Using the ‘five safes’ to structure economic evaluations of data governance

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Abstract:

The ‘five safes’ is a popular data governance framework. It is used to design and critique data management strategies across the world, and has also been used as a performance framework to measure the effectiveness of data access operations. We report on a novel application of the five safes framework: to structure economic evaluation of data governance.

As the world has become more digitally-dependent, questions of data governance such as ethics, institutional arrangements and statistical protection measures have increased in significance. Understanding the economic contribution of investments in data sharing and data governance is highly problematic: outputs and outcomes are often widely dispersed and hard to measure, and value of those investments is very context-dependent.

The Five Safes was designed to allow structured investigation into data governance. Combining this with more traditional logic models can provide an evaluation methodology which is practical, reproducible and comparable. We illustrate this by considering the application of the combined logic model-Five Safes framework to agronomy investments in Ethiopia. We demonstrate how the Five Safes was used to generate the necessary context for a more traditional quantitative study, and consider lessons learned for the wider evaluation of data and data governance investments.

Introduction

Data is increasingly seen as a core component of business, even in businesses which traditionally might not be thought of as data-heavy: agriculture, food processing, construction (Bilal et. Al, 2016; Kamilaris, Kartakoullis, and Prenafeta-Boldú, 2017; Sagury and Karel, 1980). The ability to use data collected as part of regular business, to analyse consumer patterns, or to fine-tune supply chains to real time demand and supply constraints can make the difference between running a leading operation and struggling to keep up with others. Estimates of the value to the economy of data sharing and use vary so wildly as to make them almost meaningless (Whittard et al, 2021 cabi), although some effective estimates of the value of data can be made in specific cases (Technopolis, 2020).

New data protection regulations and the value of sharing data with others have raised the importance of data governance (the processes and procedures to ensure that data use and sharing is ethical, fair and appropriate). Data governance is often seen as a cost, but there are arguments that it should be seen as an investment (Green and Ritchie, 2016), and there is clear evidence of the ability of good data governance to reduce costs (e.g. Alves and Ritchie, 2020). The Covid-19 pandemic proved a strong test for data governance systems in both the public and private sector. While many organisations found their data governance processes unsuited to home working, large research organisations with strong effective data governance systems made the switch relatively easily. For example, the secure Research Data Centres (RDCs) were able to easily adjust from on-site access to home working, a policy that had been unthinkable a year before (South and O'Donnell, 2021). In contrast, similar RDCs in other countries simply closed down as their data governance systems were not adaptable to the new situation.

Ritchie (2021) argues that good data governance should be seen as an investment, not a cost. If so, it is fair to ask if the return on that investment outweighs the cost – and whether investing more or less in data governance generates the most overall gains. As an investment, some estimate of the value can help to determine whether and how far investments should be made. However, putting a value on data governance is challenging, even harder than valuing data which in itself is rather problematic (Wdowin and Diepeveen, 2020). This is because the governance itself is not the end product; it combines many linked activities of an organisation; and the costs of poor governance may not be appreciated if they lead to higher risks but not realised outcomes.

In 2019 University of the West of England (UWE) was commissioned by CABI to review the value of data governance in Bill and Melinda Gates Foundation (BMGF)-funded projects. Part of the project aim was to explore *how* data governance could be valued, particularly in a low-income agricultural context: and how one can define this complex concept in a meaningful way so that can be easily understood and related to measurement of success and failure, which is often distilled down in economic evaluations to purely financial gains and losses.

One popular way of dealing with the multidimensionality of data governance is the 'five safes' model (Ritchie, 2017). This breaks down data governance into five separate but linked domains: projects, people, settings, outputs and data. It is widely used in government data access for planning, describing and implementing data governance solutions, for training (e.g. SRT, 2019), and increasingly for legislation (see Ritchie, 2021 for details of all of these). The Five Safes has even been used to structure reviews of data governance (e.g. Ritchie, 2009; Ritchie, 2020), but these have not included formal evaluations.

