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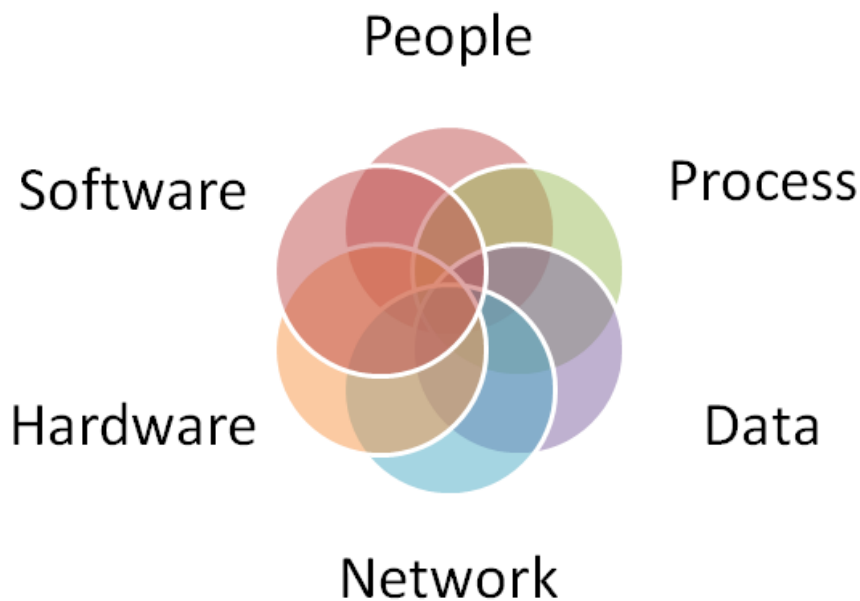
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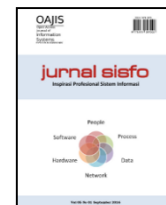
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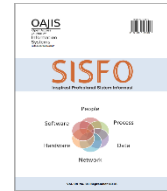
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Daftar Isi

Analisis Faktor yang Memengaruhi User Loyalty dan User Commitment Pada Penggunaan Mesin Pencari non-Google Dengan Variabel Mediasi Search Engine Value <i>Andre Parvian Aristio, Mudjahidin, Ufaira Khanzahasna Nanfaiq Nadhifa</i>	1
The Effect of Social Media Marketing on Brand Trust and Loyalty for Luxury Shoes <i>Satria Fadil Persada, Evan Kuncoro Jati, Reny Nadlifatin</i>	15
Implementasi Voice Over Internet Protocol (VOIP) Menggunakan Protokol Keamanan VPN Dan Protokol SIP Pada Jaringan Pusdatin Kemensos <i>Moch Andika Lucky Prasetya</i>	27
How to Control Workarounds: A Literature Review <i>Arif Wibisono</i>	49
Identification of Factors that Influence Buying Interest Caused by Youtube Reviewer: A Case Study of Smartphone Products in Indonesia <i>Zainiyah Alfirdaus, Satria Fadil Persada, Jumhur Nur Utan Shan</i>	59

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How to Control Workarounds: A Literature Review

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Abstract

In this essay, we would like to explore the potential of workaround remedies as suggested by Information Systems (IS) literature. A workaround is a policy deviation that organisational people perform to address policy-reality mismatches. As a policy non-conformity, the organisation does not advise how an employee undertakes a workaround. Thereby, it has the potential to break organisational control structures and has profound consequences in the downstream processes. In this essay, we would like to explore potential actions an organisation could perform to control workarounds. In doing so, we collected workaround papers from major IS databases such as ScienceDirect, AIS e-Library, ACM digital library, Emerald, EBSCO, and CiteerX. Afterwards, we develop our research question and visualise it.

Keywords: Workarounds, Literature Review, Control, Information Systems

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1 Introduction

A workaround is an IS-user-driven resilient strategy to overcome daily organisational problems [1]–[4]. Mainly whenever there are misfits between policy – (which sometimes is bounded as an IS) and reality [2], [5]–[8], this reality misfit is always there [5]. This reality misfit is there regardless of whether the organisation uses open source vs commercial Enterprise Resource Planning [9]. Likewise, this reality misfit is there regardless of whether the organisation applies proven enterprise architecture standards such as COBIT [10].

Workaround itself can manifest in many forms using diverse IT apparatus. For example, users develop spreadsheet solutions for tracking transactions [11] or users skip essential processes in the system [5], [11]–[14]. During its enactment, workaround users may use one or more IT artefacts such as software [13], [15], [16], cloud services [3], [17]–[19], hardware [19], and physical papers [11], [20]–[23]. Here, every workaround is unique [10], [12], [24]. Every workaround has its scope and type [10]. It has only been specified for one organisation [24]. For the same objective, six users could develop six different workarounds [4].

