

# Systematic Review as a Research Method to Establish the Concept of Value Leaks During Project Deployment

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**Abstract:** Systematic literature review is considered an important research methodology that can equip practising managers with the knowledge to solve problems in their field. However, there is insufficient research in project management that attempts to provide managers with information on how systematic literature review can help solve problems. Most research works answer theoretical questions for academic purposes rather than address work related issues faced by these managers in their line of work. In addressing this gap, this study adopted a systematic literature review as a research methodology to establish a demonstrative concept of value leaks problem during project deployment. As emphasised in the project business case, project value leak is a serious issue in project management. The ability to control or avert it can make or break a project's value success. The findings clarify how systematic literature review aided the establishment of value leak's concept during project deployment. First, the study formulates the factors that propel an occurrence of value leaks, which might traditionally be considered a slip during project deployment. Second, it situates value leaks from earned value analysis (EVA) perspective as a widely accepted technique to assess and report project performance. Third, it establishes value leaks' causal factors and their sources of origin. Beyond equipping managers with problem-solving knowledge, the findings culminate in developing the value leaks diagnostic model, which serves as a guide and diagnostic mechanism to create and maintain value through project management practitioners' projects, regardless of the industry. In addition, this study contributes to the contemporary literature in project management as the concept of project value leaks is still gaining prominence, and the adoption of a systematic review as a research methodology to establish this concept advances knowledge.

**Keywords:** systematic review, research methodology, value leaks, value creation, earned value analysis, project management

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## 1. Introduction

Several scholars have acknowledged the importance of systematic literature review in transforming practice. For example, Pittaway et al. (2004) and Tranfield, Denyer, and Smart (2003) suggest the adoption of systematic review methods could be beneficial to practising managers in the field of management. Denyer, Tranfield, and van Aken (2008) reiterate the value of systematic literature review in equipping practising managers with the knowledge to solve problems in their work field. However, recent research highlights scholars' challenge in creating knowledge that has both theoretical rigour and relevance to practice (Swanson, 2014; Shapiro and Kirkman, 2018). Swanson (2014) conveys the need for research to justify its value by addressing actual rather than the imagined impact on professional practice. Shapiro and Kirkman (2018) reveal the disconnect between the approaches of academics and managers in solving a problem, arguing that on the one hand, managers do not consider journal publication in their quest to improve practice. On the other hand, scholars exclude practice managers in their design of studies. Nagle, Sammon, and Doyle (2020) propose an innovative research approach for projects to bridge the gap. Notably, the interesting, innovative approach is outside the purview of systematic literature review as a methodology for equipping practising managers. This limitation generates the need for a systematic literature review relevance for practice. Therefore, the study offers a progressive and diligent systematic literature case for value leaks in project management and its potential value to practising managers.

Drawing upon the field of telecommunication project management, this study offers insights into the rigour of systematic literature review as a technique to provide a model for managers to solve practical problems. Telecommunication project management is of particular interest because projects as value-creation apparatuses are more profound in the construction and telecommunication industries. For instance, in the telecom industry, Al Zadjali, Bashir, and Maqrashi (2014) assert that projects are used continuously to expand and improve the network coverage and quality to satisfy customers' needs. Ameh, Soyingbe, and Odusami (2010) argue that these telecom projects are considered capital intensive. Their value outcome not only provides quality network access to the customers, but also contributes immensely to economic growth (Ofori, 2013).

Nonetheless, in the quest to accomplish this business and economic value through projects, it is noticeable that some factors may cause projects' value to leak or be unrealised. Keen (2011) explains the term *project value leaks* as the forgone benefit that could have been fulfilled due to project management slip-ups. Keen (2011) further argues that value leaks are considered a big issue in project management, and the ability to control or avert them can make or break a project's value success. Value creation through projects in project management has recently attracted the interest of top scholars worldwide, such as Zwikael, Chih, and Restubog (2019), Fuentes, Smyth, and Davies (2019), Laursen (2018), Artto, Ahola, and Vartiainen (2016). While these scholars provide various perspectives on how value creation is conceptualised and endorsed within the projects, none of them has focused on the value that leaks during project deployment before the overall value is assessed after completion of the project. For instance, a study by Zwikael et al. (2019) highlights that creation of value for a client by solving a business problem should precede the service providers' quest for creating their own value in the form of attaining an improved reputation. Zwikael et al. (2019) add that it is perceptible that the value of solving a business problem while instantaneously attaining an improved reputation can be seen as the aftermath of the value-creation process.

