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A case study of Indonesian's "Kawal Pemilu"**

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Citizen Engagement in an Open Election Data Initiative: A Case Study of Indonesian's "Kawal Pemilu"

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ABSTRACT

Citizen engagement is key to the successful and sustainable use of Open Government Data (OGD), involving multiple activities ranging from the retrieval and conversion of raw data to OGD based applications, to the use of these applications to solve societal problems. However, there is a lack of insight into what drives citizens to engage in OGD initiatives. Such insight helps inform policymakers in stimulating and improving the engage ability of an OGD program. This study aims to identify factors that influence why citizens engage in OGD initiatives. To attain this objective, we conducted a single case study of citizen engagement in an open election data initiative in Indonesia. Our study shows that social altruism as an intrinsic motivation is a strong driver for citizens to start and continue engaging with open election data. Low data quality appeared not to hinder citizens from engaging in the OGD initiative; in contrast, it can lead to more engagement. Election is typically concerning with political participation, yet trust and political efficacy factors only marginally influenced citizen engagement in our case study. The case shows that, in a time-critical situation where potential social conflicts were seen to threaten the citizens' lives, collective actions are enabled by the availability of OGD. We draw some key lessons learnt for policymakers to enhance OGD engage ability. Further research is needed to examine whether factors found in this particular case also apply in different settings.

CCS CONCEPTS

• **Social and professional topics** → **Government technology policy**; Cultural characteristics; • **Information systems** → *Collaborative and social computing systems and tools*;

KEYWORDS

open government data, open data, citizen engagement, development, case study, Indonesia, election

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1 INTRODUCTION

Citizen engagement is key to the successful and sustainable use of OGD [13], involving multiple activities ranging from the retrieval and conversion of raw data to an OGD based application, to the use of these applications to contribute to solving societal problems. OGD advocates assume that more engagement will lead to better decision making; tacit knowledge required to improve government policy is widely available in society when citizens are more engaged [25]. Studies concerning socio-technical conditions of OGD usage, both enablers and barriers, have been well established [29]. However, OGD does not necessarily result in the creation of applications by citizens [24] because citizens typically lack the required proficiency to access and analyse the opened data provided in raw format [23]. As a result, only digitally literate citizens who can utilise OGD; yet, little is known regarding the citizens' motivation to engage in an OGD initiative.

Engagement in OGD initiatives involves not only OGD use (e.g., locating, downloading, distilling, scrutinising, and refining data [9]) but also the creation of applications based on OGD and the use of these applications to solve problems. Therefore, engagement is one step beyond OGD use. The open data literature has provided knowledge about which predictors or determinants influence citizens' intention to use OGD (e.g., [42], [32], [39], [38]) and which barriers might hinder citizens' usage (e.g., [41]). These studies have put forth an initial understanding into factors that influence OGD use, but there is still a lack of insight into drivers that motivate citizens to develop OGD based applications and use the applications to tackle societal problems. Such insight is crucial to civil servants responsible for the development of OGD strategies because it can help design policy to stimulate and improve engage ability of an OGD program. Therefore, this study identifies factors that influence why citizens engage in OGD initiatives. To attain this objective, we conduct a single case study of citizen engagement in an open election data initiative in Indonesia. This study scientifically contributes to the understanding of citizen engagement in an OGD initiative and the verification and extensions of factors that influence the engagement found in the open data literature.

This paper is structured as follows. First, we present our definition of citizen engagement, followed by a discussion of the current literature on citizen engagement in OGD. Next, we discuss our research methodology and present a discussion of case study findings. Finally, we conclude with insights into citizens' motivations to engage in OGD initiatives and their impacts on civil servants in charge of OGD and on future research.

2 RESEARCH BACKGROUND

2.1 Defining Citizen Engagement

In the open data literature, citizen engagement mainly refers to open data use by citizens [33]. Using OGD involves various processes including data-to-fact (discovering specific facts in the data), data-to-information (elucidating data content through static representation), data-to-data (bringing forth derivative data by reformatting, augmenting, or combining data), data-to-interface (creating an interactive interface for accessing and exploring datasets), and data-to-service (providing a service powered by open data) [10]. Different use involves different tasks and activities. For example, data-to-fact involves data searching and browsing and fact extraction. Susha et al. [33] add that the level of complexity of OGD use increases from data-to-fact to data-to-service and that different use of OGD generates different values, such as supporting personal decision-making or serving a community needs.

We argue that citizen engagement goes one step further and does not only include OGD use but also requires the development and use of OGD-based applications for contributing to finding a solution to societal problems. Developing an OGD-based application involves multiple OGD use activities. For instance, a local flood monitoring website that uses open data from a governmental disaster mitigation agency. Its primary output is an interface (e.g., the website) that provides not only data (e.g., in a map format) but also facts (e.g., the level of flooding in a particular location) and information (e.g., flooding patterns of the whole city) and may function as a service to its users (e.g., feature for reporting the occurrence of flooding). Using an OGD-based application represents a user's activities, such as adding new data (e.g., reporting flooding in a particular neighbourhood, reviewing local government's disaster mitigation performance) to OGD.

In Information Systems (IS) development research, *engagement* is defined as a superset of *participation* and *involvement* [18]. Participation refers to 'a set of behaviors or activities' performed by individuals and involvement concerns with 'a subjective psychological state reflecting the importance and personal relevance' (beliefs or attitudes) of the individual [4, p. 53]. The effect of participation on intention to use IS can be solidly explained when involvement mediates the relationship [4]. Building on these studies, we define citizen engagement as *a combination of observable activities/behaviours and beliefs/attitudes of citizens towards developing and using OGD-based applications.*

2.2 Examples of Citizen Engagement

We can observe many examples of citizen engagement in OGD practitioners and researchers works. For instance, the Italian's Monithon [30], Netherlands' local version of OpenSpending [15], and Indonesia's Kawal Pemilu [14].

