PROJECT GOVERNANCE: A SYSTEMS APPROACH TOWARDS SIMPLER, BETTER AND FASTER

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ABSTRACT

This paper describes an empirical study that analysed and improved project governance, in terms of health monitoring and reporting, and ultimately decision making capabilities relating to large capital (mega) projects. The researcher applied boundary critique to analyse monitoring, reporting and decision making mechanisms embedded in the governance process and system—she applied Werner Ulrich's critical systems heuristics to confirm that the process/system is flawed, and identify shortcomings. These were improved upon, and the process as well as associated system were improved upon and streamlined.

Keywords: Project governance; critical systems thinking; critical systems heuristics

INTRODUCTION

Megaprojects continue to grow in magnitude, regardless of the state of world economies. Flyvbjerg (2014) argues that "megaprojects have proved remarkably recession proof…the downturn from 2008 helped the megaprojects business grow further by showering stimulus spending on everything from infrastructure to ICT". Proper governance of such projects is crucial to ensure maximum return on investment—it is "critical in influencing the success or failure of projects" and ensures that projects are delivered efficiently and sustainably (Too et al., 2017). Project management and governance is a dynamic field; Abbasi & Jaafari (2018) state that research in the project management field have been expanding substantially over the past few decades; evolution and innovation still occur consistently in both industry and academia. Still, more empirical research is needed to refine governance processes (Musawir et al., 2017). Despite the fact that improper governance is a main cause of project failure and abandonment, limited effort have been made to address project governance, especially in African countries (Zarewa et al., 2018). Hence, in this study the researcher aimed to improve the project governance process in a large South African based company; the company has an international footprint also and its projects are resource intensive in terms of time, capital and human resources; e.g., completion costs range between $5billion and $15billion. Management was very concerned when a benchmarking company confirmed that project-related investment decisions, which stem from the applied project governance process and associated software/information systems, were suboptimal.

In order to ascertain shortcomings, the researcher applied critical systems heuristics (CSH) (Ulrich, 1983); CSH facilitated analysis of the monitoring, reporting and decision making mechanisms. The actual (as-is) vs desired (to-be) dimensions of the project governance process and associated system, i.e. what makes (vs what should make) it purposeful and measurable for clients; who controls (vs who should control) resources; who are (vs who should be) relevant experts, including what is (vs what should be) regarded as relevant expertise so as to guarantee successful design, development, implementation and continued use; and who/what emancipates (should emancipate) affected, yet uninvolved stakeholders. Insight gained from the application of the boundary questions was used to improve (through targeted simplification) the governance process and system applied to assess and monitor the organisation's project portfolio health, so as to inform investment decisions.

BACKGROUND AND OBJECTIVE OF THE STUDY

This study was conducted in a large South African based company that has an international footprint also. It continually sustains, improves and grows its asset base in order to remain competitive within its industry. Therefore, sustenance, improvement and growth activities are continuously undertaken in its local and international operations. The company largely depends upon infrastructure megaprojects to expand its business and to grow in the tough economic climate; e.g., they execute a number of such projects that have an estimated completion costs ranging between \$5billion and \$21billion. These projects are resource intensive in terms of time, capital and human resources. To accelerate sustainable growth, they strive towards world-class project planning and execution processes and systems. These are governed so as to confirm adherence thereto, and also to ensure that they remain up-to-date and optimal. One of the key governance processes is the project gate keeping process—it governs investments decisions throughout projects' lifecycles. However, a benchmarking company found this process/system to be suboptimal; as a result, re-work during execution phases led to an estimated loss of 6.3% internal rate of return (IRR) and, on average, schedule overruns of 23% across this company's portfolio of projects. Hence, management became increasingly uncomfortable with the quality of it, which they use to base investment decisions on. So, they decided to investigate so as to improve upon it—the aim of this study was thus to identify the shortcomings and improve upon them.

THEORETICAL UNDERPINNINGS

The relevant theoretical underpinnings for this study are: the governance process that was investigated and improved upon; and critical systems heuristics. These are discussed next.