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Even though users enact workarounds with good intentions [25], it negatively impacts organisations [15]. For instance, workarounds impose audit problems [14], [17], [26], weaken organisational compliance [4], [10], [12], [27]–[29], and impose inefficiencies [8], [30]–[32]. As a result, managers need to manage their presence [8], [33]–[37].

Unfortunately, controlling workarounds is not a trivial task for two reasons. First, workarounds are uneasy to find [3], [14], [38]–[40]. Workaround emerges as a hidden solution for daily operational problems [3]. It is still "under the radar" until being found [41]. Larger workarounds are easier to find [39]. However, they are more challenging to control than small ones [41]. Worse, most managers are unconscious of their presence [42]. Moreover, there is no easy mechanism to scan organisational IT assets [38] to avoid workarounds.

Second, workarounds cascade across functions and grow more prominent as time passes [5], [14], [32], [43]. Workarounds grow bigger until they stabilise [44]. This situation happens because workaround actors tell other actors to align jobs; hence workarounds are contiguous [42]. Whenever sufficient controls are not there, a workaround could trigger other workarounds and produce a cycle of deterioration [28]. At this point, one needs to be aware that broad workarounds adoption is risky for organisations [45]; especially when it is beyond organisations' controls.

Given these explanations, it is necessary to establish relevant workaround controls. For this reason, we would like to explore potential controls that IS literature suggests for workarounds. In doing so, we collect papers from reputable IS databases and draw workaround countermeasures. So, we pose the following research question:

Research Question: What does the IS literature suggest to control workarounds?

Workaround papers were gathered from major IS databases such as ScienceDirect, AIS e-Library, ACM digital library, Emerald, EBSCO, and CiteerX. The remainder section of this essay is as follows. Section two discusses the workaround definition. Section three explains the literature search methodology. Section four discusses our findings, and section five explains and concludes our research.

2 Workaround Definition

Workarounds are defined in this study as "centralised adaptive processes environment of the system".

This description supports the notion that workarounds are common in circumstances when an IS does not match the criteria of a specific job (from the standpoint of the user) [46, p. 186]

Workarounds are omnipresent and can happen anytime [47]. While the effects of a workaround on an individual user can be positive [37], the overall effects on the organisation may be less than desired. Research demonstrates that the presence of workarounds is typically disguised in some cases [14].

Workarounds can come in multiple forms, such as shadow IT, shadow systems, and feral systems. A Shadow system is a system which replicates the functionality and data generated by the legitimate systems of the organisation [48]. The replication can be either extensive or fractional [48]. Next, Feral Information System (FIS) is a computerised software that users construct to help them attain their working objectives [49]. The system is outside management's consent and is not a legal infrastructure [49]. At this point, employees use FIS to solve the misfit between the legal system and the real-world condition [49].

For some readers, Shadow Systems/IT and Feral Systems/Information Systems may be dissimilar [50], [51], but we do not differentiate them. The authors did not discriminate against them because both are workaround appliances with technology. Both phenomena seem to exist by the same explanations for why workarounds happen. So, any study which describes the origin of both occurrences is pertinent to the Theory of Workarounds [52].

3 Methodology

To address our research question, we execute three steps: selecting keywords, selecting literature, and analysing literature (see Figure 1). In selecting keywords, we formulate appropriate keywords that are related to workarounds. This step is necessary to cover papers that are related to workarounds. In the selecting literature, we show how we select papers given our keywords. In the analysing the literature, we do qualitative data analysis to extract strategies to control workarounds.

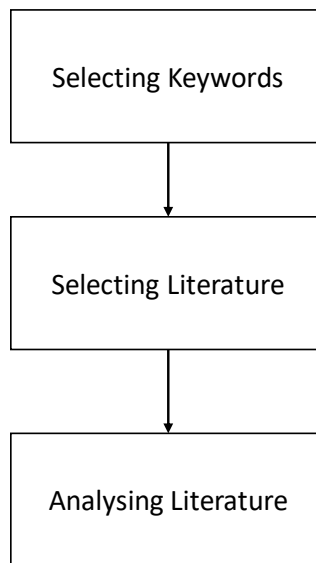


Figure 1. Research Methodology

2.1. *Selecting Keywords*

We use selection criteria by Mehta and Pandit [53]. The following inclusion criteria (IC) were in practice:

IC1: Articles that relate to "Workarounds", "Shadow Systems", "Shadow IT", "Feral System", AND "Feral Information System".

IC2: Articles are from 2009 - 2019

IC3: Articles published in English

IC4: Articles should have at least one case study

IC5: Articles are not a literature review

2.2. Selecting Literature

The study selection is an adaptation of [53] for workarounds. The steps are as follows: Use reputable IS databases and find suitable keywords. In our case, we utilise the search string as follows for the search process:

("SHADOW SYSTEM" OR WORKAROUNDS OR "FERAL SYSTEM" OR "FERAL INFORMATION SYSTEM" OR "SHADOW IT") AND (SYSTEMS OR ELECTRONIC OR TECHNOLOGY) AND CASE

1. For each group, categorise the results according to "title."
2. For each group, categorise the results according to "abstract" and "keywords."
3. For each group, categorise the results according to "Full-text reading."

