AN INFORMATION SYSTEMS SUB-FRAMEWORK FOR THE GOVERNANCE OF PROJECTS

WIKUS ERASMUS
RESEARCHER AND SENIOR LECTURER

CARL MARNEWICK
PROFESSOR

UNIVERSITY OF JOHANNESBURG, SOUTH AFRICA

Abstract: Most information systems projects fail. Very little progress has been made to turn the tide. A lack of effective project governance has been suggested as a major reason for project failure. Through an analysis of governance practices in literature from various project management standards, methodologies and guidelines, various project governance practices are identified. A quantitative approach is followed to obtain data from IS project practitioners to descriptively analyse and perform exploratory factor analysis. The purpose is to determine what governance practices in the project lifecycle are considered important and to what extent these are implemented. The results indicate that here is a fundamental disconnect between the perceived importance of governance practices and the extent of their implementation. In all cases, project governance practices are implemented to a lesser extent than the importance attached to them. Underlying structures revealed there are some overlapping factors between the desired state of project governance and current state. These overlaps indicate that certain governance practices be enhanced. Practices currently implemented that are not considered as important are identified to be maintained. Practices considered to be part of the desired state but that do not form part of the current state are to be prioritised to be implemented. This provides the basis for establishing a framework for the governance of IS projects.

1 INTRODUCTION

According to the Standish Group, most information systems (IS) projects fail (Johnson, 2018). These IS projects deliver required information technology (IT) capability to the organisations that conduct them (Gido, Clements, & Baker, 2017; Schwalbe, 2018). Given that the global IT spend projections for 2020 exceed USD 3.7 billion, the situation is untenable (Gartner, 2019).

Of course, these projections were made prior to the Covid-19 pandemic outbreak and may be revised upwards or downwards once the fallout becomes clearer. What has been observed is that spending on digital workspaces has increased while governments and organisations have been searching for cost-cutting measures (Roth, 2020). This may seem to indicate that project management as a discipline will be depended on to deliver on new priorities in an environment that is more fluid and dynamic than ever before. What is abundantly clear is that IS projects are failing to produce the promised return on investment in an era where resources are becoming scarcer, and new priorities are being established. IS project management cannot afford to lose further credibility as a discipline if they cannot be guided to desired outcomes. The seminal work of Bannerman (2008) indicates that this success can be achieved on various levels. Albeit on the foundational levels of technical project success by delivering the project within the iron triangle of constraints, achieving customer satisfaction or by achieving ultimate strategic success (Einhorn, Marnewick, & Meredith, 2019; Zwikael & Meredith, 2019).

Guiding the IS project to such desired outcomes may require intervention in the face of such dismal performance. Much research has been done on critical success factors of various hues (Erasmus & Marnewick, 2012; Hussein, 2019; Osei-Kyei & Chan, 2015). Standards and guidelines have been developed and updated to provide practitioners the tools to manage projects properly (Ghosh, Forrest, Wolfe, & Lambert, 2015; Project Management Institute, 2017a). Project managers are allegedly becoming more competent as certification rates increase (Adenle, Azadi, & Arbiol, 2015; Erasmus, Joseph, & Marnewick, 2016; Joseph & Marnewick, 2018). Why then is IS project success so elusive? This observation of Cobb's paradox looms like a giant shadow over the discipline of IS project management (Carlton, 2017).

Project governance has long been proposed as one such measure that has the potential to increase project success rates (Association for Project Management, 2005; Muller, 2017; Project Management Institute, 2015). Governance is the process of guiding individuals and processes to achieve the desired result (Bevir, 2013). Various such activities have been suggested in the proposed guidelines and standards such as ISO 21505:2017 Guidance on Governance and the Project Management Institute's (PMI practice guide on governance (International Standards Organisation, 2017; Project Management Institute, 2016). As demonstrated previously, the mere fact that these are available does not guarantee these are being implemented by project practitioners in a manner that promotes project success.

The purpose of this research is to present a framework for the implementation of project governance for IS projects. This requires identifying what project governance practices are currently implemented and in need of implementation. It may be likely that many of the identified project governance practices are already implemented and considered important. This category of practices could benefit from being enhanced. It may also be the case that some of these practices are already implemented but may not be considered as important. Conceivably, these groups of practices should at least be maintained and not discarded.

It is then of value to determine what governance practices are considered important by practitioners and to what extent these are implemented for the successful completion of projects.

The following research questions are then applicable to guide this study:

- *i) What project governance practices are considered to be important by IS project practitioners?*
- *ii) To what extent are the project governance practices implemented in these environments?*
- *iii) What project governance practices are to be implemented, enhanced, or maintained?*

The analysis of these results can be distilled into a framework for the practical guidance of IS project practitioners for the governance of IS projects.

This paper addresses current literature on the matter and then presents the received data and discusses the analysis. Recommendations for the establishment of a proposed framework is provided, followed by a conclusion.

2 LITERATURE

This section provides context from literature to discuss the concepts of governance in general and how it is linked and applied to information system projects.

2.1 Governance

Governance is the action of applying processes or practice to guide the behaviour of actors in a system in order to achieve a specified or desired outcome (Bevir, 2013; Oguntade & Erasmus, 2019). This may require that processes or individuals behave in a specified manner. Where this behaviour is observed to deviate from the requirements set out by formal governance regimes, corrective action must be taken. Steps need to be taken to determine if the existing measure are adequate and appropriate. Where it is found that these are not adequate, these governance practices, processes or procedures need to be enhanced or, where they do not exist, be designed and implemented.

Governance is generally implemented in the organisation in the form of corporate governance (Di Berardino, 2016). In the context of this paper, governance is also applied to projects in guiding them to desired outcomes (Bekker, 2015; Müller, Turner, Andersen, Shao, & Kvalnes, 2016).

2.2 Corporate governance

According to The World Bank (2012), corporate, or organisational, governance consists of mechanisms that ensures the organisation's financiers a return on investment. This implies that structures need to be established in an organisation in order to achieve this outcome. These structures apply authority in three organisational levels namely the (i) strategic, (ii) business and (iii) operational levels. These three levels ought to be aligned by being directed to achieve the objectives of a coherent organisational strategy. Such alignment ensures coordination on all the organisational levels where successful achievement of objectives in numerous lower-level structures are aggregated to achieve ultimate strategic success (Musawir, Abd-Karim, & Mohd-Danuri, 2020).