The Governance Process

Projects are planned and executed according to a well-defined project management methodology in the company where the study was conducted; it is essentially based on the project lifecycle approach as prescribed by the Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI, 2013). Hence, projects are planned/ executed using a stage-gated approach. The issues potentially relate to ineffective planning that is inappropriately governed (refer to the findings of the benchmarking company in the background section). According to the benchmarking company these impact negatively upon execution and waste resources. Literature also confirms that improper governance negatively influences progress and outcomes of projects (Musawir et al., 2017, Too et al., 2017, Abbasi & Jaafari, 2018, Zarewa et al., 2018). So, this study focused on planning phases of megaprojects in the organisation; they were governed as follows: projects were evaluated at three pre-defined evaluation points ("gates") during planning phases; the objective of these were to determine the project's health/performance relative to its phase in the project's lifecycle. Outcomes of evaluations informed further investment decisions.

Decision points were referred to as "gates" or "gate decisions"; senior investment managers decided whether to allocate resources to continue to the next phase of the project. The process was formally applied to all projects adhering to minimum criteria in terms of complexity and cost. So, during a project lifecycle investment decisions were taken based on the outcome of a "gate readiness review". The two fundamental questions that must be answered at the reviews were: First, are the project deliverables complete with adequate quality to enable the gate decision? Second, is the project (still) viable and set up to be successful in the next phase. The questions were posed by the project management office (PMO) (as the governors of the process) to the project team. It is illustrated in Figure 1.

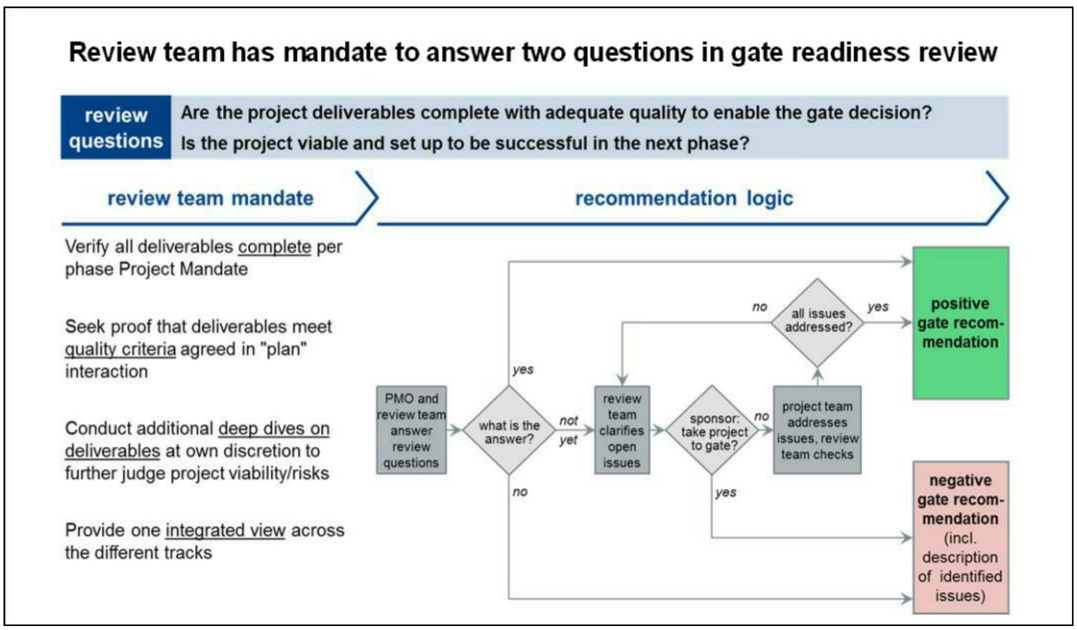

Figure 1. The Gate Readiness Review

The outcomes of evaluations were either: continue the project as-is and allocate resources (positive recommendation); recycle the project, i.e. the project required more work prior to continuation, and resource allocation was delayed until proof of further deliverables have been provided (provisional recommendation); or terminate (stop/shelve) due to lack of maturity and/or viability (negative recommendation). Investment managers used these on a per project basis to inform further investment decisions, i.e. to allocate resources for further development and/or refinement or termination. It is illustrated in Figure 2.