While it can be contended that the expected value created through the project becomes evident at the end of the project, the question arises concerning the part of the value that does not materialise. Given this, the study adopted systematic review as a research methodology to reify the concept of value leaks during project deployment. The study establishes measures that propel an occurrence of value leaks and the factors that cause value leaks and their sources of origin and develop a value leak conceptual framework to help identify its occurrence and rectification. Although Denyer and Tranfield (2009) argue that the review of existing research studies to inform decision making and encourage future research has been in existence for a long time. However, the practising managers seldom employ outcomes of these reviews to enhance their performance. This is because the managers may not have the time, motivation or skills needed to interpret and assess research findings. Several reviews are also done to answer theoretical questions for academic purposes rather than address work-related issues managers face in their work line. For this reason, the study adopted systematic review instead of any other review method as argued by Denyer et al. (2008) to provide project practitioners with ideas and information on the concept of value leaks in a well-simplified manner for practice.

## **2. Systematic review as a research methodology**

According to Aveyard and Sharp (2011), systematic reviews are considered original empirical research because primary data are usually reviewed quantitatively or qualitatively. Gough, Oliver, and Thomas (2012) add that a systematic review is a research method that involves systematic and rigorous methods employed to review research literature. Similar to Denyer et al. (2008), this study uses a systematic review as an explicit methodology to discover existing studies, chooses and assesses contributions, examines and synthesises data, and reports the findings as a concept of value leaks in a manner that allows sensibly rich conclusions to be attained about what is known and unknown. Denyer and Tranfield (2009) state that the systematic review is considered an important research methodology. Its application brings replicable, scientific, and transparent methods that reduce bias as the reviewer is required to recapitulate all existing evidence about the phenomenon in a detailed and dispassionate manner. In adopting systematic review, there are some key principles advocated by Denyer and Tranfield (2009), which may be conceptualised as the ethical considerations for every review. These key principles are as follows:

- *Transparency:* According to Tranfield et al. (2003), the rationale for documenting review methods is to aid transparency. In view of review transparency, the reviewer must state clearly the processes and methods used in the review to aid readers in understanding the scope of the review. Further, there must be clear links between the systematic review findings and the reviewer's conclusion based on the evidence (Denyer and Tranfield, 2009).
- *Inclusivity:* Denyer and Tranfield (2009) allude that the systematic review potentially entails experiencing difficulties in assessing the sources of quality information. Given this, Boaz and Ashby (2003) propose that articles' selection for the review may be based on fit for purpose criterion. Similarly, Salipante et al. (1982) suggest the inclusion of a wide variety of article sources in the review to account for the reviewer's value judgement and uncontrolled validity threats.
- *Heuristic nature:* Denyer et al. (2008) assert that systematic review should equip managers with the knowledge to solve problems in their field. Thus, managers should be provided with ideas, tools, and methods to achieve effective project implementation.

Therefore, this study has adopted five (5) unique principles and the value metrics as illustrated in Figure 1:

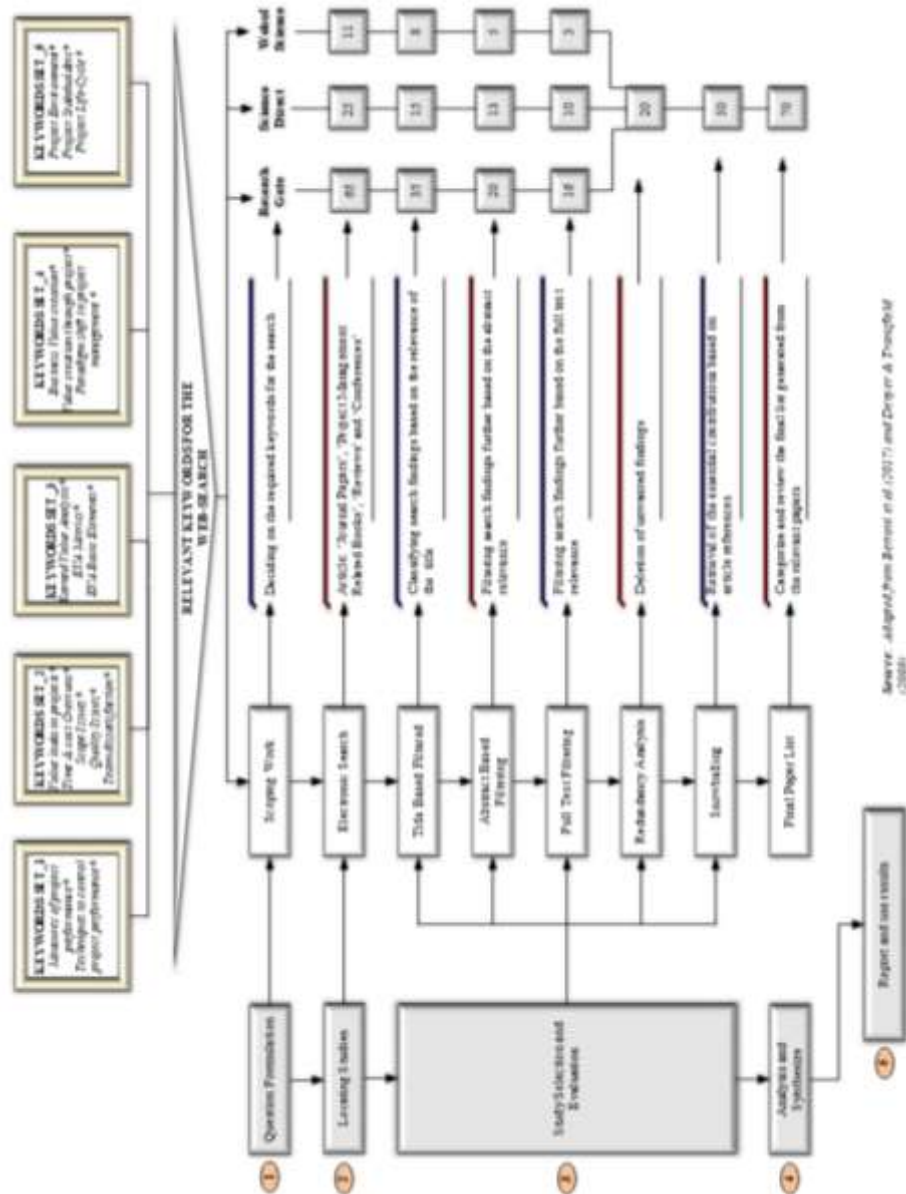


Figure 1: The systematic review process

## 2.1 Question formulation

Cooper and Hedges (1994), in Denyer and Tranfield (2009), contend that the vital aim of preparing a review is to outline its focus and is achieved effectively by asking well-framed questions that define a strategy for the search. "Experts in the subject area, especially people with academic knowledge and practical expertise, must be involved in framing the study questions" (Denyer & Tranfield, 2009). Given this, information scientist (research manager in the telecom industry) and PMP instructor were consulted to formulate these three (3) questions: (i) what measures propel the occurrence of value leaks during project deployment? (ii) what factors cause value leaks, and where do they come from? (iii) to what extent can a diagnostic model of value leaks be developed for project management practitioners? After establishing the review questions, Bertoni et al. (2017) argue that keywords for the search must be defined from the set of questions. This study grouped the keywords into five (5) sets, as shown in Figure 1.

## 2.2 Locating studies (search strategy)

This study relied on electronic databases such as ResearchGate and ScienceDirect and project management related books, especially PMBOKs. With respect to the year of publication, the search span from 2005 to 2019,

which is believed to have provided all the relevant information about project management. Some key historical data beyond the specified period were also searched to enrich the study. The employed databases are argued to have had a wider coverage of highest impact journals of business research (Nguyen et al., 2018; Denyer & Tranfield, 2009). The search strategy used in the study entails the definition of strings and keywords (e.g., measures of project performance, value creation through a project, value leaks) as shown in Figure 1. The study used both “simple operators and Boolean logic” suggested by Denyer and Tranfield (2009) to search for evidence-based on best quality contributions. Specifically, the study used “word association” such as ‘near’, and Boolean logic such as ‘OR’, ‘AND’, and ‘AND NOT’ to improve the efficiency of the search, as exhibited in Figure 1.