Worldwide there are numerous such mechanisms to achieve effective implementation of corporate governance. Some take the form of legislation while others are presented as reports or guides. The most prolific such legislation is expressed in the American Sarbanes-Oxley Act of 2002 and the Chinese Organisation Law of 2005. Both these and various other such legislative documents require board oversights, establishing and protecting stakeholder rights and transparent reporting (Anand, 2008; Pissler & Liu, 2013). Such legislative governance mechanisms adopt a comply-or-else approach where any contraventions are met with severe punitive consequences.

Various guides for good corporate governance are also produced. The most prominent of these being the various Corporate Governance Codes developed by the United Kingdom's Financial Reporting Council as well as the Organisation for Economic Cooperation and Development's (OECD governance framework principles (Financial Reporting Council, 2018; OECD, 2015). These codes operate on the practice of comply-or-explain where deviations can be motivated for. In the South African context, the much-lauded King IV Report on Good Governance in Southern Africa also provides guidance on the establishment of governance regimes (Institute of Directors Southern Africa, 2016). This is suggested to be implemented on a apply-or-explain basis where only the aspects that are of relevance to a specific organisation are to be selected and motivated for.

Regardless of what type of context an organisation operates in, the application of a formal governance mechanism is expected and required in order to protect shareholders. This corporate or organisational governance regime has implications for all operations within an organisation. Therefore, project and information systems projects are also subject to such governance arrangements.

2.3 Governance of projects

Projects are undertaken by organisations to achieve a specified, short-term business objective within numerous constraints (Meredith & Mantel, 2011; Schwalbe, 2018). In the IS context, this business objective is often related to providing a capability that the organisation lacks that could have longer-term benefits beyond the completion of the project (Marnewick, 2016; Zdravkovic, Stirna, & Grabis, 2017). These projects are performed on the operational organisational level of the enterprise but may have an impact on strategic objectives of the organisation as well (Bannerman, 2008).

Strategically similar projects may be grouped under programmes or under portfolios where programmes do not exist in an organisation (Project Management Institute, 2017b, 2017c). This is done in order to achieve alignment and directing these projects to achieve the desired outcome (Muller, 2017). This alignment must be implemented on all three organisational levels, that is the strategic, business and operational levels (Erasmus & Marnewick, 2018; Hoffmann, Ahlemann, & Reining, 2020). This alignment is achieved through the implementation of governance practices related to portfolios, programmes and projects (Müller, Drouin, & Sankaran, 2019). These practices can be found in the multitudes of standards, guidelines and formal methodologies that project managers are currently exposed to.

All of these standards, methodologies or guides recommend practices for completing a project successfully. This paper is concerned with the number of practices that are able to influence behaviour in order to achieve the desired outcome. For that purpose, the focus is on the application of various selected practices in the PMBoK® Guide and PRINCE2 methodologies and guides. The reason is that these selected practices are used in auditing tools to determine the level of project manager compliance to these practices (Erasmus & Marnewick, 2014).

The core of the PMI's guidance on completing projects is found in the PMBoK® Guide. This publication at the time of writing details 47 processes across 10 knowledge areas (Project Management Institute, 2017a). This guide recommends that although the project discipline is responsible for implementing and performing its own governance regimes, it should be aligned with the organisation's arrangements on corporate governance.

The PMI practice guide on the governance of projects further supports the implementation of governance practices in projects, programmes and portfolios (Project Management Institute, 2016). This guide explicitly indicates that poor governance is a major cause of projects not achieving their desired outcomes. This guide provides recommendations for (i) governance relationships and considerations, (ii) roles and responsibilities, and (iii) domains, functions and processes.

PRINCE2 is a project management methodology developed by the British Office of Government Commerce (2009).This body produced a methodology to increase project success in controlled environments. It consists of seven main processes that are performed to seven main principles. The seven main processes are (i) starting a project, (ii) initiating a project, (iii) directing a project, (iv) controlling a stage, (v) managing stage boundaries, (vi) managing delivery and (vii) closing a project. These closely align with the traditional five stages of the PLC that are (i) initiation, (ii) planning, (iii) execution, (iv) monitoring & control and (v) closing (Schwalbe, 2018).

Each of the seven processes must adhere to the seven principles of PRINCE2. These are (i) continued business justification, (ii) learn from experience, (iii) defined roles and responsibilities, (iv) manage by stages, (v) manage by exception, (vi) focus on products and (vii) tailor to suit the project environment. These are similar activities to be found in the PMBoK® that serve to guide a project to its specified conclusion. These guides and methodologies also include various tasks that are intrinsic to completing a project but not are not necessarily governing in nature.

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3 METHODOLOGY

This section describes the research design and strategy utilised in order to answer the research questions. A quantitative approach is used coupled with descriptive analysis and exploratory factor analysis. It must be noted that this study is a subsection of a larger study that includes both programme and portfolio governance matters. This paper is however focused on the issues of governance that relate to IS projects.

The population for this study is project managers and project team members who have participated in IS projects. The exact number and demographic characteristics of this population are inscrutable therefore a non-random convenience sampling strategy is utilised (Zikmund, Babin, Carr, & Griffin, 2013).

The electronically distributed questionnaire requested the respondents to reflect on various project governance practices as they are implemented in their environment. The respondent had to simultaneously indicate how important they regarded a project governance practice (unimportant to very important) as well as to what extent it has been implemented in their organisations (almost never implemented to almost always implemented). These were ranked on a five-point Likert scale.

These governance practices used in the questionnaire are identified and selected from literature and an extensively used audit tool (Erasmus & Marnewick, 2014).