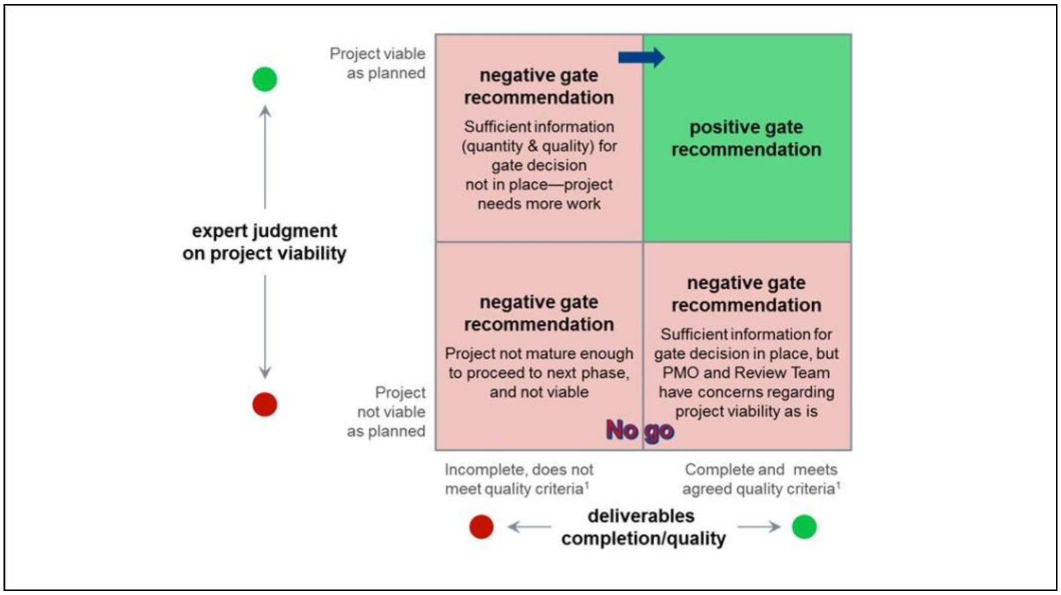

Figure 2. Possible Outcomes of Evaluations

It is discussed in more detail in the section that details the empirical work; it also outlines the company's approach to governance, and point out the identified shortcomings.

Critical Systems Heuristics

Critical systems heuristics (CSH) provides a conceptual framework for critical awareness and practice; it provides a philosophical foundation and practical (discursive) framework for real-world organisational problems (Ulrich, 2003). It is positioned in the critical systems thinking (CST) paradigm; it enables a problem solver to critically determine: *what* is relevant; *who* should assist to determine what is relevant; conflicting views amongst stakeholders; and also *how* to handle conflicting views amongst relevant stakeholders (Ulrich, 1983). CSH's core principle is boundary critique; it enables problems solvers to systematically and critically deal with *boundary judgements* of a problem situation so as to determine the gap between what the (ideal) situation *ought to be* versus what the current (actual) situation *is* (Ulrich, 1983). In practice, it facilitates determination of: dimensions of a system that makes it purposeful and measurable for clients; who is, versus who ought to, control the systems' resources; who/what is, versus who/what ought to be considered relevant experts/expertise so as to guarantee successful implementation and continued use; and who/what will/should identify, in order to ensure, emancipation of affected, yet uninvolved, stakeholders (Ulrich, 1983). CSH was applied to investigate the governance process/system and guided the interviews and outcome of the empirical study. Practical application of CSH in this study is discussed later.

THE RESEARCH APPROACH AND PROCESS

This study was conducted in the critical social research paradigm; critical social research aims to intervene in a problematical social context and is guided by theory (Baskerville, 1999, Myers & Klein, 2011). It is based on an action research (AR) approach described by Checkland & Holwell (1998). They describe it to include a number of steps. First, enter the problem situation with the aim to intervene for improvement. Second, plan the intervention by: establishing roles, declaring a methodology and philosophical (theoretical) framework of ideas, and implementing planned changes. Third, continuously reflect on the progress and success of the intervention, so as to adjust intervention actions if/as required.

In terms of entering the research context, the researcher was appointed as a consulting business analyst to investigate shortcomings and possible improvement actions in order to improve the governance process and, by implication, the associated and supporting system.

In terms of the research plan, the investigation was guided by the critical systems thinking (CST) paradigm; so, CST principles were employed as the philosophical framework of ideas—it guides improvement through the examination of taken-for-granted assumptions; it is dedicated to emancipation, yet acknowledged that that the human world is be full of contradictions and conflict (Flood & Jackson, 1991). It was found suitable as this study focused on an organisational process supported by a system (made and implemented by people), as well as people (from a messy, contradictory and conflict-ridden human world).

The empirical study, where the shortcomings in the process were identified using CSH as the guiding framework, and the process and outcome were reflected upon is discussed next.

THE EMPIRICAL STUDY

This section discusses the intervention and results, as well as reflection on the intervention.