Monithon (<http://www.monithon.it>) is an application built on top of an OGD initiative OpenCoesione (<http://opencoesione.gov.it>). OpenCoesione publishes data on projects executed to implement European Union's Cohesion Policy regarding money spent, locations and thematic areas of the interventions undertaken, parties involved and its timeline [30]. A group of a civil servant working for OpenCoesione and five citizens codeveloped the Monithon application. Other citizens use it to monitor the conduct of a project

and report the findings of an investigation about how the project progresses and ultimately what it delivers [30].

OpenSpending (<http://openspending.nl>) is a web application developed by on top of two data sources. Aggregated financial data named 'Iv3' derived from the Dutch Central Bureau of Statistics (CBS) and detail financial data from several local governments (e.g., province of Groningen and municipalities of Groningen, Dordrecht, Heerlen, Lelystad, and Utrecht) [15]. The CBS regularly publishes 'Iv3' data collected from local governments (provinces and municipalities), water boards, and public-private arrangements. The OpenSpending application was developed by a Civil Society Organization named Open State Foundation. Dutch citizens can use the application to search for public spending on various government functions (e.g., management and support, safety, traffic, transport and water management) and compare expenses between different local governments.

Kawal Pemilu (<http://www.kawalpemilu.org/>) is an application built on top of election data published by the Election Commission of Indonesia (or KPU) (<https://pilpres2014.kpu.go.id/>) in the 2014's presidential election. KPU opened election data results and recapitulations collected from its local branches at different governmental levels (e.g., village, district, municipality, and province). Five Indonesian citizens developed the Kawal Pemilu application, while 700 volunteers used the application to digitise election results and report anomalous results found in digitisation process [14].

2.3 Previous Research Concerning Citizen Engagement in OGD

Currently, there is no overview of factors that influence OGD engagement, and the literature is fragmented. Therefore, we conducted a literature overview to provide an initial understanding towards factors that plausibly influence citizens engagement with OGD. We sought for peer-reviewed journal articles and conference papers in Scopus database, which indexes well-known publishers such as ScienceDirect (Elsevier), Springer, Wiley-Blackwell, Taylor & Francis, Sage, Emerald, Oxford University Press, Cambridge University Press, ACM, and IEEE. We used a combination of keywords to gather relevant papers concerning determinants or barriers to citizen engagement or involvement or participation or use of OGD. Only seven publications were found, i.e., [8], [32], [35], [38], [39], [41], and [42]. We assumed that more factors are required as Zuiderwijk et al. [42] suggests that trust can improve our understanding of the acceptance and use of open data technologies and Davies [10] states that OGD usage represents political participation. Therefore, we broadened the search by removing OGD from the keyword combinations and excluded papers addressing non-ICT-facilitated government systems. In the end, four publications, i.e. [1], [5], [20], and [27], were included in the overview. We extracted, from the overviewed studies, only factors that are positively associated with citizens' intention to use OGD or ICT-facilitated government systems. However, this overview evidently does not offer exhaustive factors. The following sections briefly discuss these factors.

Intrinsic motivation is found significantly influencing citizen's intention to use OGD in Germany [39]. Intrinsic motivation is defined as 'a type of motivation based on people's inherent interest in

Table 1: Overview of factors influencing citizen engagement

Category	Factors	References
Psychological	Intrinsic motivation	[20], [39], [38]
	Extrinsic motivation	[5], [42], [32]
Social	Social influence	[42], [27], [32]
Technical	Data quality	[41], [35]
	Service quality	[41], [8], [32]
Political	Trust	[20], [5]
	Political efficacy	[1], [27]

activities that provide novelty and challenge' [12, p. 494]. An individual's intrinsically motivated behaviour expresses one's self and does not rely on external reinforcement [12]. In a voluntary OGD engagement aiming to solve societal problems, intrinsic motivation may influence citizen's behaviour to use open data.

Extrinsic motivation is defined as 'the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions' [11, p. 1112]. Performance expectancy, rooted in extrinsic motivation, significantly influences citizen's intention to use open data technologies [42]. Although extrinsic motivation may not play a role in the early stage of voluntary engagement, this may not apply when the engagement is progressing. Citizens may expect to receive compliments during the engagement and other future benefits after the end of an engagement.

Social influence, mainly from important persons related to job performance (e.g., supervisors, teachers, managers), positively influences people's behavioural intention to use open data technologies [42]. Social influence refers to 'the degree to which an individual perceives that important others believe he or she should use the new system' [34, p. 447]. Influence from important peoples in social relations unrelated to performing a job (e.g., close friends, social media communities, patrons) may affect a citizen's intention to voluntarily engage with open data to solve societal problems.

Data quality is defined as 'data that are fit for use by data consumers' [36, p. 6]. Data quality is subjective to the people who use the data and evaluate it based on the reflections of their needs. Zuiderwijk et al. find that low quality of data, labelled as 'impediment', 'directly restrict[s] the use of open data' [p. 160]. This finding assumes that data with higher quality will enhance citizen engagement and contrary, lower data quality may diminish the engagement. Building on the study, we select data impediments mentioned in at least two different sources (among literature, data interviews, and workshop) and group them into topics related to accuracy, format, currency, understandability, and interoperability. At the start of the voluntary engagement, the quality of data may be unknown to citizens, but during the engagement, they may perceive the levels of data quality.