These practices are divided into the five project life cycle phases: initiation, planning, execution, monitoring and control, and closing (Schwalbe, 2018). The tool referred governance practices used in the Project Management Institute's (PMI) Project management Body of Knowledge (PMBoK®) and PRINCE2's processes and procedures (Hedeman & Seegers, 2018; Project Management Institute, 2017a). The data is analysed for descriptive statistics and then via exploratory factor analysis to determine underlying structures (Klein, Biesenthal, & Dehlin, 2015). This is achieved in two sections. Firstly, an analysis, interpretation and discussion are given of the results collected from the data focused on this area for descriptive purposes. Secondly, EFA is introduced, discussed and applied to the prepared dataset to highlight any underlying variables that are worthy of discussion. The following section analyses and discusses the results obtained.

4 RESULTS AND ANALYSIS

The first section of the questionnaire requested demographic information from the respondents. The main section of the questionnaire requested the respondents to reflect on the importance of certain governance practices and to which extent these are implemented. The questionnaire received 575 valid responses spanning various industries.

4.1 Demographics

The demographic section of the questionnaire requested data related to the organisational and individual profile. The organisational profile questions requested data on what project management certifications or qualifications were held by the respondents and which were adopted by the organisation where they were employed. The individual profile questions requested data on employment role and industry of respondents.

Forty per cent of the respondents represent the finance and banking industry along with management and consulting organisations. The top represented industries engage in numerous IS and IT projects and their operations are built on the capabilities provided by IS projects (Aliyu & Tasmin, 2012). This reassures that the sample is not unrepresentative of IS projects given that the ICT industry is represented by 9%.

More than half the respondents were however project and programme managers with 53% of instances collected. Respondents that answered "Other" consist of employees in the organisation that has worked on projects before in some capacity as team members. This group represents a quarter of the responses. Directors, auditors and other managers that considered themselves stakeholders of projects represent the remaining 23% of responses.

4.2 Adopted methodology and certification

Adoption of a formal methodology has been identified as critical success factor for the successful completion of projects (Bekker, 2015; Erasmus & Marnewick, & Joseph, 2018; Muller, 2017). It is also noted that project managers require the skills and competencies to be empowered to complete projects successfully (Farashah, Thomas, & Blomquist, 2019). It should however be noted that it has been observed that project manager effectiveness may decrease once project certification has been obtained (Joseph & Marnewick, 2018). **Figure 1** indicates that the PMI's PMBoK® and PRINCE 2 have the highest levels of adoption and certifications held by this group of respondents. It is however disconcerting to note that the greatest proportion of organisations have adopted no formal methodology, guideline or standard while almost a quarter of those surveyed holds no certification or qualification whatsoever.
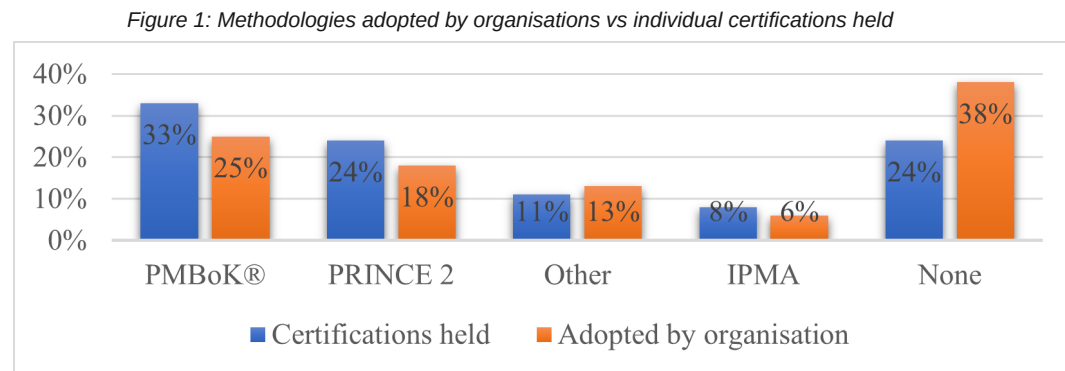
However, one would expect a higher level of certification among the project and programme manager respondents. It is, therefore, worthwhile to focus on the project and programme manager respondents to determine their level of certification in methodologies. When only examining these cases, it is found that 70% of this category of respondents hold a certification of some sort. However, the fact that almost a third of project managers and programme mangers do not hold a certification in project management is still causing concern. This indicates that in many cases, project and programme managers are not necessarily equipped and empowered with the discipline's best practices and skills.

The following caveats may apply. Some of the respondents may have undergone project management training but remain uncertified. It is also not to say that some of the project team member who forms part of this sample require project management certification although some may have. This result requires clarification from future studies to more accurately determine the state of project manager education.

4.3 Governance practices in the project life cycle

Each PLC phase has a number of project governance practices attached to it and these were considered the variables. The greatest number of these governance practices are grouped in the monitoring and controlling phase. This is supported by literature as this PLC phase is where the greatest level of guidance of behaviour is exercised to achieve the desired outcome (Bevir, 2013; Marnewick & Erasmus, & Joseph, 2014; Gido et al., 2017).

The questionnaire's main body is divided into two sections namely (i) the perceived importance of project governance practices and (ii) the extent these are implemented in the respondents' various environments. The respondents were asked to reflect on all 34 identified processes and practices.

Both sections returned reliability values of greater than .7, which is acceptable (Zikmund et al., 2013). The instrument is regarded as internally consistent and the results can therefore be reliably interpreted. The summarised means for each section are compared in **Table 1**.

Both sections are measured on a 5-point Likert scale with 1 indicating the most negative and 5 the most the most positive position. The governance practices are generally regarded as highly important with a mean of 4.5447. However, the practices were perceived to be somewhat often implemented by the respondents with a mean of 3.7919. There is a discrepancy between the importance attached to governance practices and the extent to which they are implemented.

The reasons for this discrepancy are not clear and not the focus of this paper. One may reasonably suspect that organisational pressures are at the heart of this discrepancy. This would form part of the scope for future research. In attempting to ascertain the relationship between the perceived importance and the extent of implementation of governance practices. A statistically significant but weak relationship exists between these two variables at 0.316 (Evans, 1996). This would seem to indicate that many governance practices are implemented (or not implemented) without much regard to how important or unimportant a particular governance practice is considered. To determine in which PLC phase the greatest level of discrepancy exist, the means for each of these are compared in **Table 2**.