The Participants

In this study, the company's *as-is* project health monitoring and reporting practices were be compared with a proposed *ideal* situation, according to relevant stakeholders involved in and affected by this process; this illuminated the gap and illustrated the improvement actions to be taken. Project governance is applied across the organisation by all project managers—they are responsible to capture the progress of their projects in the system at key decision points; the output of the system is then used by senior management to inform critical investment decisions at these key decision points in the lifecycle of projects. For this intervention the researcher (as a consulting business analyst), senior investment managers (project investment decision makers), representatives of the governance team, and affected stakeholders (project managers) of the governance process/system formed a task team; they were regarded as the participants in this study.

The Research Methodology

The CSH methodology was applied to guide discussions with participants and determine: the dimensions of the process/system that makes it purposeful and measurable for its clients; who is, versus who ought to, control the system's resources; who/what is versus who/what ought to be considered relevant experts/expertise so as to guarantee successful implementation and continued use of a new and improved process/system; and who/what should identify/ensure emancipation of affected, yet uninvolved, stakeholders.

The Results of the Empirical Study

Interviews with participants revealed that the (flawed) governance process/system was applied as-is in the company for more than ten years; it was thus deeply entrenched as part of the organisational culture; proper motivation and even significant change management would thus be needed to change it. It would entail an extensive social (cultural) intervention in addition to a systemic intervention. The outcome of the interviews is discussed next. To keep with the CSH methodology, the outcome is discussed as per the following categories: the purpose and measurement of the governance process/system (for its clients); the current versus ideal controllers of process/ system resources; current versus ideal expert/expertise of those involved; and emancipation of affected (yet uninvolved) stakeholders.

Purpose and measurement of the system (for clients)
A sample of 60% randomly chosen projects that were assessed over a period of three years were considered in order to compare the output of the process/system to the findings of the benchmarking company, and determine the authority of the benchmarking company's findings. It was found that only 10% of these projects were indicated by the governance process/system to be underdeveloped, i.e. were identified to have had major deficiencies with regard to completeness and quality of the work done. This confirmed the findings of the benchmarking company that indicated major deficiencies and resultant re-work due to poor planning, i.e. that poorly developed projects were recommended to continue. So, it had to be investigated further to identify possible shortcomings in the process/system.

Also, when questioned regarding the purpose/measurement of governance, investment managers indicated that they need support (back-up data) to ensure appropriate investment decisions; on the other hand, project managers regarded governance as purely bureaucratic. Final reports stemming from the process/system were 'editable' and, hence, the integrity thereof questionable. Detailed analyses of the process/system revealed that key decision support data/information was *not* automatically generated; it was edited off-line prior to presenting it to senior management. Senior management were unaware of this. So, they based their investment decisions on information of which the integrity was compromised.

Current versus ideal controllers of the system
Investigation of the governance process/system revealed that data capturing, calculation of project development indexes and output reports (graphs) were extremely complicated. This section attempts to briefly explain the way in which data were captured and output graphs (that inform investment decisions) were created, according to the participants.

Evaluations were done separately for three work areas (streams) of projects, i.e. business-related elements, engineering-related elements and project management-related elements. Figure 3 shows an example input screen where input was captured for the business-related elements by clicking on the "Answer Questionnaire" button. He/she was presented with a screen such as the one shown in Figure 4; a response required selecting the radio button next to the response that best described the level of development for the particular element.

Business Track - PDRI Evaluation			2008/03/10 00:00
Element		Score	Evaluation Comments
Business Strategy and Strategic Fit	Answer Questionaire	0.0	
Business and Ownership Structure	Answer Questionaire	0.0	
Cross - Business Impact Analyses	Answer Questionaire	1.0	
Management Structure and Organization design	Answer Questionaire	2.0	
Industry Analysis and Competitive Advantages	Answer Questionaire	0.0	
Competitor Analysis and Value Chain Comparisons	Answer Questionaire	0.0	
Plant Capacities	Answer Questionaire	1.0	
Market Strategy	Answer Questionaire	4.0	
Market - Volumes (Products and By-products)	Answer Questionaire	4.0	