### **2.3 Study selection and evaluation (selection criteria)**

This is where a list of explicit criteria is set to assess how relevant each of the preliminary search studies is to the review questions. “The purpose is to generate a list of reasons for inclusion and exclusion of studies based on the selection criteria and quality checklist” (Denyer & Tranfield, 2009). The keywords set 1, 2, 3, 4, and 5 in Figure 1 were used for the search. Papers were initially filtered by the title and abstract. The inclusion criteria include value leaks in projects, measures of project performance, causal factors and sources of value leaks, and techniques to measure project performance. Any other items were considered as exclusion criteria. The list of findings was screened on the full-text base, destroying results that did not contribute to the study's purpose. This was followed by skimming through the full text and deleting undesirable information. From one publication to the other, the findings were categorised and reviewed, resulting in retrieval of only essential contributions that supported the development of a conceptual framework for value leaks. From Figure 1, the remaining publications (20) were complemented with results from snowballing (50) with both forward and backward methods (Wohlin, 2014). The final paper list consists of 70 items that were further categorised on type and variety as discussed.

### **2.4 Analysis and synthesis**

The ultimate aim of this study is to reorganise the evidence into a new arrangement and advance knowledge that is not superficial from analysing the individual studies in isolation. The study answered the set questions by breaking down individual studies into relevant sections and explaining how each relates to the other, as Denyer and Tranfield (2009) argued. Denyer and Tranfield (2009) also argue that management and organisation studies take interpretative rather than aggregative analytic approaches. Therefore, the study employed an explanatory method to establish the concept of value leaks during project deployment.

### **2.5 Reporting and using the results**

This section provides what is known and unknown about the value leaks questions in the study. The systematic review findings and discussions are presented in the following sections:

## **3. Systematic review findings and discussions**

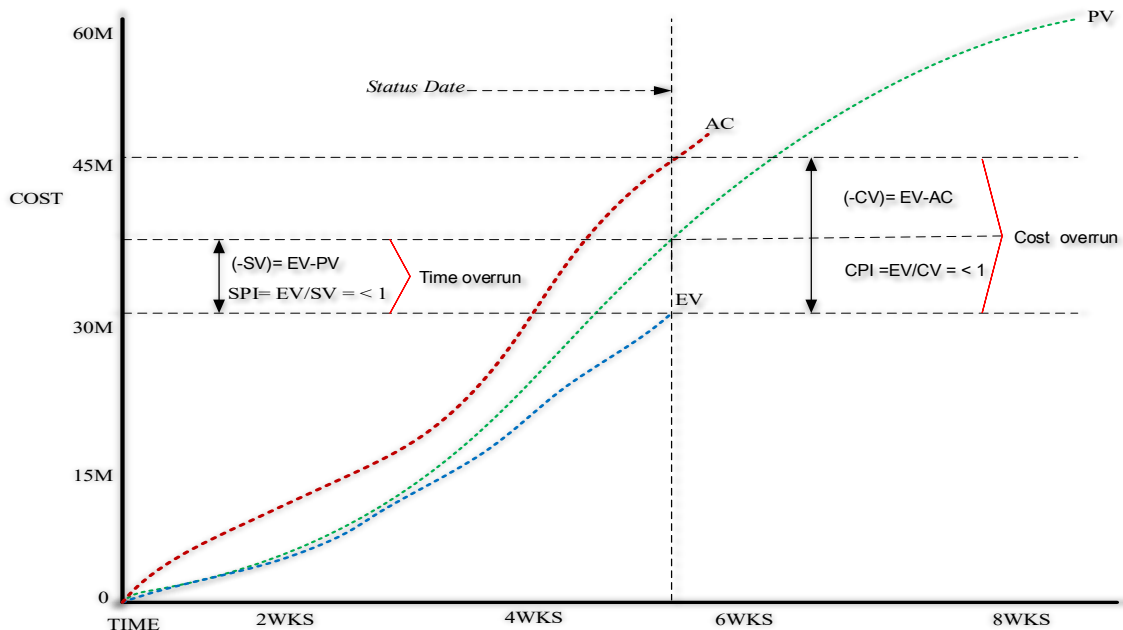
This section presents the findings from the systematic review. The presentation is based on the three (3) main questions formulated for the review as follows:

### **3.1 The measures that propel an occurrence of value leaks during project deployment**

From the systematic review, we found out that no particular set of measures could commonly be used to measure project performance across industries. This lack of a standardised set of measures suggests that industries apply different measures to track their project performance. Therefore, we conceptualised the common value measures of project performance found across some influential authors' assertions based on value to formulate the value leaks measures, which serve as an indication of its occurrence during project deployment. Given this, Figure 2 illustrates that the triple constraints theory is considered a standard measure of project success irrespective of the industry (i.e., Baccarini, 1999; Pinto and Mantel, 1990). Other authors have made expansions to the triple constraint theory (see Figure 2). We also found out that the traditional thinking on projects has moved towards creating strategic value from projects (Green & Sergeeva, 2019), but the concept of value has not been developed in value management texts beyond the triple constraints (Kelly, 2007). In support of Kelly's (2007) argument, the measures found to assess the value of delivering projects are not much different from those of the aforementioned project performance. Pennypacker (2005) proposed ten-value



but it does not measure project quality performance and project team satisfaction. Further, it does not take into cognizance of value leaks in its calculations for reporting project performance. Therefore, we have used the four (4) variance metrics of EVA to demonstrate how value leaks could be ascertained through its calculation, as illustrated in Figure 3. First, *Schedule variance (SV)* shows whether the project is ahead, on, or behind the planned delivery date, at any given point in time. From Figure 3, SV is therefore determined by the difference between earned value (EV) and planned value (PV). Thus,  $SV = EV - PV$ . The results offer three (3) scenarios: first, the project is behind schedule when SV is negative, as termed by *time overrun*. Second, the project is on schedule when SV is zero, as termed by *on-time delivery*, and it is ahead of schedule when SV is positive (ahead of delivery time). However, when SV is negative, there is an occurrence of time overrun, which can be considered value leaks based on Figure 2.



Source: Adapted from PMBOK® Guide, 2013

Figure 3: Situating value leaks in earned value analysis

Second, *Cost variance (CV)* indicates whether the project’s budget has been overspent (cost overrun/deficit) or underspent (surplus) at a given point in time. CV is determined by the difference between EV and actual cost (AC);  $CV = EV - AC$ , as illustrated in Figure 3. However, when a budget for work activity is overspent (cost overrun), CV becomes negative, resulting in value leaks. This arguably means that an additional budget is required to complete project activities. Third, the *Schedule Performance Index (SPI)* shows how effectively the project team uses time. From Figure 3,  $SPI = EV / SV$ , but when the SPI value is less than 1.0, less work (scope of work) is done than expected (time overrun). Debatably, the project team is being ineffective on the timeliness of project activities, which results in value leaks based on time overrun’s occurrence. Conversely, when the SPI value is more than 1.0, more work is completed than planned (time underrun). Moselhi et al. (2011) cited that *SPI of 0.57* indicates that the project progresses at 57% of the planned rate. In effect, this suggests a delay in completing the project work at that given point in time. Finally, *Cost Performance Index (CPI)* indicates how efficiently the budget is utilised for the completed work (scope of work) and considered the most important metric and measure of EVA. As shown in Figure 3,  $CPI = EV / CV$ , and when the CPI value is below 1.0, it shows cost overrun for the accomplished work. Arguably, this inefficiency in budget utilisation results in value leaks. Nevertheless, when the CPI value is above 1.0, then it indicates cost underrun of work done. According to Griffin (2013), a *CPI of 0.75* can be explained as the value of *US\$ 0.75* earned for every dollar spent. Thus, it begets the question of what happens to *US\$ 0.25* that ought to have been realised. Griffin (2013) suggests that the remaining *US\$ 0.25* is the unrealised value that should have been earned; that is, the value leaked from the full expected value that was achieved.

### 3.3 Factors that cause value leaks and their sources of origin

From the systematic review, we found key factors that cause time and cost overruns, poor quality, out of scope and team dissatisfaction. These factors are summarised in Table 1. With reference to Figure 1, these factors



could be considered value leaks' causal factors during deployment. Nonetheless, none of these scholarly works considered them as such.