The governance of the Closing phase is considered the most important, whereas the governance of the Execution phase is considered the least important, although still very important. The governance practices of the Closing phase are the most implemented, while those of the Monitoring and Control phase are implemented somewhat less in comparison. No phase's level of implementation exceeded the "Often Implemented" threshold of 4 on the Likert scale.

Figure 1: Methodologies adopted by organisations vs individual certifications held

		Global mean of importance of project governance practices	Global mean of extent implemented
N	Valid	575	575
	Missing	0	0
Mean		4.5447	3.7919

Table 1: Global means

	Perceived importance			Extent implemented			
	N	Mean	Std deviation	N	Mean	Std deviation	Means difference
Initiation	575	4.57	0.567	575	3.91	0.882	0.66
Planning	575	4.59	0.572	575	3.82	0.849	0.77
Execution	575	4.30	0.776	574	3.72	0.895	0.58
Monitoring and control	575	4.55	0.484	574	3.71	0.827	0.84
Closing	574	4.68	0.531	575	3.96	0.886	0.73

Table 2: Means and difference in means per phase

However, the phase with the greatest discrepancy between the perceived level of importance of governance practices and their implementation is the Monitoring and Control phase. In all phases there is a discrepancy between the level of importance and level of implementation of governance practices. None of the individual phases presented a relationship exceeding a weak relationship between the perceived importance of governance practice and the extent to which they are implemented.

All of the 34 identified governance practices are considered at least as "Very Important" and none presented a mean among the 575 responses of below 4 on the 5-point Likert scale. However, there is some variance when the means for the extent to which these practices are implemented are investigated. This provided an opportunity to meaningfully illustrate the top and bottom 10 implemented governance practices. **Figure 2** indicates this comparison

The most implemented governance practices revolve around establishing the project and project team, stakeholder management and communication, closing the project and providing direction when managing issues. The least implemented practices seem to revolve around directing behaviour of unplanned actions. Providing ad hoc direction and managing risk in accordance to a risk management plan is not implemented as often as their relative importance. Formal documentation of risk responses and change management plans are also not implemented as often.

In summary it can be said that in each and every instance a particular governance practice is considered more important than the extent it has been implemented. It is also not possible to predict to what extent a governance practice can be implemented relevant to its perceived importance. This variance requires explanation in future research. The following section addresses latent structures in order to arrive at a coherent model for the governance of IS projects within the project management discipline. This is achieved through the use of EFA to determine a structure of a desired state and a current state of governance. Comparing these two structures provides guidance to practitioners on the implementation of governance practices.

4.4 Exploratory factor analysis (EFA)

EFA as a statistical technique that aims to uncover latent structures and to reduce the number of variables in a dataset (Lin, Wang, McLachlan, & Lee, 2018). This paper follows the 5-step protocol recommended by Onsman (2016) to establish a process and a set of acceptability criteria. These steps are (i) suitability of data, (ii) factor extraction method, (iii) factor extraction assisting criteria, (iv) rotation method and (v) interpretation & labelling.

The suitability of the data is determined by the sample size itself and to other adequacy measures namely (i) Kaiser-Meyer-Olkin (KMO) and (ii) Bartlett's test of sphericity (BTS), (iii) factoriability and (iv) variance. Comrey's scale proposes adequacy levels for various brackets of response quantities whereas factoriability refers to whether or not a dataset can be analysed for factors (Comrey & Lee, 2013).

This would require correlations of 0.3 or higher to be observed between variables in the dataset (Hair, Black,

Babin, & Anderson, 2014). The KMO and BTS values are computed by a statistical software package to calculate whether the sample is of statistical adequacy (Assaf & Al-Hejji, 2006; Field, 2013). The KMO is required to be above 0.5 and the BTS to be significant o at least the 95% level (0.05). Should these four metrics be satisfied then the selection of an appropriate extraction method be applied.

Principle Axis Factoring (PAF) is selected for study as the extraction method as it allows for the extraction of the least number of factors to explain the variance in the data (Field, 2013; Williams, Onsman, & Brown, 2010). The assisting criteria refer to the selection of an appropriate eigen-value and understanding to what extent variance is explained. The eigen-value is calculated for each latent variable and then included or excluded on this basis. On the advice of literature, an eigen-value of 1 is selected. The requirement for the level of variance explained varies greatly in social science applications from 50%-90% (Williams et al., 2010). This study has selected 50% as a requirement.

The initial factor loadings can be rotated in order to maximise the number of variables with high loadings in a structure while reducing the number of variables with low loadings (Williams et al., 2010; Zikmund et al., 2013). This study utilised the Varimax rotation method in order to deliver factors that are as maximally dissimilar from one another as the data allows. Once all this is achieved the resultant factors may be labelled and interpreted.

The above metrics and thresholds were applied to complete two separate EFA procedures. The first EFA procedure extracted factors for the importance the respondents attached to the identified governance practices. This was repeated for the second procedure but based on the extent to which these governance practices were implemented.

4.4.1 Factors of the importance of governance practices
The first of two EFA operations are conducted with regards to respondents' perceptions on the importance of governance practices. As previously reported, the study is analysing the results of 575 respondents. On Comrey's scale, this is seen as a "Very good" sample. The KMO for this sample measured 0.904 and the BTS is statistically significant to a greater level than the required p<0.05. This sample is therefore adequate. Correlations of 0.3 and more are observed in the correlation matrix and are therefore exhibits factoriability.

The seven extracted factors only account for 44.725% of the variance between the latent structures. This however does not meet the threshold as selected. However, Hair et al. (2014) indicate that variance explained values of below 60% may be accepted but prudently interpreting the results with greater caution than one is normally wont to do. Therefore, this will be accepted with the relevant caveat.