Figure 3. Extract of the User Interface

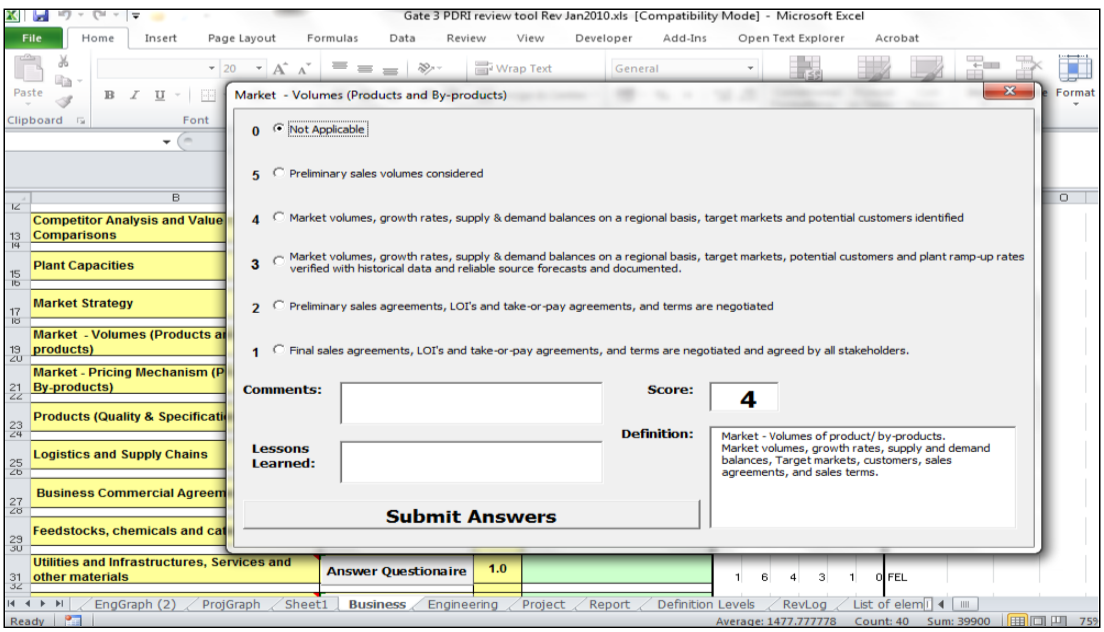

Figure 4. Example of Possible Response Levels

The responses' elements were coupled to a score used to generate output graphs. When a response was chosen the block marked "Score" automatically updated with a numeric score coupled to the response. Figure 5 and Figure 6 show examples of scores coupled to possible responses—refer to the column marked "Level scoring" where response levels indicated an increased level of completeness, with level 1 being the most complete and level 5 being the least complete, has a lower numeric score coupled to it. Also, note that the scores were not allocated to the different response levels of the various elements in the same way—an element that was regarded as more important had higher numeric scores coupled to it. For example, the level 5 (least complete) response in Figure 5 is allocated a numeric score of 18 whilst the level 5 (least complete) response in Figure 6 is allocated a numeric score of 6 only. This implied that the element "Engineering Track Quality Management" was considered to be more important for the project's success than the element "Market – Volumes (Products and By-products)". Figure 5 also illustrates that the response levels at the maximum level of development (level 1) was in some instances zero, thus not adding any numeric value to the total for the work stream and the total for the project. The maximum level of development (level 1) of each element did not necessarily indicate the *best* (ideal) level of development. E.g., ideal level of development for elements illustrated in both figures below are at the *second* level; extra (non-value) adding level(s) were thus added to most of the elements.

BT33	Market - Volumes (Products and By-products)	Level scoring
0	Not Applicable	0
5	Preliminary sales volumes considered	6
4	Market volumes, growth rates, supply & demand balances on a regional basis, target markets and potential customers identified	4
3	Market volumes, growth rates, supply & demand balances on a regional basis, target markets, potential customers and plant ramp-up rates verified with historical data and reliable source forecasts and documented.	3
2	Preliminary sales agreements, LOI's and take-or-pay agreements, and terms are negotiated	1
1	Final sales agreements, LOI's and take-or-pay agreements, and terms are negotiated and agreed by all stakeholders.	0

Figure 5. Example of Scoring per Level

ET47	Engineering Track Quality Management	Level scoring
0	Not Applicable	4
5	ETQP compiled for the current phase, but with limited stakeholder involvement or with only general description of activities and responsibilities.	18
4	ETQP compiled for the current phase, but not all stakeholders involvement or specific plans, activities and responsibilities only defined for some engineering disciplines.	12
3	ETQP compiled for the current phase with involvement of most stakeholders, specific plans, activities and responsibilities for all engineering disciplines, but with limited effectiveness of tracking system and review of the ETQP to incorporate feedback.	8
2	ETQP fully defined for current phase with involvement of all stakeholders and specific plans, activities and responsibilities for all disciplines, but ETQP lack alignment across all disciplines such that there may be uncertainty regarding conformance of work at interfaces between engineering disciplines. Formal tracking and feedback system not fully applied for all disciplines.	3
1	ETQP for current phase was in place early in the phase. ETQP was compiled with effective involvement of all stakeholders and plans,activites and responsibilities defined and reviewed with feedback. Formal tracking and feedback system implemented. There is general confidence that all discipline work and the engineering work overall is all complete as planned, technically correct, technically aligned and aligned with the business intent/objectives.	3