The Five Safes was designed to clarify the concepts involved in data governance, and make them separable. The UWE/CABI project decided to explore whether the Five Safes concept could provide useful structure to a formal evaluation. The resulting report, Whittard et al. (2021), showed that there were both pros and cons to this process, but overall this seemed to be a useful addition to the canon of evaluation techniques.

This paper reports on that experiment, and considers the lessons learned; specifically

- Is this a useful way to frame evaluations of data governance? Does it bring clarity to the process?
- What practical lessons can be learned from this initial trial?

Literature review

The Five Safes

Data governance and data access is a complex issue, involving question of law, ethics, IT, statistics, contracts, HR, accreditation, and other factors (Ritchie and Green, 2020). The Five Safes splits data governance and access questions into five 'dimensions of control':

Element	Typical question	Example of problems being addressed
Safe projects	Is this appropriate use and management of the data?	What is the purpose of the access request? Is this an ethical and lawful use of the data? What is the benefit to society or to the organisations sharing data? Is there a data management plan in place? What happens to the data at the end of the project?
Safe people	How much can I trust the data users to use it appropriately?	Do the users have the necessary technical skills? Do the users need training in handling confidential data? Are users likely to follow procedures?
Safe settings	How much protection does the physical environment afford to the data?	How is data stored? Are there physical restrictions on the users? Does the IT prevent unauthorised use? Are mistakes by authorised users likely to be detected?
Safe outputs	How much risk is there in the outputs of the access breaching confidentiality?	If the aim of access is to produce statistics, is there any residual risk by for example, highlighting outliers? If the aim of access is to produce data for onward sharing, how do we make sure that the data is appropriate?
Safe data	Is the level of detail in the data appropriate?	Is there sufficient detail to allow the project to go ahead? Is this excessive detail which is not necessary for the project?

Table 1 The Five Safes (adapted from Ritchie and Green, 2020)

The Five Safes was first created to describe data management systems, particularly research data centres (RDCs: controlled access facilities which researchers visit, physically or remotely, to access the data). It is currently used to describe the governance arrangements for all the general-purpose UK government and academic RDCs, and for wider government data-sharing arrangements in the UK, Canada, New Zealand and Australia. Eurostat, the Bundesbank, the Dutch research infrastructure

ODISSEI describe their RDCs in this way. The UK Data Archive uses it to describe their multiple data offerings and show how they integrate.

As the Five Safes has become better known in the last ten years, it has become more common to use it actively for designing data strategies in the public sector (OECD, 2014; Green and Ritchie, 2016: ICON, 2016; OSR, 2018; Cranswick et al, 2019) and private sector (Security Brief, 2019; Arbuckle and El Emam, 2020). Ritchie and Green (2020) note that the scope of Five Safes has moved away from RDCs and has now been applied to areas as diverse as managing HR systems or compliance modelling.

The Five Safes is used in formal legislation, such as the UK Digital Economy Act, as well as other regulation. In the UK, for example, the Office for Statistics Regulation bases its guidance on the Five Safes (OSR, 2018), while key academic funders (Administrative Data Research UK, Health Data Research UK, The Innovation Hub), all require bidders to 'address' the Five Safes in their data management plans.

One area that is lacking is evaluation, both process (does the system perform as well as it could) and economic (does the system generate a positive return on investment?). Ritchie (2017) noted that, in theory, the Five Safes provides a handy structure for evaluations; in practice, ONS (2011) appears to be the only example to date that has used the Five Safes in an evaluation, and that was a process evaluation for a system that mirrored ONS' system. There appear to be no examples of using the Five Safes for economic evaluation.

Economic and social evaluation (ESE) in data governance

The role of the evaluation is to identify the benefits and costs of a project or intervention; assess whether the intervention is worthwhile and has delivered its aims and objectives; to communicate these results; and, ultimately, to incorporate into a broader project cycle so that lessons can be learned (Alves et al, 2021). The principle of economic and social evaluation is well established; for example, the 'Magenta Book' (HM Treasury, 2011a) is a long-established guide to evaluators.