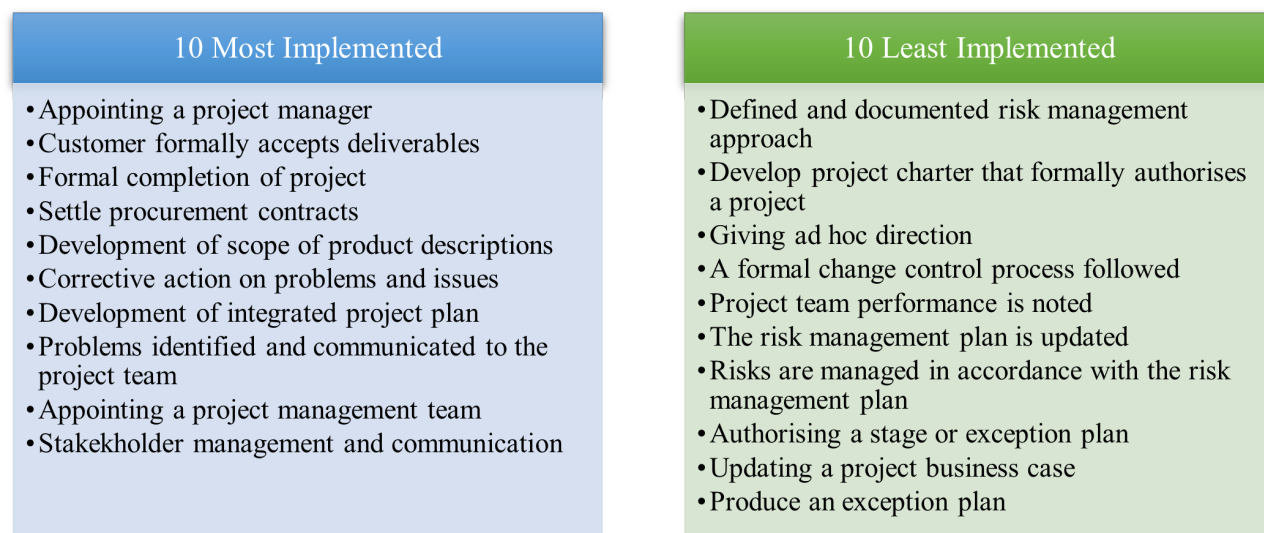The variables were loaded into seven factors as seen in **Table 3**:

	Factor						
	1	2	3	4	5	6	7
A2.2 A detailed description of the project scope and product was developed	0.652	0.162	0.141	0.040	0.082	0.058	-0.031
A2.1 Develop project management plan: The necessary actions were documented to define, prepare, integrate and coordinate all subsidiary plans	0.617	0.094	0.217	0.057	0.183	0.084	0.007
A2.3 Quality standards were identified that are relevant to the project and determining how to satisfy them	0.611	0.058	0.105	-0.007	0.253	0.165	0.190
A2.5 The information and communications needs of the stakeholders were determined and documented	0.603	0.164	0.097	0.195	0.115	0.085	0.063
A2.4 Project roles, responsibilities and reporting relationships were identified, documented and assigned	0.517	0.293	0.129	0.159	0.214	0.154	0.152
A2.6 The risk management approach was defined and documented	0.491	0.089	-0.052	0.306	0.133	0.142	0.182
A5.3 Complete and settle each project procurement contract	0.096	0.622	0.177	0.036	0.089	0.176	0.047
A5.2 The completed project deliverables are formally accepted by the customer	0.119	0.586	0.120	0.089	0.034	0.125	0.094
A5.1 Finalise all activities to formally complete the project	0.221	0.574	0.134	0.099	0.194	0.096	0.091
A4.6 Deviations from project baselines are reported on	0.187	0.434	0.186	0.359	0.106	0.106	0.105
A5.4 Evaluating a project	0.120	0.401	0.138	0.182	0.163	0.164	0.109
A4.2 Taking corrective action on problems and issues raised	0.165	0.187	0.751	0.077	0.017	0.054	0.237
A4.1 Problems arising are identified and communicated to the project team	0.151	0.277	0.641	0.090	0.105	0.028	0.283
A4.10 Communicate and work with stakeholders to meet their needs and addressing issues as they occur	0.188	0.126	0.588	0.270	0.062	0.105	0.014
A4.5 The budget, scope and schedule is compared against the project baselines	0.076	0.268	0.441	0.331	0.067	0.032	-0.119

Table 3: Perceived importance factor loadings

Figure 2: Most and least implemented governance practices

10 Most Implemented

- Appointing a project manager
- Customer formally accepts deliverables
- Formal completion of project
- Settle procurement contracts
- Development of scope of product descriptions
- Corrective action on problems and issues
- Development of integrated project plan
- Problems identified and communicated to the project team
- Appointing a project management team
- Stakeholder management and communication

10 Least Implemented

- Defined and documented risk management approach
- Develop project charter that formally authorises a project
- Giving ad hoc direction
- A formal change control process followed
- Project team performance is noted
- The risk management plan is updated
- Risks are managed in accordance with the risk management plan
- Authorising a stage or exception plan
- Updating a project business case
- Produce an exception plan

A4.9 Team performance is noted during the course of the project	0.121	0.237	**0.320**	0.231	0.249	0.241	0.240
A4.12 Risks are managed in accordance with the risk management plan	0.065	0.127	0.301	**0.522**	0.139	0.205	0.165
A4.11 Collect and distribute performance information including status reports, progress measurements and forecasts	0.174	0.016	0.323	**0.502**	0.102	0.197	-0.056
A4.13 The risk management plan is updated as risks manifest and new risks are identified	0.214	0.139	0.259	**0.447**	0.189	0.133	0.337
A4.7 A formal change control process followed	0.073	0.331	0.024	**0.430**	0.194	0.121	0.230
A4.8 The project management plan is updated once changes are approved	0.161	0.326	0.163	**0.393**	0.167	0.088	0.204
A4.14 Manage procurement relationships, monitor contract performance and make changes and corrections	0.103	0.303	0.108	**0.320**	0.214	0.163	0.146
A1.3 Appointing a project management team	0.110	0.166	0.050	0.107	**0.584**	0.109	0.100
A1.1 Appointing a project manager	0.179	0.134	0.208	0.032	**0.546**	-0.004	-0.217
A1.4 Defining a project approach	0.220	0.194	0.068	0.038	**0.535**	0.137	0.246
A1.2 A business case is used to initiate the project	0.093	0.051	0.045	0.076	**0.422**	0.063	0.117
A1.5 Develop project charter that formally authorises a project	0.106	0.010	-0.041	0.153	**0.388**	0.090	0.027
A3.3 Authorising a stage or exception plan	0.148	0.218	0.032	0.198	0.192	**0.734**	0.164
A3.4 Giving ad hoc direction	0.159	0.183	0.065	0.183	0.091	**0.560**	0.164
A3.1 Performing work as explicitly set out in a formal project plan	0.160	0.330	0.168	0.046	0.100	**0.473**	-0.026
A3.2 Authorising initiation of phase	0.166	0.089	0.031	0.348	0.311	**0.416**	0.102
A4.3 Updating a project business case	0.181	0.192	0.228	0.126	0.189	0.146	**0.604**
A4.4 Produce an exception plan	0.106	0.196	0.174	0.281	0.104	0.223	**0.507**

Extraction method: PAF.
Rotation method: Varimax with Kaiser normalisation.
a. Rotation converged in 15 iterations.