Service quality is defined as 'a comparison of consumer service expectations with perceived service performance' [19, p. 743]. In open data context, users expect data providers to perform services related to many facets of data use. For example, providing a forum that enables users and OGD providers discuss data quality.

However, OGD related services are often neglected, 'data deposit impediments make it difficult to store, discuss and provide feedback on datasets' [41, p. 160]. These impediments pertain to low quality or non-existent of services offered by OGD provider regarding feedback from users. We select impediments related to service quality [41] and group them in reliability, assurance, and responsiveness factors. Service quality may influence a citizen's intention to continue using OGD, particularly when a user needs help or guidance in using certain data or when a user expects follow-ups from the OGD provider regarding feedback on data quality.

Trust in government positively influences a citizen's intentions to use an e-government service [5] and is defined as 'one's perceptions regarding the integrity and ability of the agency providing the service' [5, p. 167]. Corruption has led people to lose trust in government. Transparency, seen as an impact of opening government data, could be used as a means to discourage corruption and regain people's trust [3]. Trust in government influences a citizen's intention to continue using OGD. In a collaborative engagement, trust is also applied to the opened data and other citizens, because data could expose privacy risk to citizens and citizens could distrust their colleagues for conducting inappropriate acts (e.g., adding inaccurate data that may lead to a wrong conclusion).

Political efficacy positively affects one's intentions to participate in online policy deliberation forums [27]. Political efficacy refers to 'beliefs about one's own ability to influence the political process and [...] about the responsiveness of government officials to the concerns of the citizenry' [2, p. 63]. Citizens engagement in an OGD initiative to solve societal problems reflects citizens' beliefs that they can influence government processes and that government's responsiveness toward their involvements is possible. Political efficacy can influence a citizen's intention to continue using OGD.

3 RESEARCH APPROACH

Our research aim is to identify factors that influence why citizens engage in OGD initiatives. The literature shows that there is no overview of various factors. The factors we found were derived from different domains (i.e., open data, e-government, e-participation) and it is unclear whether these factors are relevant or there are missing factors. Therefore, we employed a qualitative approach based on a single case study to further understand, extend and refine the factors. The characteristics of the case should help gain insight into factors that influence citizen engagement.

Case studies are appropriate for research attempting to answer 'how' or 'why' questions about contemporary events over which the researcher has little or no control [40]. Evidently, we ask a 'why-question' (why citizens engage in OGD initiatives), and we study a contemporary event (citizen engagement in an open election data initiative in the period of Indonesia's 2014 presidential election), over which the researchers had little control. In the following section, we explain our research design decision.

Criteria for selecting a case included:

- The case concerns open government data;
- The case includes an OGD-based application that is voluntarily developed by citizens; and
- The case concerns an OGD-based application that is used voluntarily by citizens to solve societal problems.

The case of Kawal Pemilu fits all of the criteria and has many facets that would enable us to gain a deep understanding of the factors influencing citizen engagement. Kawal Pemilu concerns the vote results published online by the Election Commission of Indonesia at all levels of governmental administration (regencies/municipalities, provinces, and national) at every recapitulation process. The case represents the broadest involvement of OGD providers (OpenSpending involves only local governments) covering all election institutions at both local and national level and involves raw data (Monithon and OpenSpending use processed data). This case involves voluntary digitally literate citizens (we refer to them as *developers*) who did not hold any position in the government (Monithon was initiated by a government institution). The application was used by voluntary citizens (we refer to them as *volunteers*) to achieve common goals, namely digitising election results and reporting anomalous results (the aim of OpenSpending use is unknown).

3.1 Case Study Design

This study was designed to understand citizen engagement in open election data through the development of the Kawal Pemilu application and its use to digitise election results in Indonesia's 2014 presidential election tabulation. As a result, the study features a descriptive case in that it attempts to describe open data engagement and factors influencing the engagement. This case spanned from the voting day, 9 July 2014, to the final legitimization of the election outcome on 22 August 2014. The primary unit of analysis in this study is the Kawal Pemilu application, and the embedded unit of analysis includes developers who build the application and volunteers who digitise election results and report anomalous ones using the application. Although the first author was involved as a volunteer in digitising election results, the researcher did not have the instruments to control the behaviour of developers and volunteers engaged in the initiative.

A single case study design is acceptable under specific situations where the research represents a critical case, an extreme or unusual case, a common case, a revelatory case, or a longitudinal case [40]. This study fits the revelatory case because the researcher had access to a situation previously inaccessible to the inquiry. Until recently, Kawal Pemilu's volunteers are inaccessible to researchers and practitioners due to the secrecy and anonymity applied as a consensual agreement to protect their identity from physical threats or bribery [14].

We established a case protocol to guide the conduct of the study in which the overview of the research was described, and data collection procedures were defined. We also built a case database to store all information produced in every stage of the study. Case study protocol and case database are part of establishing a chain of evidence, and both can increase the reliability and construct validity of a study [40]. We also used the theories explained in Section 2.3 as a guide prior designing the case data collection to improve the external validity of the study [40].

3.2 Data Collection

We collected various types of qualitative data using multiple sources of evidence, so that construct validity is enhanced [40] (see Table 2).