**Table 1:** Summarised value leaks' causal factors

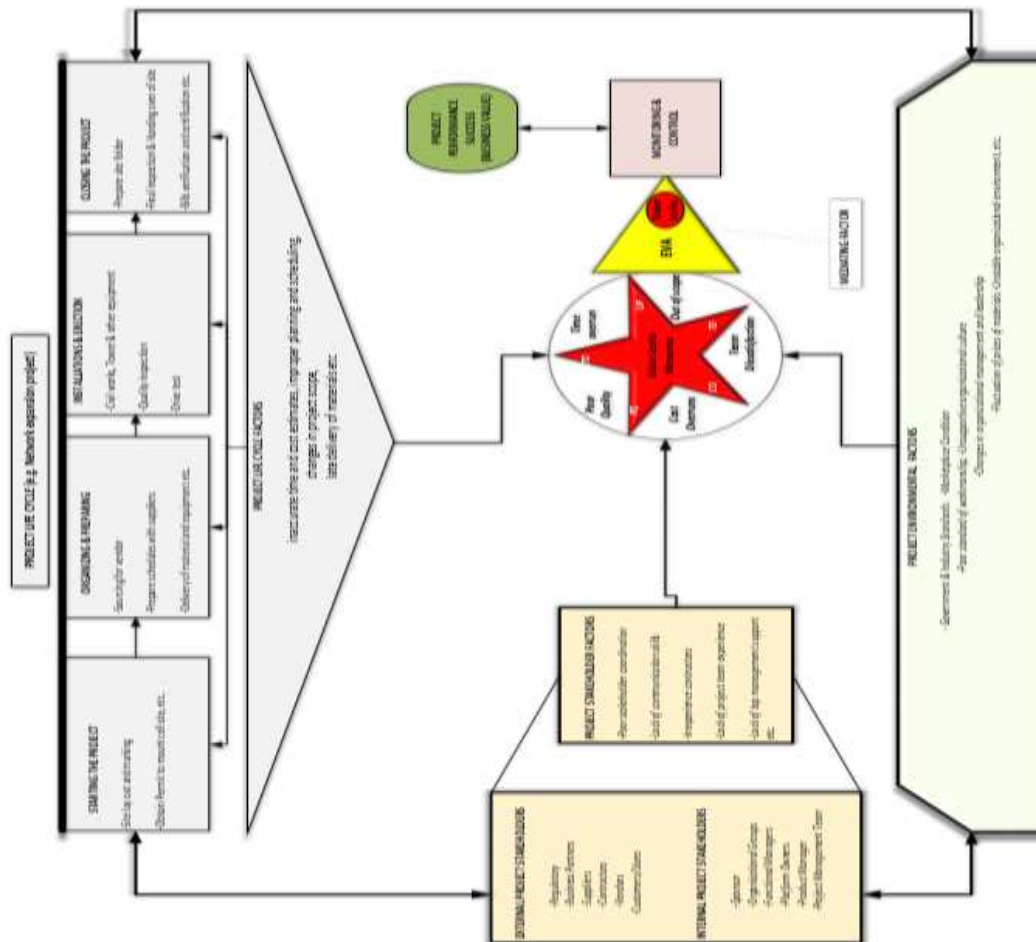
Measures of value leaks	Key causal factors	Bentil et al. (2017)-Const. (Ghana)	Rauzana (2016)-Const. (Indonesia)	Taherdoost and Keshavarzsaleh (2016)	Al Zadjali et al. (2014)-Telecom.(Oman)	Murray and Seif (2013)-Const. (Nigeria)	Ade-Ojo and Bababola (2013)	Alinaitwe et al. (2013)-Const. (Uganda)	Danso and Antwi (2012)-Telecom. (Ghana)	Jha and Iyer (2006)-Const. (Indian)
Time & cost overruns	Gold plating/Over specification	*								
Time & cost overruns	Late delivery of materials	*						*		
Poor quality	Conflict among project participants									*
Poor quality	Hostile Social Economic and Climatic Condition									*
Time & cost overruns	Inaccurate time and cost estimates	*			*	*				
Time & cost overruns	labor disputes	*								
Poor quality	Poor supervision and inspections		*			*			*	
Team dissatisfaction	Lack of top management support			*	*					
All measures	Inexperience contractors							*		
Time & cost overruns	Inflation & interest rates		*							
All measures	Poor contract management								*	
Out of scope	Changes in project scope		*							
Time & cost overruns	Poor client-vendor relationship		*							
Poor quality	Poor deliverable quality								*	
Time & cost overruns	Conflict among project participants		*							
Poor quality	Faulty project conceptualization									*
Team dissatisfaction	Corporate politics with negative effect			*						
Out of scope	Ill-defined project scope							*		
All measures	Poor communication					*				
Team dissatisfaction	Changes in organizational management and leadership			*						
Team dissatisfaction	Unstable organizational environment			*						
Poor quality	Delays in payment to vendor								*	
Team dissatisfaction	Unsupportive organizational culture			*						
Poor quality	Incorrect requirement								*	
Team dissatisfaction	Different geographical locations			*						
Time & cost overruns	Indecisiveness of project participants				*					
Out of scope	Incomplete and error in project requirement						*			
Out of scope	Poor scoping						*			