All the identified factors exhibited a Cronbach alpha of over 0.7 except for Factor 7. This means that the variables loaded for Factors 1 to 6 exhibit an internal consistency that enables them to be considered valid factors. Factor 7 is therefore not considered to be reliably part of further consideration. Factors 1 to 6 are labeled as follows:

• Factor 1: Production of a comprehensive project plan. Including a risk, communication, scope and quality management plan This includes a quality is associated with variables that relate to the production of a comprehensive project plan. Cost management and scheduling are excluded.

- **Factor 2**: Validation of work done. This is achieved through the application of closing phase governance practices as well as reporting on deviations.

- **Factor 3**: Variance resolution. Corrective action is formulated through identifying issues arising from comparing the actual performance of budget, scope and schedule with respective baselines. This includes team communication.

- **Factor 4**: Risk and change management. This factor only contains variables from the monitoring and controlling phase that are linked to managing risk and updating plans when changes are required.

- **Factor 5**: This factor is correlated with all the governance practices of the project initiation phase. Establishing the project through a charter based on a business case,

- appointing a project manager and a project team constitutes initiation governance practices.
- **Factor 6**: Authorisation. Providing ad hoc direction, approving new phases and exception plan authorisation and performing work as detailed by approved project plans are the main activities associated with this factor. IT seems to relate to leadership and authorisation in execution.

According to the Comrey scale, 500 to 1000 responses are considered very good. The KMO and BTS measures further confirm the suitability of the sample. Factors can be extracted as the dataset indicated correlations between numerous variables of above 0.3. The variance explained is below the selected threshold although an academic case can be made in order for the factors to be considered. As previously argued, the underlying structure for the perceived importance of governance practices is to be interpreted with greater caution than normally required.

4.4.2 Extent implemented factors

The same sample of respondents then reflected on the extent to these governance practices are implemented in their respective environments.

The KMO of 0.960 and the BTS significance of 0.000 are within the thresholds allowable and indicate that the sample is adequate to perform EFA. Correlations of 0.3 and above are observed among numerous variables that would indicate one is able to reduce the variables into factors. The variance explained exceeds the 50% threshold and one can with greater confidence trust in the underlying structure.

Five factors are extracted from the data given the selected criteria as seen in **Table 4**:

Extraction method: PAF.
Rotation method: Varimax with Kaiser normalisation.
a. Rotation converged in 10 iterations.

Each factor reported a Cronbach alpha of over 0.7 and is thereby considered internally consistent and valid. The derived factors seem to be closely related to the governance practices performed in each PLC phase. Each factor can be labeled in the following manner:

- **Factor 1**: Monitoring and controlling governance practices. This factor is mostly related to many activities in the monitoring and control phase. Activities included are those of risk management, change control,

	Factor				
	1	2	3	4	5
B4.11 Collect and distribute performance information including status reports, progress measurements and forecasts	**0.708**	0.140	0.252	0.204	0.180
B4.10 Communicate and work with stakeholders to meet their needs and addressing issues as they occur	**0.615**	0.139	0.124	0.242	0.372
B4.1 Problems arising are identified and communicated to the project team	**0.610**	0.202	0.230	0.075	0.247
B4.2 Taking corrective action on problems and issues raised	**0.600**	0.249	0.222	0.111	0.235
B4.12 Risks are managed in accordance with the risk management plan	**0.566**	0.433	0.155	0.251	0.088
B4.13 The risk management plan is updated as risks manifest and new risks are identified	**0.554**	0.470	0.148	0.238	0.080
B4.9 Team performance is noted during the course of the project	**0.540**	0.443	0.144	0.209	0.141
B4.6 Deviations from project baselines are reported on	**0.534**	0.379	0.207	0.207	0.302
B4.7 A formal change control process followed	**0.512**	0.491	0.182	0.145	0.135
B4.5 The budget, scope and schedule is compared against the project baselines	**0.443**	0.409	0.203	0.189	0.313
B3.4 Giving ad hoc direction	**0.333**	0.300	0.232	0.192	0.218
B4.4 Produce an exception plan	0.204	**0.657**	0.191	0.130	0.168
B4.3 Updating a project business case	0.266	**0.655**	0.195	0.136	0.162
B4.14 Manage procurement relationships, monitor contract performance and make changes and corrections	0.355	**0.521**	0.133	0.238	0.304
B4.8 The project management plan is updated once changes are approved	0.465	**0.508**	0.197	0.222	0.201
B3.3 Authorising a stage or exception plan	0.224	**0.493**	0.384	0.198	0.214
B3.2 Authorising initiation of phase	0.211	**0.479**	0.424	0.234	0.279
B3.1 Performing work as explicitly set out in a formal project plan	0.320	**0.422**	0.260	0.228	0.292
B1.1 Appointing a project manager	0.222	0.068	**0.698**	0.169	0.137
B1.3 Appointing a project management team	0.129	0.173	**0.660**	0.222	0.175
B1.4 Defining a project approach	0.225	0.307	**0.615**	0.328	0.152
B1.5 Develop project charter that formally authorises a project	0.179	0.327	**0.557**	0.335	0.107
B1.2 A business case is used to initiate the project	0.226	0.261	**0.476**	0.170	0.105
B2.4 Project roles, responsibilities and reporting relationships were identified, documented and assigned	0.300	0.095	0.298	**0.680**	0.233
B2.5 The information and communications needs of the stakeholders were determined and documented	0.266	0.288	0.278	**0.585**	0.143
B2.3 Quality standards were identified that are relevant to the project and determining how to satisfy them	0.202	0.308	0.364	**0.540**	0.145
B2.1 Develop project management plan: The necessary actions were documented to define, prepare, integrate and coordinate all subsidiary plans	0.074	0.235	0.382	**0.533**	0.246
B2.6 The risk management approach was defined and documented	0.217	0.444	0.246	**0.524**	0.072
B2.2 A detailed description of the project scope and product was developed	0.259	0.049	0.417	**0.488**	0.342
B5.2 The completed project deliverables are formally accepted by the customer	0.352	0.178	0.208	0.231	**0.650**
B5.3 Complete and settle each project procurement contract	0.241	0.301	0.221	0.156	**0.629**
B5.1 Finalise all activities to formally complete the project	0.414	0.249	0.221	0.195	**0.589**
B5.4 Evaluating a project	0.353	0.293	0.160	0.281	**0.366**