To facilitate analysis at the case level, we sought for election legislation documents, online news articles and social media posts related to Kawal Pemilu, personal blogs, Kawal Pemilu's design or development documents and unobtrusive artifacts. The legislation documents provide information regarding the election processes carried out by the Election Commission. News articles, social media posts, mainly from Facebook, and blogs are sources for opinions of society towards Kawal Pemilu. Design documents help gain an understanding of the conduct of Kawal Pemilu application development processes. KPU's open data portal provides the supporting evidence for the technical aspects of open data use and the final official outcome of the election, whereas the collection of anomalous election results is direct evidence of the negative outcome of the election.

We also gathered qualitative data from sixteen semi-structured interviews with government officials, developers and volunteers, from October 2017 until January 2018. We selected three Commissioners, working at three different local Election Commissions (one from a provincial level committee and two from the regency level), who were involved in the 2014 presidential election. The first author interviewed thirteen informants through online voice calls, because the interviewees live in different cities or countries, and three interviews through a face-to-face method. We used a snowball sampling technique to identify volunteers due to difficulty in locating them. The first author interviewed thirteen respondents (developers and volunteers) who were referenced by other informants as adequately knowledgeable about the Kawal Pemilu initiative. The researcher decided to stop searching for other volunteers because the respondents supplied no new information. We recorded and transcribed all interview sessions as agreed by the interviewees. On average, an interview session took an hour to complete. We developed and tested a list of interview questions, as a part of the case protocol. We divided the topics of questions into two parts: 1) those concerning the citizen engagement processes, and 2) those addressing the factors informed by our literature overview. An example of questions in the first part is 'How did you engage with the use of the Kawal Pemilu application?'. In the second part, questions include the following example: 'To what extent did personal benefits influence you to use the Kawal Pemilu application?'

The first author actually engaged in the case as a volunteer who used the Kawal Pemilu application to digitise the election results. Gaining actual access to the case as a participant-observer provides a distinctive opportunity to understand the engagement process from the perspective of an *insider* [40]. However, we are aware that the participant-observation strategy may introduce potential biases. Therefore, we provide a discussion on this issue in Section 5.2.

3.3 Data Analysis

We divided our analysis into two phases using different coding methods with distinct objectives. In the first phase, we aimed to capture the process series of citizens engagement in open election data. Provisional codes capturing OGD processes and factors were generated from the literature overview used for guiding the interview questions development. As interview transcriptions and other documents were analysed, we modified these codes to include new codes [31] created using process coding and simultaneous methods.

Table 2: A list of data collected in the case

Data Source	Data Type
Documents	General election legislation, news, social media posts, personal blogs, Kawal Pemilu’s design documents
Interviews	Sixteen individuals (three election commissioners, two developers and eleven volunteers) semi-structured interviews
Participant-observations	Facebook secret group posts
Unobtrusive artifacts	Open election data portal, collection of anomalous election results

In Kawal Pemilu case, OGD use processes suggested by literature [10, 33] were complemented by social processes found in the qualitative data. The second phase aimed at depicting factors emerged in each process identified in the first phase. Provisional codes of factors that influence OGD use captured in the first phase were modified using the initial coding method to include new codes emerged in the data [31]. These codes were analysed further to indicate their existence using structural coding methods.

4 DISCUSSION

We divide the discussion into three sections which reflect our attempts to answer the research question. Section 4.1 presents the context of the case which includes a general description of the election in Indonesia and a particular account of the publication of election data in 2014 and the case itself. Since the study aims at describing factors, it does neither offer an accurate prediction of factors nor determine causal factors and their effects on citizen engagement. Therefore, we approach the answer to the research question (why) by offering discussions of the citizen engagement processes grouped in three phases in Section 4.2 (how) and factors that influence the engagement phases in Section 4.3 (what).

4.1 Case Description

4.1.1 Presidential Elections in Indonesia. Elections in Indonesia are conducted manually, and so is the vote counting. Figure 1 illustrates the hierarchical structure of the tabulation. Principally, the election results are counted at the polling station level as follows. First, paper ballots representing the voter’s choice are read by the chairman of the local voting organiser group (named KPPS). Then, a member of the KPPS tally the result on an official form, named *C1 Plano*. Next, after the tallying process is completed, another member of the KPPS will write the results manually on an official form named *C1*. A *C1* form records the number of votes gathered by each candidate and the total of the votes and should be signed by the chairman and at least two members of the KPPS. Afterwards, the KPPS members dispatch a copy of the *C1* to the village voting committee (or PPS) and one to the regency election committee (or KPUD).

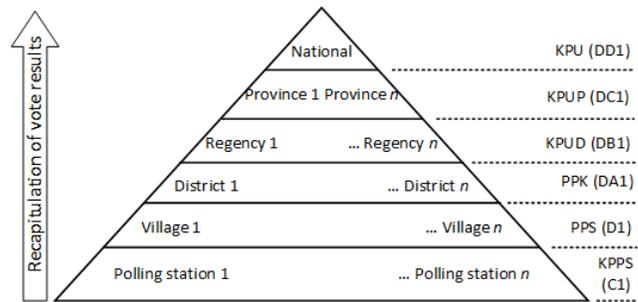


Figure 1: Levels of hierarchy in the vote counting process

The next processes involve C1 recapitulation meetings between election actors started from the village level and ended at the national level. Each meeting has to be attended by the committees and the candidates’ witnesses. Historically, voters could not access and monitor the counting processes after the C1 forms were transferred to PPS (the village committee). In 2014, KPU published election results online and made the results accessible and usable through Application Programming Interface services. C1 forms were scanned and opened as Joint Photographic Experts Group images, and recapitulation results were digitised and published as Hypertext Markup Language.

