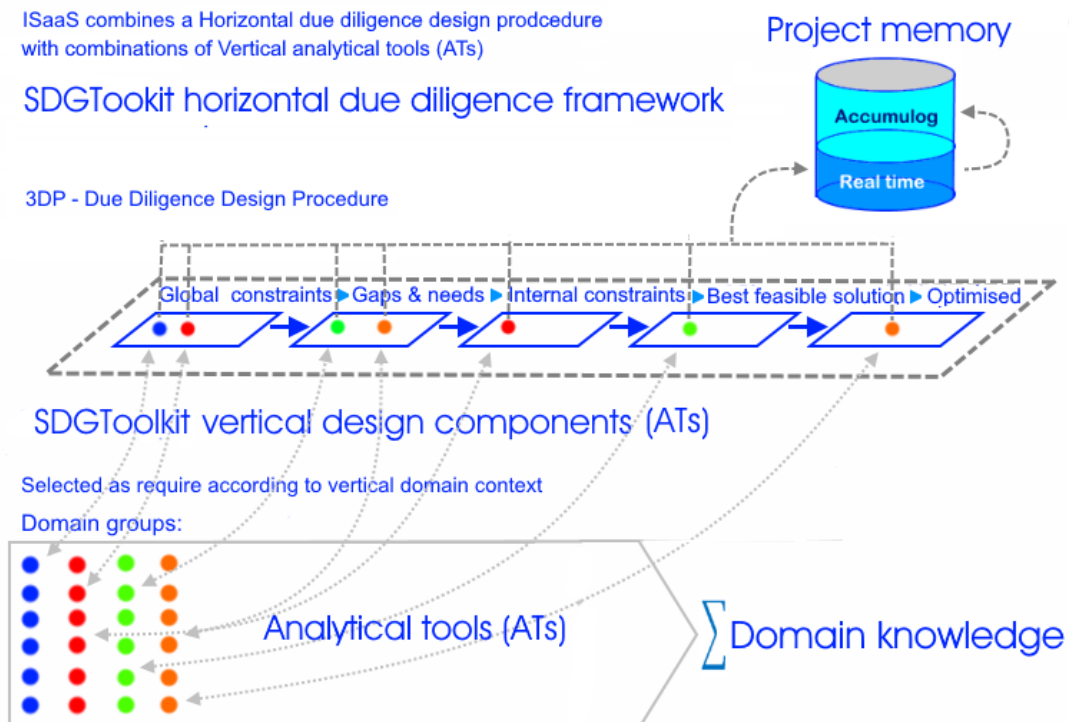
Diagram: The SDGToolkit, as an Integrated Development Environment

Due diligence design procedure (3DP) with accumulating knowledge resources based on analytical tools (ATs)

Integrated Software as a Service

ISaaS combines a Horizontal due diligence design procedure with combinations of Vertical analytical tools (ATs)

SDGToolkit horizontal due diligence framework



OQSI ISaaS: 2015; V 1.3

SDF-Sustainable Development Facility

The SDF is a holding account established by the George Boole Foundation to facilitate the administration of prepayments by donors for a 5 years provision of SDGToolkit services together with technical support and on-the-job training on the first two project designs. The SDF was set up to support SDGToolkit distribution and is under final stages of organization and it should be operational by mid-May, 2021.

Covid-19 secure

While not an original part of the specification, the remote delivery of SDGToolkit services makes this system Covid-19 secure.

Covid-19 secure signifies that any risks of infection remain a function of the precautions exercised in reception work environments. Social distancing is facilitated by the fact that teams can work as a team while remaining socially distanced with each accessing the system via separate laptops, tablets or mobiles.

Personnel security

The unfortunate rise in terrorist activities in some countries have included attacks on public offices, NGOs and international technical service personnel visiting countries. SDGToolkit helps to distribute teams raising their levels of security. The reduction or removal of the need of international team visits can contribute to safeguarding the security of international technical service personnel without prejudicing the quality of support provided.

Data security

Each user is assigned a dedicated server and one of the most advanced databases and database servers in existence. The capacity of each system can be used for any size project portfolio with projects located in any part of the world.

Backup cycles are short resulting in the risk of any data loss being limited to live data requests as opposed to resident data in the real time and Accumulog sections of the database.

All operating system updates are applied as they are released as a basic security discipline.

The SDGToolkit modules in the form of the due diligence design procedure and ATs all carry appropriate protection against malicious attacks and

The Leading Edge

As a learning system that accompanies the advance in domain knowledge, SDGToolkit will never be completed but will advance with the needs of stakeholders and users. In 2021, with the launch of SDGToolkit we are applying two innovations developed by SEEL.

Accumulog technology

One is the use of Accumulog technologies applied to databases. This work, within a specialised unit, Plasma.Systems makes up an essential component of portfolio management, real time oversight and data integrity. An important objective of Plasma.Systems is to simplify the user experience in conducting complex comparative searches across multiple databases and projects of any size..

Locational-State Theory

The other is the application of Locational-State Theory (LST) to issues related to climate change. LST provides an important contribution to the logic deployed in ATs that manage simulations of the interactions of bioclimate and yields, crop genotypes and resulting financial and environmental impact projections. This work is managed by SEEL.