2.3. Analysing the result

In analysing the result, we used open coding [54]. We used open coding because it can help to analyse text that is straightforward [55]. By doing so, we can have a better analysis results and producing a better theory.

4 Findings and Discussion

In this section, we describe what IS literature suggests to manage workarounds. In this sense, we managed to infer potential action for workarounds That is, formalising workarounds, allocating business units to manage workarounds, improving communication and collaboration among units, and giving training to employees.

Table 1. Potential Strategies to control workarounds

No	Actions	References
1	Formalise workarounds	[4]–[6], [23], [56]–[58]
2	Allocate business unit to manage workarounds	[3], [6], [10], [29], [40], [45], [59]
3	Improve collaboration and communication among unit members.	[8], [11], [12], [26]
4	Give training to employees	[7], [14], [21], [26], [31], [37], [38]

Formalising workarounds means that the organisation acknowledge workarounds at the organisation level [5]. As total banning workarounds are sometimes ineffective in controlling their presence [23], formalising workaround is a good choice. It will enable an organisation to track its execution and evolution [56]. It is also good because it enables workaround solutions to grow in a controlled environment [39].

Allocating business unit to manage workarounds are another feasible solution [3], [6], [10], [29], [40], [45], [59]. Instead of putting the responsibility to manage workarounds in central IT, this idea put the business unit to manage its own workarounds. Previously, central IT's slow responsiveness has been alleged as the cause of workarounds [6], [30], [32], [42], [45], [60]. By allocating business units to manage workarounds

– as well as providing their countermeasures, an organisation could eliminate workaround presences. Researcher suggests that allocating business unit to manage workarounds have many benefits. For example, it improves the monitoring process, retains transparency, improves external controls, provides data documentation, and reduces transactional costs [32].

Another strategy is to improve collaboration and communication among unit members. Workarounds have been associated with poor communication [11], [61] and collaboration [7], [24], [62]. For example, workarounds happen when reaching particular people is difficult during organisational process enactments [24]. On some occasions, workaround systems (such as shadow IT) are regarded as an effective tool to facilitate collaboration [7]. Improve collaboration and communication can be achieved in several ways. For example, promote user participation in the operational software design [21], [26]. Another strategy is to improve communication to create reliable communication channels among unit members [12].

The last strategy to use is to give training for employees [7], [14], [21], [26], [31], [37], [38]. Giving training will promote a safer environment for working [7]. Researchers believe that training could overcome workarounds [14], [31]. The training content could encompass the process understanding (how to do it) and its impacts (what is the impact on the other unit if I do workarounds) [31]. Training is also beneficial to help new employees to aware of their core functions in the system [21]. Nonetheless, training is not a seamless silver bullet solution. Training content should be beneficial in the users' perspectives [37]. Otherwise, they will not come. For example, physicians are the most difficult users to train in avoiding workarounds, because they never come in the training session [37].

5 Conclusion

In this short essay, we explain how to solve workarounds from the IS literature viewpoint. In doing so, we extract insights from IS articles stored in major IS databases. We have found that there are four strategies that a manager could do to alleviate workarounds. That is, formalising workarounds, allocating business units to manage workarounds, improving collaboration and communication among unit members, and giving training to employees.

5.1 *Theoretical Contributions*

We contribute to workaround literature by revealing control approaches for workarounds suggested from IS literature. We explain each control approach and show how they can be beneficial in controlling workarounds. Also, each control approach falls into Theory Type I – Theory of Analysis [63] in the Information Systems viewpoints. By doing so, our contribution to both workaround and information systems literature is obvious.

5.2 *Practical Implications*

As to practical implications, our list of control offer insights for the design process of IT artefacts and applications. Managers and designers can sit together to formulate the best strategy to control workaround through IT artefacts and applications. By doing so, the future artefact can be more effective and efficient.

5.3 *Further Research*

The problem with those control strategies is the lack of empirical work. Most studies come with a conceptual framework to manage workarounds but with no real actions [3], [5], [57], [64]. There exists one study that suggested workaround controls and implemented them in the real-world setting [56].

This study suggests that there are three different workaround types that a manager could consider when controlling workarounds. That is, data adjustment, process adjustment, and parallel-process adjustment workarounds. In this point, the organisation selected a top-down strategy to re-arrange policy and rules. The researchers have found that these three strategies are useful in controlling workarounds. However, the researchers reported that the duration to undertake this research is somehow longer. Hence, it may not fit to other researchers' time and budget constraints [56]. Therefore, further research may pertain to how organisations implement those strategies in their context. Also, further research may include how workaround evolutions affect their control strategies.

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