The systematic review also established that the project environment is a source of value leaks during project deployment as projects exist within an environment. This project environment encompasses several factors such as financial and economic conditions, governmental and regulatory agencies, labour unions, equipment vendors, contractors, and sub-contractors that can directly or indirectly influence the outcome of projects negatively or positively (Simushi, 2017; Petrarca, 2010). Thus, the factors outlined in Table 1, such as high inflation and interest rates, corporate politics with a negative effect, unsupportive organisational culture, different geographical location, conflict among project participants, hostile social-economic, and climatic condition, are all related to the project environment.

We also found that the overruns resulted from actions and the project team's inactions that executes the project. Again, the power and interest of project stakeholders can influence the outcome of the project (PMI, 2017; AlSehaimi et al., 2013). Therefore, project stakeholder is conceptually considered a source of value leaks. The causal factors outlined in Table 1, noticeably relating to the project stakeholders, include poor client-vendor relationship, conflict among project participants, and poor communication. Finally, we found that every project goes through a series of phases known as the project life cycle before delivering the project outcome. This project lifecycle is the process of turning organisational vision into reality (PMI, 2017; Turner, 2009). Therefore, we contended that project lifecycle is a source of value leaks as in the quest to turn project objective into reality; some factors may influence the process. Table 1 shows that inaccurate time and cost estimates, incomplete and error in project requirement/specification, improper planning and scheduling, and poor scoping are considered occurrences during the planning phase of the project life cycle.

### 3.4 Value leaks conceptual framework

The findings from the systematic review culminated in developing a diagnostic model shown in Figure 4 to illustrate the concept of value leaks during project deployment. This proposed value leaks model may help identify, control, and remedy its occurrence during project deployment. The model posits that value leaks emanate from an occurrence of five (5) key measures: cost overrun (CO), time overrun (TO), out of scope (UP), poor quality (PQ), and project team dissatisfaction (TD), during project deployment. The model further postulates that earned value analysis (EVA) technique is used to measure project performance. Through EVA application, out- of the scope, time, and cost overruns are ascertained; however, this does not involve quality and TD in EVA application. Similarly, EVA does not recognise value leaks in its calculation and provides no reasons for the variance occurrence in project management. The model postulates that it is imperative to include value leaks, as it gives information on the project value that has gone unrealised because EVA is the common technique used in assessing project performance. The factors that cause value leaks with respect to its measures originate from three different sources. First, the model indicates that a project goes through a systematic process known as project lifecycle, which turns the project inputs into business value. At each stage of the project lifecycle, there are some activities performed, which tend to result in value leaks if not done well. Among such factors are inaccurate time and cost estimates, improper planning and scheduling, project scope changes, and late delivery of materials. Second, there are project stakeholders who are either influencers or impacted by the outcome of a project. The activities of people can also cause value leaks that may undermine the ability to realise the full value of the project. The factors classified under the stakeholders involve poor stakeholder coordination, lack of communication skills, inexperience contractors, lack of project team experience, and lack of top management support. Third, the environment where project is being carried out. The factors that cause value leaks from the project environment, which avert full realisation of the EV, include changes in organisational management and leadership, market condition, and unsupportive organisational culture. Finally, the model concludes that in an attempt to deliver the overall business value, the identified factors and their sources should be monitored and controlled keenly to minimise value leaks during project deployment.



Source: Researchers' Own Construct, 2018

Figure 4: Value leaks diagnostic model



#### 4. Conclusions

This study used systematic review as a research methodology to establish value leaks during project deployment as it is noticeably nonexistent in the literature. We contend that the concept of value leak during project deployment is novel, and so using systematic review to establish this concept advances knowledge. Furthermore, this study enhances the perspective of project management practitioners in terms of value leaks, which might traditionally be considered a slip in their quest to achieve value through projects. Therefore, we contend that the proposed value leaks model may serve as a guide and diagnostic mechanism to create and maintain value through projects for the practitioners, regardless of the industry. Future research can assess the extent to which value leaks become problematic in delivering value and its quantitative impacts on project performance.

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