Although the literature talks of 'economic and social evaluation', in practice this is almost always just the former. As Alves et al (2021) note, economic evaluation is hard enough without the additional uncertainties brought about by considering less easily-measured social costs and benefits.

Even for economic evaluation (EE), this can be difficult. The Green Book (HM Treasury 2011b) suggests EE can take the form of a Cost Effectiveness Analysis (CEA), Multi-Criteria Analysis (MCA), Economic Impact Assessment (EIA) or Cost Benefit Analysis (CBA); and ideally the choice is between two alternatives considered ex ante. Baker (2000) suggest the minimum is a simple counterfactual: "doing X" versus "not doing X".

Whittard et al (2021) summarise the guidelines on EE as:

- The full costs should include direct and indirect costs and attributable overheads
- All benefits, both direct and indirect, should be valued unless it is clearly not practical to do – however it remains important to consider valuing the differences between the options
- All costs and benefits should be valued at market price (opportunity costs)
- Where possible, estimates for wider social and environmental costs and benefits, for which there is no market price, should be included
- The value should cover the useful lifetime of the asset encompassed

- Cost and benefits should be expressed in 'real terms'
- Cost and benefits should be discounted due to private/social time preference
- Cost and benefits of different options should be valued and the net cost and benefit calculated

This is an ideal world; these guidelines reflect the fact that methods for EE were designed for large investment projects with easily identified inputs and outputs, and a clear alternative.

However, as Alves et al (2021) discuss, these rapidly run into problems when consider more intangible investments such as those relating to data. Multiple authors have highlighted the fundamental measurement problem in valuing the benefits of data investments and use. Key confounders include the complementarity between data, infrastructure and processes; the ability for data to be re-used infinitely and simultaneously without reducing the 'stock'; and the possibility that data appreciates in value over time, rather than depreciating as is normal with assets. Wdowin and Diepeveen (2020) summarise both the issues and the wide range of resulting estimates arising from different assumptions, but even these are just for the valuation of data investments; as noted in the introduction, data is not the same as data governance, and there appear to be no evaluations of investments in the latter prior to Whittard et al (2021).

The issue of assumptions is perhaps the thorniest issue in relation to evaluations. This is because the vested interest of the donar investment is about producing a "large number", while recognising that most stakeholders "saw relatively little real value in the number" (Alves, 2021 ODI p24). Given the uncertainty embedded throughout the quantitative evaluation process, it does not take much in terms of loosening the parameters, to turn a potentially 'failing' project into one which records a strong positive return.

Whittard et al (2021) throw an additional problem into the mix: evaluation in LMICs. While there have been a number of evaluation on projects in LMICs (including agriculture), evaluation methods designed for high-income countries may not be appropriate in places where discount rates, financing methods, outside options, and institutions differ significantly from the models envisaged. Whittard et al (2021) argue that there is a strong need to tailor the evaluation to the particular circumstances of the project, and that qualitative evaluations may be just as informative as quantitative evaluations, if not more.

Combining models for evaluating data governance: a case study

Project genesis

In 2019, the UWE team were commissioned by CABI to carry out an evaluation of data governance on Bill and Melinda Gates Foundation (BMGF) projects. The initial aim was simply to provide an economic evaluation to demonstrate how this could be done. However, after initial discussions, it became clear that existing EE models were inappropriate and that a new approach would be needed. The project aims changed to include both the development of an effective valuation method, and the application of that method to a BMGF project as proof-of-concept.

The evaluation was carried out on Supporting Soil Health Interventions in Ethopia (SSHIiE). This is a $1.5 million project led by Gesellschaft für Internationale Zusammenarbeit (GIZ). The overall objective of the project was to provide proof of concept for the impact of leveraged geo-spatial soil, agronomic, and health data on transformative agricultural development. Specific aims were to

- increase the quality, efficiency, and reach of government and private sector services;
- improve national and regional resource allocation and policies; and
- increase the quality, availability, and utility of data and evidence.