Table 4: Extent implemented factor loadings

- identifying deviations and providing ad hoc direction for resolving issues. This execution phase activity is considered linked with these monitoring and controlling governance activities.
- **Factor 2**: Execution governance practices: This structure is associated with governance activities in the execution phase but includes activities from the monitoring and control phase. Work is performed according to documented plans but while being aware of and managing change.
- **Factor 3**: Initiation governance practices. All the governance practices in the initiation phases are aligned with this structure.
- **Factor 4**: Planning governance practices. All the planning phase governance practices are included in this factor.
- **Factor 5**: Closing governance practices. All the governance practices of the closing phases are associated with this factor.

All of the thresholds and requirements are met and therefore the underlying structure as represented by the factors may be accepted as valid.

5 RECOMMENDATIONS

The recommendations in this section are based on the results of the descriptive statistics as well as the two EFA operations conducted previously.

The descriptive statistics reveal there is a fundamental incongruity in how project governance practices are implemented relative to their importance. There is no guarantee that an important governance practice will be prioritised, nor a less important government practice be deprioritised. In fact, the absence of any strong correlation and means indicate that even where governance practices are implemented extensively, these are not considered the most important. In all cases, governance practices are considered more important to the level they are currently implemented.

As IS projects continue to fail, it can logically be due to what has been implemented. Force majeure cannot be at play in all instances of failed projects. Three possibilities come to mind explaining continued failure. Firstly, these governance practices are perhaps not appropriately or adequately prioritised in practice. Secondly, the implemented governance practices are not implemented correctly. Or thirdly, the identified governance practices are ineffective and not applicable to Is projects at all.

The level of importance that project practitioners associate with the identified governance practices would seem to negate this third possibility as these are all considered to be very important. When taking the vast body of literature into account, it would be reasonable to infer that these governance practices ought to contribute to project success in the IS domain.

In order to determine if governance practices are implemented correct, a researcher may be required to observe and analyse such implementation on a case by case basis. This is beyond the scope of this research paper and warrants future research in this area to be conducted.

The purpose of this research is on the implementation focus of governance practices. The factors identified for the importance of governance practices may be perceived as the desired state by the respondents. These factors resulted from their perceptions on what governance practices are important. The factors identified from the data relating to the extent of implementation of governance practices may be taken to represent the current state of the governance of projects. When these two structures are compared and mapped, one may a course of action on how to prioritise currently implemented and yet to be implemented governance practices.

The latent structure for the extent of governance practice implementation, or the current state, is aligned with the phases of the PLC, which are (i) initiation governance practices, (ii) planning governance practices, (iii) execution governance practices, (iv) monitoring & control governance practices, and (v) closing governance practices.

This aligns closely with how literature views the matter. The level of implementation may be in question. It must be noted the data does not indicate there are poor levels of implementation. This, therefore, raises the question of the quality of implementation as highlighted earlier.

The latent structure for the perceived importance of governance practices, or the desired state, is represented by the six factors of (i) comprehensive project plan production, (ii) validation of work done, (iii) variance resolution, (iv) risk and change management, (v) initiation phase governance practices and (vi) authorisation and leadership.

These two structures can now be compared. Three situations can be identified:

- Where practices exist in the desired state (perceived importance) but not in the current state (extent implemented), these are to be prioritised for implementation.

- Where practices exist in the current state but not in the desired state, these are to be maintained and not abolished.
- Where practices exist in both the desired and the current state, these are already implemented but may benefit from being enhanced.

This can be applied in the following manner as illustrated in **Figure 3**.

On this basis, the following practical recommendations are presented:

- Practices in the planning, execution, monitoring & control and closing phases seem to be established. These are to be maintained and not abolished. There are some higher-level detail considerations that will be addressed in the following.
- Project initiation practices are established and considered to be part of the desired state. Is project manager must prioritise these activities in order to enhance their level of implementation in this regard.
- As it relates to practices that are considered to be part of the desired state but do not seem to be part of the structure of the current state, these practices are to be implemented. However, there may seem to be a category overlap with practices required to be