Figure 6. Example of Scoring per Level

The responses of all the scores were tallied up and a total score was obtained for each work stream. A work stream's score had to be within a certain pre-defined numeric range to be "acceptable". The scoring was applied as follows: a lower score indicated a better level of development and a higher score indicated a lower level of development. The three streams' scores were tallied up to obtain a total score for the project. The total score also had to be lower, rather than higher, to indicate an acceptable, or even better than acceptable ("overdeveloped"), level of development; the total score also had to fall within a pre-defined numeric range to be "acceptable". Each work stream as well as the total for the project had a pre-defined "target score" within the pre-defined numeric range that indicated optimal development; this was however, not clearly indicated on the output report.

For example, Figure 7 shows an output graph generated by the system—the column named "Score" indicates the tallied results obtained for a project, i.e. the totals of the individual input responses to determine the level of development for the work streams (refer to the column named "Track" in Figure 7) and the total for the project; the total score for each track, *and* the total for the project, has to fall within pre-defined ranges that indicate ideal levels of development. The predefined ranges for ideal development differed between the three work streams—it ranged between numerical values of approximately 75 to 240.

Track	Score	Index	Comment	Key
Total	401	100	Acceptable	Overdeveloped
Business	75	100	Acceptable	Acceptable
Engineering	240	100	Acceptable	Underdeveloped
Project	86	101	Acceptable	Risky

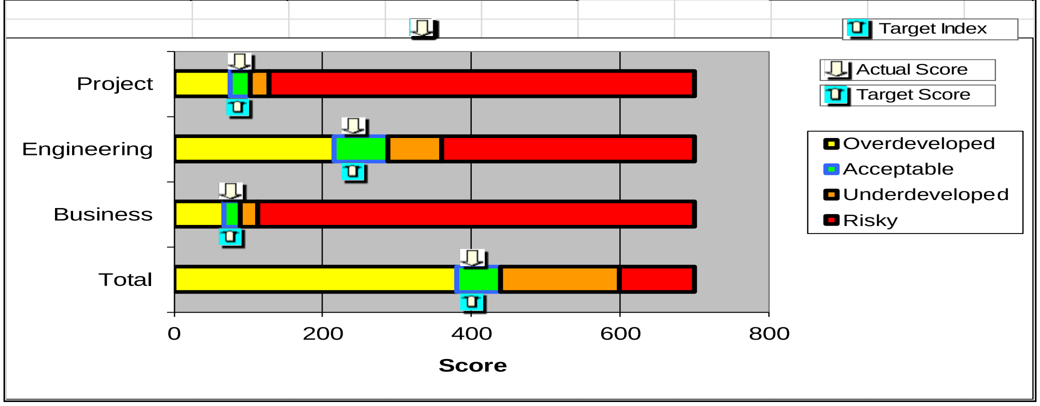

Figure 7. Example of Output Report

In summary, the extreme complexity and vagueness of the content and scoring of elements described here emphasises that the process and the metrics embedded in the process and system were extremely complicated. So, confirming the appropriateness and applicability of metrics, and the effectiveness of the process overall, was extremely difficult.

Relevant experts/expertise

The complexity of the system, as described in the previous section, raises a question about the relevant experts and expertise that were involved in the design of the system. When comparing the fact that this system only indicated two underdeveloped projects (refer to the sample that was taken previously) versus the benchmarking company that indicated severe underdevelopment in the majority of projects (hence major shortfalls in terms of IRR and re-work), the researcher could not verify that the process/system was *not* ineffective.

When questioning participants about the experts/expertise included in the original design of the gate keeping system, they confirmed it was designed/developed in-house more than a decade ago by project managers and engineers, and without consulting with relevant industry/project governance experts. Embedded metrics were also not protected; users could thus change metrics to 'manipulate' outcomes. When considering this, the extreme complexity and vagueness of metrics, and the fact that users already admitted to editing reports off-line, the integrity and effectiveness of the process and associated system had to be questioned. Senior management confirmed that they were unaware of these issues and, as such, agreed that investment decisions could no longer be based on reports produced. It was necessary to simplify, improve and streamline the process as well as system.