The agreed approach was to split the evaluation into a qualitative component which would then direct and frame data collection for a quantitative component. Whittard et al (2021) describe the evaluation in detail, which included several innovations. One of those concerns us in this paper: the decision to use the Five Safes as a framework to structure the qualitative data collection.

Method

The first task was to identify the activities in SSHIiE that delivered 'data governance'. Three of the five workpackages were identified as primarily or mostly about improving the governance of data on the project.

The second stage was to identify what elements of data governance was being addressed in that work package. The Five Safes were broken down into additional subdomains, with the idea that each separate project workpackage with elements of governance would be tested against the subdomains, where relevant.

Domain	Sub domain	Example questions
Safe projects	a) Project planning	• What was the approval process? • How did it facilitate or delay the project? • What processes have been set up to make the next iteration more efficient?
	b) Data management plan	• Did you have a data management plan at beginning? • Were all stages identified? • How much did this change?
	c) Approvals process	• Who was responsible for the approval process? • Was the approval process developed from scratch? • How was the advice of specialists used?
	d) Public Engagement	• Is explaining your role to the wider public part of your project's objectives? • How do you engage with the public?
Safe people	a) Governance	• What model and structure of data governance and access is used? • How many people are employed in data governance functions and in what capacity? • What proportion of their time was spent on data governance issues?
	b) Training	• What, if any, training is provided for the following groups:

		○ Data collectors ○ IT staff and data processors/stewards ○ Users • Is this training developed and delivered in house?
	c) Access	• How do you differentiate access privileges by type of users? • What systems and procedures are in place to ensure data users operate in an appropriate manner?
Safe data	Data quality	• How is the flow of data processed in the project? • How is data quality managed? • How is disclosure risk in the data managed?
	Data need	• How do you limit the level of detail available depending on the type of user and level of need? • What is the most detailed level of data made available to researchers? (e.g. geography)
	Compliance	• What are the mechanisms through which breaches of data governance procedures are enforced? • What are the range of sanctions that can be applied in the case of a breach?
Safe settings		• How do you make data available from a safe setting? ○ From where can data be accessed? ○ What IT systems do you use to limit unauthorised access? • What are the challenges to users safely accessing the data from a safe setting? • How do you enforce standards and policies in relation to accessing data in a safe setting?
Safe outputs	Disclosure risk	• Are clear standards set and adhered to in relation to disclosure control? • What type of output checking for disclosure control is undertaken before release? • Are researchers trained in checking outputs for disclosure risk?
	Building capacity	• Is data created specifically for a project retained after the project is completed? • Are users allowed to archive their workspace (including code) once the project has finished? • What additional products and services have been developed as a result of using the data?

Five Safes: questions to be asked for each domain
• How much did the processes you commented on contribute to the costs and outcomes of the project? • What have you learned and what you would do differently next time?

Table 2 Detailed governance questions for workpackages (from Whittard et al, 2021)

The third element is the link between activities and outcomes. Every evaluation requires a 'logic model', a statement of how inputs, outputs, impacts and outcomes interact. Table 3 shows a typical logic model suggested by the UK government:

Term	Definition
Inputs	Resources used to deliver the project
Activities	What is delivered to the recipient
Outputs	What the recipient does with the activity
Intermediate outcomes	The intermediate outcomes of the project produced by the recipient
Impacts	Wider economic and social outcomes

Table 3 Typical logic model (HM Treasury, 2011)

Combining these three elements (workpackages, Five Safes, logic model) formed the basis for the team to structure its qualitative investigation:

Logic Model						Five Safes				
Work Package	**Inputs**	**Activity (what was done)**	**Outputs**	**Intermediate Outcomes**	**Long-term outcomes**	**Pro.**	**Pep.**	**Set.**	**Out.**	**Dat.**
WP 1. Develop Policy	Number of people Total cost Other tangible inputs Other intangible inputs (including from previous stages)	Open Data Sensitization Workshop (awareness raising)	Number and type of attendees Policy documents/ documents guidance produced	Common basic understanding of data access issues among relevant decision-makers so that decision-making is improved	Capacity: individuals who understand value of open data		x			
		Development of Coalition of willing	Identification of partners Identification of objectives Identification of responsibilities	Agreement on project aims, providers, beneficiaries, operating methods, so that future discussions do not need to revisit basic points	Example of pro-active governance to wider community	x	x			
		Consultation workshop on data access and sharing	Number and type of attendees Policy documents/ documents guidance produced	Common basic understanding of data access issues among relevant decision-makers reducing time to get agreement in future	Guidelines for the wider community	x	x	x	x	x
		Establishment of data sharing taskforce	Taskforce membership, longevity Policy documents/ guides produced	Recognised authority for project decisions reducing approval time/activity	Recognised authority for decisions on data sharing in the wider community	x			x	x

Table 4 Project mapping (part view; from Whittard et al, 2021)

Table 4 shows a partial view on the table generated for each of the workpackages. Thus it can be seen that, for example, in workpackage 1 (WP1), one of the activities was the Open Data Sensitization Workshop. Inputs and measurable outputs were identified. The only relevant governance domain is 'people', and this was used to identified the target outcomes. Measurable inputs and output associated with the activity and the outcomes were identified. This was used to generate specific questions for that activity. A simplified version of the full framework was then sent to the interviewees prior to interview, to indicate the topics that would be discussed. The interviews were transcribed and analysed.

Analysing findings

The interview findings had two functions: as direct evaluation data, and to help structure the quantitative study for the more formal economic evaluation.

The direct analysis of the interviews was structured around the Five Safes. For each dimension, the team reported interview findings, and identified lessons learned for that governance dimension. These are tabulated below, in summary; for the report, the 'five safes' were replaced with more meaningful descriptions of the dimensions:

Lessons learned in respect of…	
…organization of projects and investment in setting up processes	• effective working links between local and international partners was key to maximizing project value • engagement with a diverse set of stakeholders, even though it may be costly and time consuming, also provides substantial benefits in achieved full project value • short-term project goals may be in conflict with longer-term wider benefits to society
…organization of and investment in people	• Identify top-level 'champions', and allow time for the relationships to develop • Recruit/empower stakeholders at all levels of delivery to practically drive the project forward • Put in feedback loops to link levels • Training and knowledge transfer is initially most effectively targeted at specific local actors • Investment in time to build trust generates substantial dividends
…the set up and management of safe settings	• Individuals need to trust the processes for handling data (which could include trust in automated systems) • More attention should be paid to second-order conditions (governance, staff training) when planning IT solutions
…producing statistical outputs and shareable datasets	• Outputs produce direct tangible evidence of value created • Training in producing safe outputs is often overlooked
…investments in data quality and usability	• working through trusted local organizations and individuals can realise value of the data • external expertise can provide the scaffolding to support the infrastructure for local stakeholders • standardisation (or, at least, inter-operability) of data collection and processing should be prioritised • projects should allow learning by doing • maximising value requires planning for second-order activities, such as putting robust policies and procedures in place

Having used the interviews to determine what factors seemed to help or hinder the successful exploitation of data, the qualitative data collection was designed to put values, as far as possible, on these factors.

The interview findings were then re-used to qualify and provide context for the quantitative findings. For example, the quantitative study showed that, when restricting the evaluation to direct, reasonably measurable components, the investments in data governance had a negative benefit (in other words, BMGF would have been better off choosing to invest the money elsewhere - or not at all). However, the information collected on the qualitative section showed that a large number of intangible, persistent benefits had been generated in data governance. Some very limited assumptions were sufficient to show that the project overall was of benefit to the community; for example, assuming that the research papers produced during the project were valued using the time cost of production.