- maintained. Practices such as developing a comprehensive project plan may ordinarily fall under the project planning phase factor. However, there seems to be a need for this to be prioritised above other project planning phase practices for implementation. The same is said for variance resolution and risk and change management (ordinarily part of monitoring and control). Similarly, for authorisation and leadership (execution phase) and validating work done (closing phase).
- In particular, the management of variances found in cost, schedule, scope and quality is imperative to implement. The verification or validation of work done will not be effectively completed should baseline plans not be monitored. Team performance measures may be impacted if this is not addressed.
- Effective risk and change management practices are considered to be part of the ideal state and require particular focus. Undocumented risk, mitigation strategies and changes present a clear risk to the successful completion of any IS project.
- Authorisation and leadership are seen as important and distinct enough to create a separate factor in the underlying structure of variables. In the face of risks and imminent project changes, ad hoc direction is required. The project leader is also responsible for mobilising the committed resources in engaging in the next phase or section of a project.
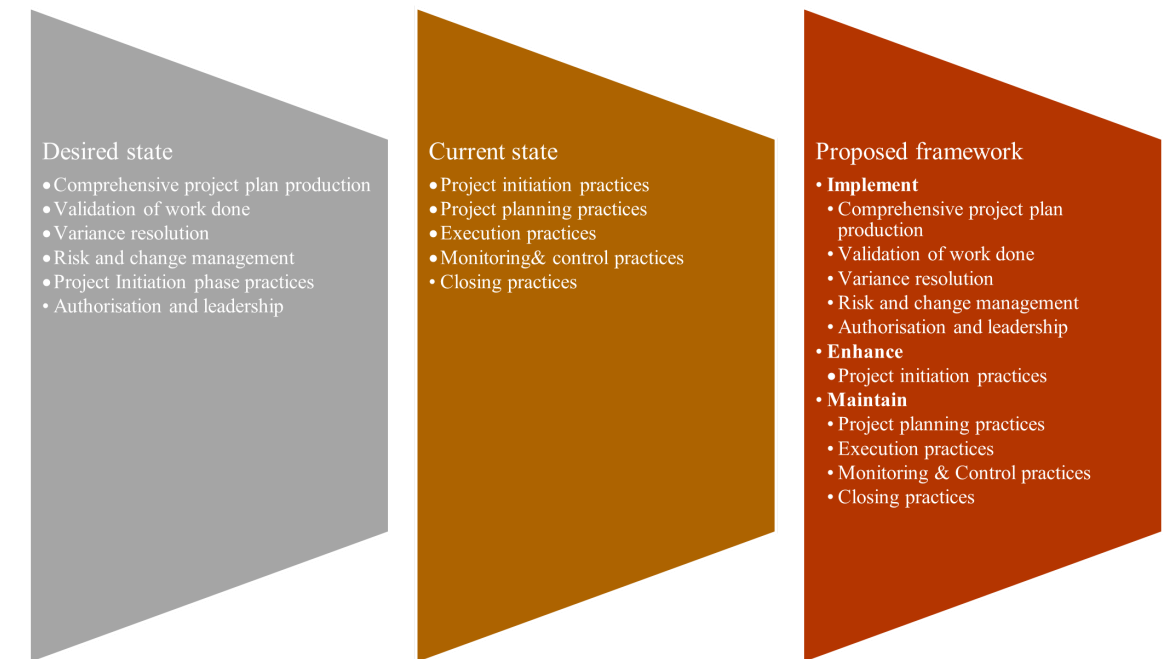

Desired state
- Comprehensive project plan production
- Validation of work done
- Variance resolution
- Risk and change management
- Project Initiation phase practices
- Authorisation and leadership

Current state
- Project initiation practices
- Project planning practices
- Execution practices
- Monitoring & control practices
- Closing practices

Proposed framework
- **Implement**
  - Comprehensive project plan production
  - Validation of work done
  - Variance resolution
  - Risk and change management
  - Authorisation and leadership
- **Enhance**
  - Project initiation practices
- **Maintain**
  - Project planning practices
  - Execution practices
  - Monitoring & Control practices
  - Closing practices

Figure 3: Towards a framework for the governance of IS projects.

6 CONCLUSION

The data shows there is a fundamental disconnect between what is considered an important governance practice and what governance practices are implemented. The low rate of IS project success has been attributed to poor governance of projects. This has a direct bearing on how and what governance practices are implemented. It is therefore imperative that project practice be augmented.

Practices deemed to be important but not necessarily form part of the current state of practices must be prioritised to be implemented. Practices that are part of the current state and desired state should be enhanced to be performed more effectively. Practices part of the current state but not necessarily of the desired state should be maintained to continue extracting a return on investment and not be abandoned.

This research made use of a relatively large sample. However, the results for this sample consisting of IS project managers, programme managers and team members cannot be extrapolated beyond the South African geographic region. Additionally, the interpretation of the framework is limited due to the low level of variance explained for the EFA operation related to the perceived importance of governance practices.

Three future research projects are identified given the gaps that presented themselves. Firstly it must be determined how well the implemented governance practices are performed. It may be that the focus and prioritisation are sufficient and only the quality of implementation is lacking. One may even be able to determine to what extent both good implementation and proper focus are responsible for project success. Secondly, the true state and effect of project management certification in this context should be investigated. Literature and statistical observation are at odds and clarity must be sought. Thirdly, the reasons for the discrepancy between the perceived importance of governance practices and their relative extent of implementation is also fertile ground for further research. Reasons must be sought for why the implementation of governance practices is seemingly resisted.

It is hoped this framework can serve as a point of departure for project practitioners to determine a way forward for creating an enhanced, yet value-adding governance regime for the successful delivery of IS projects. Coupled with a project practice audit, valuable insights may be gained in what can be done to elevate the project management practice in an organisation and thereby restoring credibility to the discipline.

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ABOUT AUTHORS

Wikus Erasmus is a researcher and senior lecturer at the University of Johannesburg which he joined in 2010. Prior to joining academia he was a project manager for information systems and IT infrastructure projects. His main research areas are chiefly concerned with achieving greater IS project, programme and portfolio success through effective and value adding governance. This eventually translated in him obtaining his Ph.D. in Information Technology Management in 2020 at the University of Johannesburg. He obtained his B.Com in Informatics and B.Com (Hons) in Strategic Management at the same institution. He is currently the deputy head of department for Applied Information Systems serving in the teaching and learning portfolio. Email: werasmus@uj.ac.za

Carl Marnewick received his BSc, BSc (Hons), MSc, and Ph.D. in Computer Science from the Potchefstroom University for Christian Higher Education, Potchefstroom, South Africa, in 1989, 1990, 1992 and 2009, respectively. He is a Professor at the University of Johannesburg, South Africa. The focus of his research is the overarching topic and special interest in the strategic alignment of IT projects with the vision of the organization. A natural outflow of the research is the realization of benefits to the organization through the implementation of IT/IS systems. His research to date has identified impediments in the realization of benefits, which is part of a complex system. He is currently the Head of the Information Technology Project Management Knowledge and Wisdom Research Cluster. This research cluster focuses on research in IT project management and includes governance, auditing, and assurance, complexity, IT project success, benefits management, sustainability, and agile project management. Email: cmarnewick@uj.ac.za