4.1.2 Kawal Pemilu. Ainun Najib, a data engineer, working for a Singaporean company, and his four Indonesian friends initiated the Kawal Pemilu application to digitise the election results. Counting election results is time critical. If the application is released after the official recapitulation announcement, then no one will use it. Therefore, the initiators applied an agile development method to overcome this limitation. Three days after the voting day (12 July 2014), the system was ready to use, but they faced a challenge: recruiting volunteers to digitise 478,829 C1 forms. Ainun adopted Multi-Level Marketing recruitment systems to tackle this problem. He recruited ten friends, ‘downline’, who then recruited another ten and so forth, through a secret Facebook group. In only one day (13 July 2014), Ainun has gathered 700 volunteers and closed the recruitment. He applied secrecy to four initiators and volunteers to prevent bribery and intimidation. However, until recently, the volunteers’ identities have not been revealed to the public.

4.2 Open Election Data Engagement Process

We examined the sequences of events within and surrounding the Kawal Pemilu initiative using process model to describe the citizen engagement process that leads to solving societal problems as the outcomes of interest in this study [28]. Events are instances of social action relating to the citizen engagement [28]. We analysed the events that comprised citizen engagement process (PROCESSES) and the events that may either affect the engagement (ANTECEDENTS) or be affected by it (OUTCOMES). OUTCOMES of a phase can function as ANTECEDENTS to the latter or even to the previous process. For example, when volunteers start to digitise election results using the Kawal Pemilu application, they may encounter and report bugs to the developers who then fix and improve the system. We grouped the sequences into three phases in which

closely related events develop a meaningful generic process (see Figure 2).

4.2.1 Phase one: ideation. ANTECEDENTS: Every five years since 2004, Indonesian citizens directly elect their president and vice president. In 2014, only two pairs of candidates, Joko Widodo-Jusuf Kalla and Prabowo Subianto-Hatta Rajasa, competed. This head-to-head situation led to fierce competitions as fake news and hoaxes were used for campaign materials. Tensions between supporters heightened towards voting day. As soon as the voting ended, both candidates claimed their victories based on particular quick count results, although the election outcome would be officially announced within two weeks afterwards.

PROCESSES: Ainun perceived that the situation was unconvincing and predicted that it would lead to physical clashes between both supporters. Ainun then sought for a solution to falsify one of the claims (i.e., only a pair of candidate wins the election) through the participation of independent citizens who are neither affiliated with both candidates and their supporters nor the government agencies related to the election. Having informed that the election results were published online, Ainun started to experientially learn the data by browsing, downloading, and exploring the data. Ainun and other four initiators, henceforth the developers, designed the solution that would be developed.

OUTCOMES: The developers designed a crowdsourcing platform with following requirements. First, election results should be digitised in a closed environment, but the digitisation results and errors would be accessible to the public. Second, verification mechanisms should be embedded in the system to tackle data quality problems. Third, the system's interface should be user friendly and easy to use to speed up the digitisation process. Fourth, the system should apply a reward scheme to motivate volunteers to continually digitise election results. Whoever finishes entering data for a particular village, they can roll up to the district level and find out who is the fastest in completing digitisation in village level.

4.2.2 Phase two: agile development. ANTECEDENTS: Design established in the ideation phase, volunteers' feedback, and bugs found by volunteers, guided the Kawal Pemilu platform development.

PROCESSES: Four developers built the platform, whereas Ainun recruited volunteers. One developer coded the closed crowdsourcing platform. Two developers coded the public view-only website. Another developer, supporting both programmers, coded scripts for scraping the DA1, DB1 and DC1 data from KPU's website and developed mirror version of the Kawal Pemilu's public website. They worked closely with several volunteers (testers) to improve the systems and fix identified bugs.

OUTCOMES: Both internal (crowdsourcing) and external websites were developed in slightly less than three days after the voting day and improved during the initiative.

4.2.3 Phase three: citizen-sourcing. ANTECEDENTS: Digitisation jobs were distributed to groups of volunteers through the secret Facebook group. A group coordinator assigned the jobs to volunteers and continuously monitored which regions whose C1 forms have not been completely digitised. Two levels of verification were applied to insure the accuracy of the digitisation results.

Eight groups of verifiers comprised of ten to twelve volunteers were formed. A liaison was appointed to compile and communicate the unsolved errors to the KPU's staffs.

PROCESSES: Using the crowdsourcing platform, volunteers entered the number of votes gathered by each candidate and the number of legal votes (the sum of all votes) displayed on the C1 forms. The volunteers might experience difficulties in recognising handwriting due to blurry, skewed, and vertically flipped scans. If a C1 form was not clear enough to read, a volunteer could flag it as an error. A volunteer might also deliberately enter wrong numbers into the platform (increasing the number of votes of a chosen candidate and or reducing the number of the competitor's votes). Public, using the Kawal Pemilu public website, could oversee the digitisation results and report any errors found. Group coordinators collected all errors and reported them to the liaison. The verifiers checked data entry results and made corrections when necessary. In the second level of verification, each verifier group was assigned to re-check another group's works.

OUTCOMES: It was the onus of the volunteers to digitise all C1 forms before KPU officially announces the winner of the election. The volunteers have digitised more than 383,000 C1 forms in the sixth day after the voting (15 July 2014) and 464,000 forms (97%) three days afterwards (18 July 2014). Finally, they finished digitising 97.91% of C1 form on 22 July 2014. Their final results deviated only 0.14% from the official KPU announcement. Slightly more than 10,000 errors were found. Verification mechanisms have contributed to reducing approximately 4,000 errors caused by volunteers, and until presently, 6,000 C1 related errors have not been resolved. The KPU staffs followed up most errors reported by the Kawal Pemilu liaison, made a correction to errors, and re-published the updated election results to the KPU's website. On 22 July 2014, KPU enacted Joko Widodo as the election winner. The commissioners of KPU were appreciative towards the Kawal Pemilu initiative and asserted that the digitisation results, representing the independent citizens checking, enhance KPU's official announcement and leverage its legitimacy and credibility. The rival, who lost the election, brought this legislation to the Constitutional Court. In the end, on 21 August 2014, the Court dismissed all allegations against KPU and re-enacted KPU's decisions.