More broadly, the qualitative study showed the range of potential benefits, even if most of them were thought to be unmeasurable. For example, a key innovation in the project was the Coalition of the Willing (CoW) – an initial meeting and then subsequent activities designed explicitly to build relationships that could make the project work. In the evaluation, this was accounted for on largely cost-of-time measures, but the qualitative review showed that the effects of the CoW were pervasive across the Five Safes: getting stakeholder buy-in, identifying potential champions and blockers, demonstrating the importance of trust in policy-making and delivery. Moreover, interviewees recognized the long-term value of the CoW for changing attitudes, for introducing new ways of thinking about data governance, and for providing a positive example of collective planning. This highlighted that the timing of the evaluation was crucial to the perspective on whether it brought a net gain or not

Reflections

The review team decided to (a) split the review into quantitative and qualitative elements (b) use the Five Safes framework to provide structure for the qualitative component. Decision (a) was undoubtedly the more important conceptual choice, as it provided a practical way of identifying the scope of the quantitative study and a context for interpreting quantitative results. However decision (b) simplified the qualitative element considerably.

The Five Safes does not directly address the measurement or timing of costs and benefits, or many of the other practical problems of evaluation noted in the literature review; as Green and Ritchie (2020) discuss, the Five Safes is a mechanism for framing questions, but provides no direct answers per se. Nevertheless, using a ready-made framework, familiar to the reviewers and with an intellectual hinterland to support it, made the task of breaking one large problem into many smaller ones much easier.

Would other approaches to the qualitative study also have worked? 'Yes, probably' is the fairest answer. However, part of the reason for choosing to use the Five Safes is that it was explicitly designed to deal with the multi-faceted nature of data governance, and the language of the Five Safes can be directly related to data governance questions. This helped to address the issues of what, exactly, on the SSHIiE project counted as 'data governance' activities and outcomes. A particular strength of the Five Safes is that it is broad in its coverage, so it ensures that all important elements area captured, while it is subjective in its application. This empowers evaluators to work within a broad framework, while allowing them the flexibility to focus in on issues they feel are of particular importance within the specific context of the project. In addition, given its familiarity to the data science community, using the Five Safes to structure an evaluation can help to reduce some of the uncertainty in an area, which by its intangible nature, is plagued by ambiguity.

It was notably that much of the project value came in the 'safe projects' dimension: that is, the element of governance concerned with objective-setting, outcomes, approvals, engagement, and planning. This is unsurprising: given the innovative nature of the project and the data governance activities (such as the CoW), planning and clear project oversight were disproportionately important in determining the success of the data governance plans. It would perhaps be useful, in future, to see whether follow-on projects place the same emphasis on planning, or whether more technical activities such as staff training become the drivers of success or failure.

If, as suggested in the qualitative studies, this project has led to permanent changes in attitude towards data sharing and data governance in Ethiopia, then one would expect future projects to reflect this. For example, "a shared understanding of the importance of trust" becomes an input, rather than an output. This is an important outcome for the donor community and would not have been picked up, had the evaluation stuck to a traditional quantitative approach. It is important for the SSHIiE project (as well as us) to reflect and understand this Programme evaluation using the Five Safes might therefore be an easy way to identify accumulative gains from investment (of course, the same could be said for any other structure which is used consistently across projects). The Five Safes is more commonly used to design data governance activities rather than evaluate them, but the implication is there is the potential to exploit this framework consistently throughout all stages of grantmaking (portfolio strategy, grant design, anticipated risk of achieving measurable impact).

One factor that came out strongly in the interviews was the importance of timing. In some of the 'safes' benefits were quickly identified as structural shifts which could have long-term impacts (providing a successful example of stakeholder management; showing how attitudes changed); in others, the benefits were more directly related to the projects (such as the relationship between system design and user training). As well as reinforcing the sensitivity of results to the timing of the evaluation, such findings also show the usefulness of a structure which can highlight the different temporal impact of different elements of governance.

It is worth noting that the qualitative/quantitative split and the use of the Five Safes was not the first solution considered for evaluating the CABI project. Several alternative conceptual frameworks were explored over some six months, often based on the more traditional quantitative or case study evaluation models. All proved unsatisfactory, mostly because they did not address the slipperiness of valuing the concept of data governance. Realising that the Five Safes could provide the scope definition, led to the qualitative/quantitative split, and the development of a practical method.