Emancipation of affected stakeholders
It was clear that the improvement had to be addressed on various levels: embedded metrics had to be simplified and support sound governance; the process and associated system had to be simplified and streamlined; and the system had to be protected so as to ensure the integrity of decision support information stemming from it.

In conclusion: the streamlined process and system: simpler, better and faster
In the end embedded metrics were redesigned following a simple binary approach. Every question asked, that indications a level of development, were rephrased to only reflect the ideal level of development, and so that it could be answered by "TRUE", "FALSE" or "N/A" (not applicable). Table 1 shows examples of the "old" elements versus new and improved (streamlined) metrics. Table 2 shows a new simplified (protected) user interface.

Table 1. Examples of Improvement of Elements

Element	**Ideal level of development at 1st assessment**	**Ideal level of development at 2nd assessment**	**Ideal level of development at 3rd assessment**
Business strategy (is-mode)	Strategic alignment of opportunity tested with group strategy, technology strategy and business unit charters; agreed with all stakeholders.	Detailed business strategy written up and approved by all stakeholders.	Detailed business strategy written up and approved by all stakeholders.
Business strategy (ought to mode)	*A preliminary business strategy was assessed based on compatibilities, synergies, risks and potential conflicts of interests with other business units.*	*Detailed business strategy written up and approved by all stakeholders.*	*Detailed business strategy written up and approved by all stakeholders.*
Project accounting requirements (is mode)	Project control philosophies were defined in view of possible partner capabilities.	All requirements have been compiled but were not yet agreed.	All requirements have been compiled but were not yet agreed.
Project accounting requirements (ought to mode)	*Project control philosophies were defined in view of possible partner capabilities.*	*All project accounting requirements were compiled.*	*All project accounting systems and processes were implemented.*
Project sponsor (is mode)	The project executive/sponsor accepted his/her leadership role, but no documentation exists to show acceptance.	The project executive/sponsor accepted his/her leadership role, but no documentation exists to show acceptance.	The project executive/sponsor accepted his/her leadership role, but no documentation exists to show acceptance.
Project sponsor (ought to mode)	*The project executive/sponsor accepted his/her leadership role.*	*The project executive/sponsor accepted his/her leadership role.*	*The project executive/sponsor accepted his/her leadership role.*
Equipment utility requirements (is mode)	No considerations given to requirements or very rough estimates exist.	Requirements were reviewed and agreed.	Requirements were reviewed and agreed.

Element	Ideal level of development at 1st assessment	Ideal level of development at 2nd assessment	Ideal level of development at 3rd assessment
Equipment utility requirements (ought to mode)	*Utility requirements were considered, availability on site was assessed and utility requirements were provided for in the project scope.*	*A list of all utilities was developed with interfaces, battery limits and preliminary tie-in positions; quality and quantity requirements agreed; all actual battery limit conditions were verified on site and discussed with the supplying authority.*	*All utility related interface documents were signed off; project scope and design is fully consistent with requirements.*
Commissioning philosophies (is mode)	Commissioning philosophies developed but not yet shared with stakeholders.	Documented commissioning philosophies available and agreed.	Documented commissioning strategy developed and agreed by all stakeholders.
Commissioning philosophies (ought to mode)	*Not applicable.*	*Commissioning philosophy documented and agreed with stakeholders.*	*Commissioning strategy documented and agreed with stakeholders.*
Social and/or community issues (is mode)	Not applicable.	Interested and affected parties consulted and verbal agreement reached on social issues.	Interested and affected parties consulted and written agreement reached on social issues.
Social and/or community issues (ought to mode)	*A preliminary summary of potential SHE/EIA issues for technical alternatives was completed.*	*EIA includes business specific environmental impacts that were pro-actively identified and incorporated into the design; EIA is ready to be submitted to the authorities.*	*Final authorisation from relevant authorities was obtained; all aspects that influence the design were identified and included in the design; the environmental management plan is available for execution.*