4.3 Factors Influencing Open Election Data Engagement

Based on the structural coding analysis, we found mixed results. Most a priori factors existed, and new factors emerged in the citizen engagement (see Table 3).

We found two intrinsic motivations that drive citizens in all phases of open election data engagement found in previous research: contributing to public good or altruism in a e-participation study[20] and enjoyment in OGD use[38, 39]. While one developer and all volunteers are intrinsically motivated by social altruism, another developer expresses an enjoyment in mastering the technical challenge of building the Kawal Pemilu application on top of open data. We suggest that the difference is due to the socio-demographic characteristics between these two groups. The latter is a highly technologically skilled citizen working as a software engineer, whereas the former represents diversity of managerial or social backgrounds.

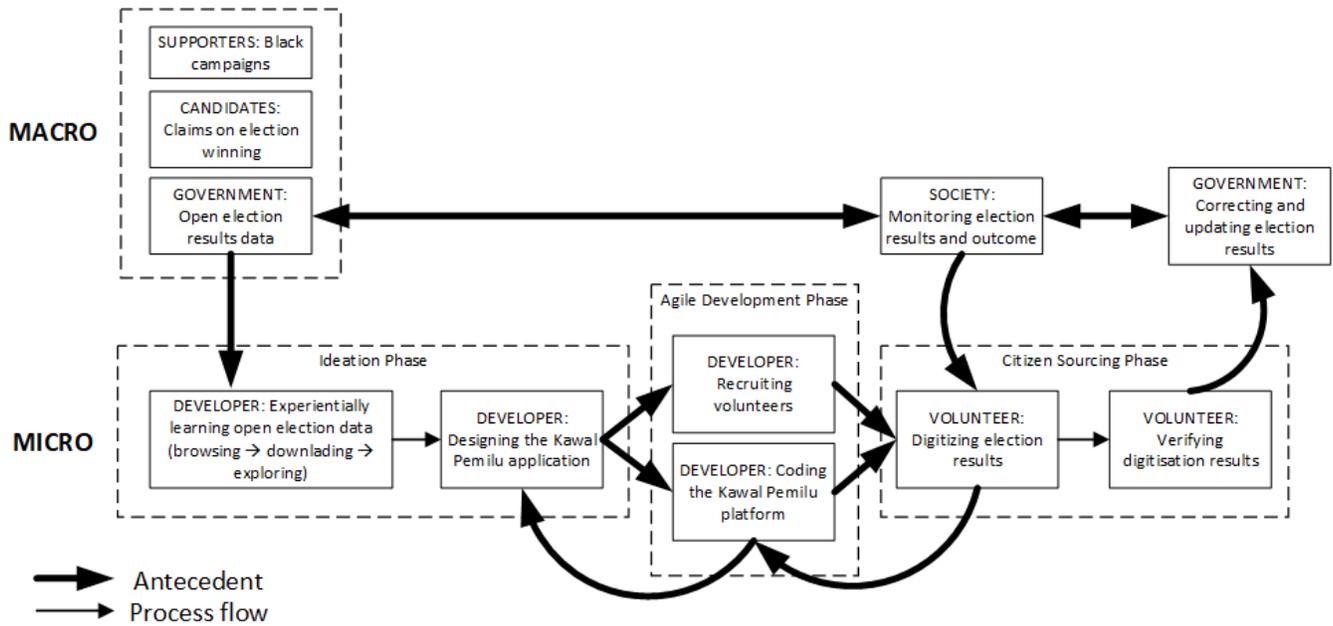


Figure 2: Processes of the citizen engagement in the Kawal Pemilu case

Table 3: Factors found in the Kawal Pemilu case

Factor	Existence and Frequency		
	Phase 1 and 2	Phase 3	
		Initial	During
A priori			
Intrinsic motivation: Social altruism	+ (2)	+ (12)	+ (12)
Intrinsic motivation: Enjoyment	+ (1)	+ (1)	+ (1)
Extrinsic motivation: Broadening social networks	-	-	+ (2)
Social influence: Friends	+ (1)	+ (12)	+ (12)
Data quality: Accuracy	-	-	+ (10)
Emergent			
Social media	+ (1)	+ (1)	+ (1)
System quality: Availability	-	-	+ (3)
Anti-corruption expectancy	-	+ (1)	+ (1)
Perceived novelty	-	+ (1)	+ (1)

We notice different definition of public goods among altruistically motivated citizens. For example, one volunteer defines it as ‘proving that a good person was people’s choice and won the election in a clean and transparent way.’ While one developer describes it as ‘counteracting further social disintegration.’ Indonesia is a *collectivist* society [16] in which individuals’ personal goals are subservient to collective goals of particular in-groups (e.g., family, clan, ethnic group, nation). The collectivist culture induces altruism, a social obligation to prioritise the interest of others or particular

communities, among its members [26]. In Indonesia, social altruism is locally termed as *gotong royong*. We suggest that the culture might shape the motivation of citizens engaged in Kawal Pemilu to contribute to public goods. The literature overview shows that the open data research has barely investigated the effect of cultural context, e.g., social altruism, on OGD use.