As this was the first attempt to use the Five Safes in this way, there was considerable learning. For example, there were originally far more questions than those presented in Table 2, and these were not structured below the level of the safe dimension. After discussion with CABI about what could be reasonably expected of the interviewees, the team reduced the number and type of questions and added the sub-dimensions to allow signposting of questions.

Finally, the framework was helpful to the researchers in planning for the interviews, and to the CABI team for seeing how the analysis would be structured. However, feedback from the interviewees made clear that the workpackage-governance matrix was less useful for them, and could even add confusion. Interviewees wanted a clear set of questions that could be answered, and had no interest in the conceptual framework. The lesson from this is that the Five Safes is more of a tool for the evaluators, and bringing the jargon of the Five Safes into data collection may be counter-productive. For example, identifying which of the 'safes' was relevant to which workpackage (as in Table 4) was supposed to streamline questions; in practice, interviews were allowed to develop organically and so the structure was only used to write up the result afterwards.

Conclusion

The evaluation of investments in data governance has been almost completely ignored in both practitioner and academic literature, partially because of the challenges involved in conceptualisation,

definition and measurement. Understanding the economic contribution of investments in data sharing and data governance is problematic: outputs and outcomes are often widely dispersed and hard to measure, and value of those investments is very context-dependent. This paper summarised the results of an eighteen-month project to carry out a formal evaluation, focusing on the overall design (qualitative and quantitative) and how the popular Five Safes framework was used to structure the qualitative element.

Overall, this was felt to be a useful strategy. The Five Safes helped to clarify what data governance was, and how to ask questions about it; and the qualitative-quantitative split helped define what evaluation data could reasonably be gathered, and how to interpret it in context. As the first time this approach has been used, there was a significant amount of learning, and so future evaluations are likely to be much more streamlined.

The use of the Five Safes opens up a number of interesting possibilities. First, as a simple framework, but one which can be applied in many different situations, it might encourage other evaluations to make comparisons: where are the short- and long-term gains? Where are costs concentrated? What about benefits? Economic evaluations are notoriously difficult to compare because they are highly dependent on assumptions and data quality, but the broad Five Safes framework encourages evaluators to see how the dimensions compare to each other across projects.

When investigating hard to measure concepts, such as the value of data governance, the SSHIIE case study demonstrated that there was considerable value of undertaking a wider evaluation that integrates both quantitative and qualitative frameworks. This study argues that in the absence of any specific frameworks, then the Five Safes, which primarily has been used to design and critique data management strategies, is a readymade, off the shelf tool which has been proven to meet the needs of this type of evaluation.

The Five Safes framework benefits from ensuring evaluators take a broad view of all important elements of data governance, while being flexible enough in its application to allow evaluators to focus in on project and contextual specific issues – thus improving the validity of the results. Its applied application in the SSHIiE case study has demonstrated its compatibility with more traditional and formal quantitative evaluation techniques. While its familiarity with the data science community should encourage a wider acceptance of the method, allowing for assessment of the reliability of findings between studies.

In the SSHIiE case study, by using the Five Safes model the evaluators were able to understand the wider value of improvements in data governance, whereas a traditional quantitative evaluation would have been primarily focused on tangible investments which potentially were (a) siloed (b) focused on the data / technology (rather than intangibles from data governance). If the Five Safes (or at least some other qualitative framework) had not been employed, quantitative evaluations which fail to pick up the nuanced effects of such projects, mean that these type of evaluations can re-enforce the loop of bad governance, duplicate data capture, lack of trust, lack of sharing and so on.

In addition, perhaps of more value in the long term comes from the option of commissioning evaluations at the start of an investment. The Five Safes is more often used to design data governance systems and processes. By using it to structure evaluations as well, this may allow project managers to

see more clearly how each element of their risk-management strategy appears to generate value – or not.

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