Table 2. Extraction of the Simplified User Interface

	Element	Required status at 3rd assessment point	Status	Comments
1	Alternative evaluation	There is a clear understanding and agreement across the organization what value measures and trade-offs will be used for decision making.	TRUE	
2	Alternative evaluation	A method such as a peer review was used to test for and eliminate bias in the data whilst value of gathering additional information has been formally evaluated together with stakeholders and/or functional/line managers.	FALSE	
3	Alternative evaluation	A wide range of business options were considered e.g. non-capital options, project delay, buy service over the fence, JV, rent service etc.	TRUE	
4	Alternative evaluation	Business alternatives were creatively generated by seeking external input, i.e. outside of the company and industry rather than inside the work team and the SBU.	N/A	
5	Alternative evaluation	Reasoning behind the selection of the specific business alternative is understood by team and decision makers; it is documented.	TRUE	
6	Business plan	Preliminary assessments of competitors' value chain and cash costs were made and compared to this proposal.	TRUE	
7	Business plan	Plant capacities design rate, on-stream factors, product yields (saleable products per year) were based on documented assumptions.	TRUE	

Figure 8 is an example of an auto-generated, secure report. Simplified metrics resulted in information that could be extracted and modelled using various views. The report in Figure

8 indicates a project with a business plan that is only 87% complete (and hence still required 13% of work to be viewed as complete enough for the project to receive funding for further development work). It also indicates that the project's schedule is only 75% complete (and hence still required 25% of work to be viewed as complete enough for the project to receive funding for further development). The same argument is applicable to all the other elements on the graph that indicates development gaps.

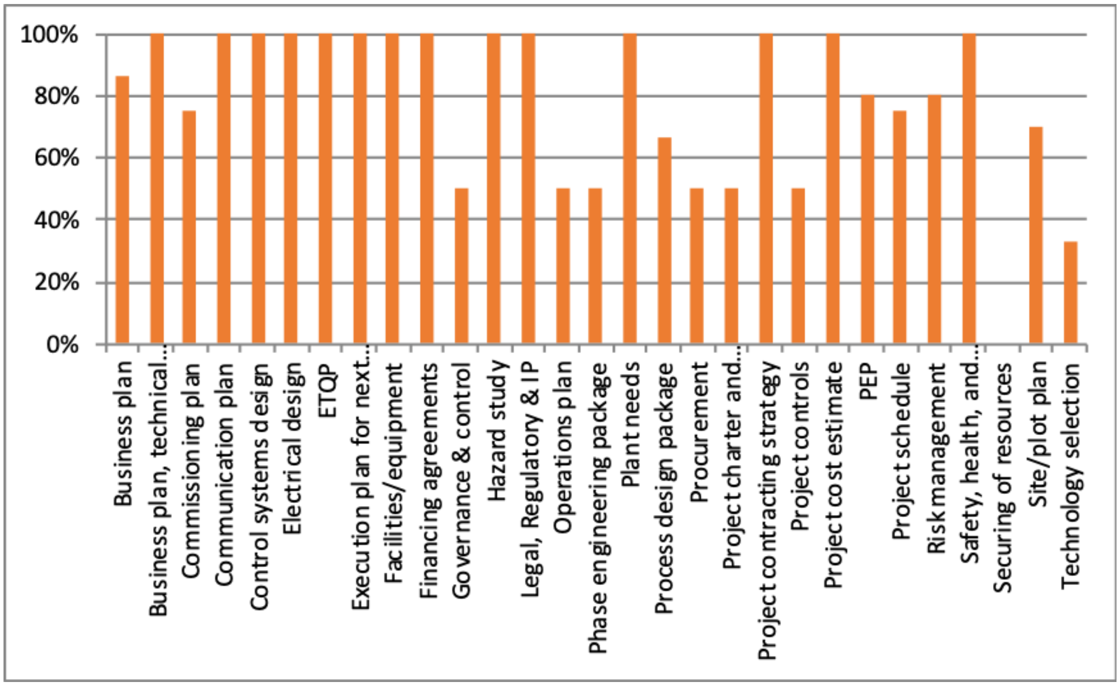

Figure 8. Output Report Indicating Development Gaps

Evaluation of the intervention

In evaluating the intervention, the researcher concluded that CSH facilitated gaining of insight into the objective versus the normative dimensions of project governance, specifically in terms monitoring and reporting in the megaprojects sphere. The historical (as-is) governance process/system could be evaluated against a new improved, streamlined (to-be) governance. It resulted in simpler, better and faster project governance.

SUMMARY

This paper describes an empirical study that analysed and improved project governance; ultimately, decision making capabilities for large capital (mega) projects were improved and streamlined. The researcher applied CSH and boundary critique to investigate the effectiveness of the governance process and system. She identified shortcomings; these were improved upon, and the governance process/system was streamlined.

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