Similar to a previous study [42], we also found that extrinsic motivation influences some volunteers to engage during citizen-sourcing phase. However, different factors were investigated; the previous study identified motivations concerning job performance, and ours found those related to broadening social networks. Volunteers enjoy having new friends as a result of their engagement in Kawal Pemilu. This motivation does not appear to be influential at the initial engagement, but as volunteers start to interact with each other, it emerges. We suggest that the motivation reinforces the enjoyment motives of volunteers in the engagement. One volunteer explains,

My motivation was to broaden my network [...] with people having a similar vision as I do.

Another verifier expresses the enjoyment of having new friends and describes,

And then I met a lot of new friends. If I did not join Kawal Pemilu, I would not know Diana, [...] Elina, [...] Elisa, or [...] Mas Robertus, [...] Edwin and so forth, [...] those Kawal Pemilu guys turned out to make me gain new knowledge. [...] For example, I know a person whose name was Nazar Amil. He is in Holland [...] [and] an architect. He likes to show off [his] beautiful architectural photographs [...].

The reward scheme established in the Kawal Pemilu system (i.e., announcement of volunteers with the fastest completion of digitisation at village level) appears not to influence the engagement. No volunteer mentions about the reward.

We found that social relationships (e.g., friends, co-workers, classmates) influence the engagement of both developers in the application development phases and volunteers in the initial citizen-sourcing phase. The findings are due to the recruitment strategy through close networks of friends on Facebook who were well known in real life. When asked to describe how the engagement started, one volunteer explains,

[...] my co-workers [...] because they looked very active in the election [...] invited me [...]

However, we found that important persons in the family (e.g., wife/husband/partner, parents) do not affect the engagement. One prominent developer even describes,

My wife didn't know what I was doing. For many days, I just stared at my laptop. My wife didn't ask, but finally, she asked, 'why don't you eat or drink or go to work?'

During the citizen-sourcing phase, new social relationships are formed between group coordinators and volunteers, between verification coordinators and verifiers, and between developers and volunteers. These new relationships create new important others similar to those in a working environment (e.g., supervisor, manager) investigated in the previous studies [27, 32, 42].

Contrary to Zuiderwijk et al.'s [41] analysis suggesting that barriers related to data quality hinders OGD use, we found opposing evidence: low quality of open election data concerning accuracy does not diminish citizen engagement. Instead, it leads to more engagement. During the digitisation phase, at least 125 anomalous C1 forms due to erroneous sum, no witness's signature and unclear scanned form, were found [7] and exposed by news media outlets. Interestingly, the discovery of these *bad data* motivates volunteers to be *armchair auditors* in detecting such data and to be the first to share these findings through social media posts or tweets. Indonesia's previous direct elections were prone to fraud, and unpublished election results have constrained citizens from monitoring the performance of KPU [7, 14]. Therefore, the release of election data stimulates and empowers citizens' enthusiasm in scrutinising the accountability of the KPU personnel. One volunteer explains,

If we found [a strange C1 form], we were just excited to look for other [C1] problems.

Another volunteer describes,

In fact, actually I was excited to find this case. We wanted to know exactly [and] captured these strange things [done by] a [corrupt] KPPS officer.

Open data research often takes data quality for granted concerning its effect on citizen engagement without considering the engagement context. In transparency and accountability context, our finding suggests that data availability is more crucial than its quality (hence, its usability [41]), particularly related to accuracy.

We found four emerging factors missing from the literature overview: *social media*, *system availability*, *anti-corruption expectancy*,

and *perceived novelty*. One developer states that social media may influence citizens to engage in open election data because developers and volunteers of Kawal Pemilu are active Facebook users interested in sharing the outcome of the election or errors found in the election results. Social media platforms can amplify information sharing by creating many-to-many interactions among users and promote transparency [6]. Historically, social media platforms have been utilised by Indonesian activists to create impactful movements and organise anti-corruption protests [22]. Some volunteers mention the importance of system availability in open data engagement. During the digitisation phase, they experienced downtime of the KPU's website and the unavailability of the website has delayed their activities. Previous research indicates that the performance of an OGD platform regarding its availability, response time, and reliability affects the users' intention to use it again [8]. One volunteer is motivated by anti-corruption expectancy and expects that the engagement may reveal corruptive acts of civil servants working at the KPU. Open election data use, combined with social media, provides radical transparency [22] that leads to anti-corruption expectancy [6]. Another volunteer is motivated by the perceived novelty of the initiative. The volunteer views the Kawal Pemilu application as a technological innovation that offers new experience. Indeed, a previous study shows that perceived novelty is a significant affecting belief that plays an important role in the adoption of information technology innovations [37].

Opposed to the previous studies [8, 41], service quality appears not influential in engagement phases. Nearly all developers and volunteers do not mention it as a driver of their engagement. They do not interact with KPU either even in the occurrence of errors. Several volunteers even comment that with or without KPU's services, they would still perform the digitisation.

Although open election data is closely related to political domain, we notice that nearly all developers and volunteers state that political factors, i.e., trust and political efficacy, do not influence them to engage in the Kawal Pemilu initiative. Thus, we do not find support for the previous research [1, 5, 20, 27]. The government of Indonesia is striving to eradicate corruption, and the public is not surprised if there are public officials, even those high-ranked, arrested by the anti-corruption agency, hence there is a high level of distrust in government [7, 22]. When asked about the influence of trust on the engagement, developers and volunteers assert that they value KPU's efforts to publish election results online more than their trust (e.g., trust in government, trust in opened data). This answer reflects scepticism towards the government, as discussed in the previous section regarding service quality. As a result, there is a mix of trust as an immediate impact of transparency [17] and distrust as an effect of corruption [3]. According to Lewicki et al. [21], trust and distrust are separate constructs that coexist and may correlate with each other, and they are not at the polar ends of a trust continuum. In a previous study by Bélanger and Carter [5] distrust is associated with risk. Scepticism characterises the existence of the low trust and high distrust [21]. Therefore, we suggest that distrust may have more influential effect towards citizen engagement in the Kawal Pemilu initiative than trust. Regarding political efficacy, developers and volunteers do not cite it as an influencing factor of their engagement. In Phang et al.'s [27] study, online political participation concerns citizens who contribute to expressing their opinions on

particular public policy issues in a government-facilitated forum. Such direct participation emphasises interactions between government managers and may result in policy change. In our case, the participation does not aim to change government policy; instead, citizens help the government in executing election policy. We suggest that this different path of online political participation may explain the non-existent influence of political efficacy factors.

5 CONCLUSIONS

This paper addresses our central research question ‘Why citizens engage in OGD initiatives?’. We investigated the engagement of citizens in the development and use of the Kawal Pemilu application that utilises opened voting results data during Indonesia’s 2014 presidential election. We find that the engagement can be divided into three phases in which different activities are performed by citizens (i.e., the developers and volunteers): 1) ideation, 2) agile development, and 3) citizen-sourcing. Guided by a literature overview, we find that various factors may affect citizens’ intention to engage in open election data initiatives at different stages. These factors are dynamic and can transform over time. Factors identified in the initial phase of engagement may evolve into different factors or may be reinforced, and new factors may emerge in the further stages. Intrinsic motivations, i.e., social altruism and enjoyment, and social influences from friends are important factors that affect the overall engagement, i.e., before, at the initial phase of and during the engagement. Extrinsic motivation, i.e., broadening social networks, and low data quality, i.e., low accuracy, are influential factors that emerge during the engagement. We also identify various emerging factors beyond our literature overview: social media, system quality (i.e., system availability), anti-corruption expectancy, perceived novelty, and distrust. These findings reflect the infancy of the field of open data engagement and more research is urged to understand influential factors that drive citizen engagement in different contexts.

5.1 Key Lessons Learnt

Based on the findings, this case provides some lessons learnt that are fruitful for civil servants responsible for designing open data strategy and policy to increase OGD engage ability. The Kawal Pemilu initiative represents an OGD-enabled collective action that benefits election actors including the government and society. Government organisations (i.e., the Election Commission, the incumbent government administration) benefit from the added legitimacy and credibility of their performance as a result of the initiative. We suggest the following recommendations to maximise the value of OGD:

- Government should identify and release critical and high-value data that are important and relevant for citizens and stimulating a sense of urgency (e.g., opening detailed accounts of government budgeting and spending data).
- The opened data should be communicated early to highly technologically skilled communities to enable them to learn about using the data experientially (e.g., through hackathons).
- Policymakers should integrate the infomediary roles of citizens into a co-production or co-creation scheme to benefit

government (e.g., partnering with initiatives such as Kawal Pemilu to digitise election results from the beginning).

- Feedback provided by citizens must be responded and followed up promptly. The follow-ups should be reflected back to the opened data and communicated to citizens (e.g., maintaining historical records of data).
- Governmental organisations should encourage innovation in the public services to stimulate new novel ways to use the open data (e.g., implementing an e-voting instead of manual election).

5.2 Research Limitations

The limitations of this study concern the role of the first author in the case and the generalisability of its findings. First, the use of a participant-observation strategy may produce potential biases [40]. The first author was engaged in the case as a volunteer digitising the election results. However, as a regular volunteer (not a volunteer group coordinator), the researcher did not have control over other volunteers’ behaviour. Moreover, the first author was able to be an external observer since nearly all engagement activities were performed virtually online and involved a large number of participants.

The findings of this study cannot be generalised to the population of open data engagement because it is a single case study that is context-bound. The Kawal Pemilu case involves particular contexts. First, it involves a developing country with a collectivist culture that is struggling to fight against corruption and suffering from transparency issues. The availability of open data is crucial, and OGD usage by infomediaries is focusing more on the monitoring of government performance than creating economic value. Second, it concerns the use of time-critical raw data that do not comply with the machine-processable standard of OGD principles. Third, it involves a bottom-up citizens initiative without supporting resources from the government. It is, therefore, essential to note that the findings from the case might not apply to other OGD contexts. However, this study contributes to the discourses of open data engagement by adding insights from a particular context rarely investigated in the extant literature.

5.3 Future Research Recommendations

Our future research will concern two or more open data engagement cases with similar settings which may replicate the findings of this research. Addition of case studies with different or polar settings may provide a competing explanation of engagement motivations. Regarding the dynamics of factors, we also suggest future research to apply longitudinal methods to identify changes occurred during an engagement and to establish causal relationships between factors and the actual engagement. In this context, quantitative methods can be used to capture the factor dynamics at different points in time: before the engagement, at the initial phase of the engagement, during the engagement, at the end of the engagement and after the engagement. Future research can also compare the effects of data quality on different contexts of open data engagement, e.g., transparency versus decision making. Researchers can consider separating trust and distrust constructs and investigate their relationships with the intention of open data engagement

in different contexts. Finally, we believe that our study provides initial insights into open data engagement studies and since the research are still in infancy, the quest for factors that influence citizens engagement in OGD will remain to be explored.

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