Content Validity of Open Government Data Usage and Individual Work Productivity

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Abstract

The increasing prominence of Open Government Data (OGD) initiatives across public sector organisations demands a rigorous empirical examination of the factors that drive its usage among public managers. Previous studies found that despite of having it as one of the government initiatives, it found that the underutilization of open government data can be attributed to several behavioral factors, including constraints on user time, a general lack of interest, and inadequate support from data providers in clarifying contextual nuances. Therefore, this paper aims at validating the research instrument prior to the main large-scale data collection of OGD and individual work productivity (IWP). The study adopted a quantitative survey design underpinned by Information Systems Success Model (ISSM), Individual Work Performance by Koopmans as its theoretical foundations. The instrument was reviewed and reassessed by six subject matter experts comprising four academics from Malaysian public higher education institutions and two senior government officials using the Content Validity Index (CVI) methodology. The pre-test phase yielded Item-level CVI (I-CVI) scores ranging from 0.83 to 1.00 across seven constructs named System Quality, Information Quality, Data Availability, Voluntariness, Trust, OGD Usage, and Individual Work Productivity. All of the variables tested met the minimum threshold of 0.83 for panels of six experts. The findings confirm that the instrument is psychometrically sound and ready for deployment in the main study.

Keywords: *Open Government Data, Individual Work Productivity, Content Validity, Subject Matter Experts, Content Validity Index*

1.0 Introduction

The Open Government Data (OGD) movement has gained substantial momentum worldwide, driven by global policy agendas that advocate for transparency, accountability, and data-driven public governance [1]. OGD refers to government-held datasets made freely accessible, reusable, and redistributable without legal or technical restriction [2]. Within the public sector, the potential of OGD extends beyond transparency: when actively used by public managers, it can enhance evidence-based decision-making, streamline administrative workflows, and ultimately bolster individual work productivity [3]. Despite these anticipated benefits, empirical evidence on the actual usage of OGD among public managers, particularly in developing country contexts, remains scarce. Much of the existing literature focuses on citizen-facing applications or policy-level adoption, leaving a significant gap concerning the individual-level behavioural determinants of OGD usage among government employees [4]. In the Malaysian public sector context, where digital government initiatives have been systematically expanded under successive national digital transformation plans, understanding the drivers and inhibitors of OGD usage among professional civil servants is both timely and strategically crucial. This premise is consistent with recent cross-national evidence that OGD raises service and productivity outcomes chiefly by enabling the realisation of data element value and by strengthening technological innovation capacity, rather than through data release alone [5]. In this connection, OGD represents a paradigmatic example of transformative technology carrying substantial potential for enhancing public sector productivity. OGD may be conceptualized as structured information that is

collected, generated, and maintained by governmental institutions across multiple administrative levels, and which is subsequently made accessible to citizens and stakeholders through various digital platforms in machine readable formats.

2.0 Literature Review

Open Government Data has emerged as a critical instrument for advancing digital governance, improving public service delivery, and enhancing government transparency [1]. Gao et al. [6] trace the evolution of OGD research across four phases, noting a progressive shift from supply-side policy discussions toward demand-side adoption studies. In this evolving landscape, studies increasingly focus on factors that influence the actual use of OGD by diverse stakeholder groups, including public officials [7]. Saxena and Janssen [8] were among the first to empirically examine OGD usage through the UTAUT lens, finding that performance expectancy was a significant predictor of OGD adoption among various stakeholder groups in India. Their work established a precedent for applying behavioural intention theories to OGD usage contexts. More recently, Matheus et al. [9] demonstrated that information system infusion moderates the relationship between information quality and OGD adoption, underscoring the role of system-level factors in shaping usage behaviour. Trust has been recognised as a critical determinant of OGD adoption, particularly in public sector contexts where concerns about data accuracy, institutional reliability, and government transparency are salient [4]. Digital trustworthiness of the underlying data systems has been shown to mediate citizens' and officials' willingness to engage with OGD platforms [10]. Data availability encompassing the accessibility, timeliness, and completeness of OGD has similarly been recognised as a prerequisite for meaningful use [2]. The downstream effects of OGD usage on individual work outcomes have received comparatively limited empirical attention. Hansen et al. [3] suggested that OGD, when effectively utilised, can enhance evidence-based decision-making processes, potentially augmenting individual productivity. More broadly, research in the information management field confirms that the net benefits of information system use a dimension of the ISSM that manifests at both the organisational and individual levels which include improvements in task efficiency, decision quality, and work performance [11, 12]. However, the specific pathway from OGD usage to individual work productivity among public managers remains underexploited, constituting the primary contribution of the broader study reported here.

Individual Work Productivity in this study is defined as the degree to which public sector managers efficiently accomplish work tasks, complete assigned work effectively, perform with high proficiency, demonstrate responsibility, achieve performance goals, maintain high work quality, consistently meet work goals, effectively utilise productivity tools, and fully leverage available systems for task completion. This definition builds upon the operational definition set out in which Individual Work Productivity was framed as the degree to which an individual effectively and efficiently performs work related tasks, produces quality outputs, and achieves performance goals as perceived by the individual themselves [13, 14]. The nine indicators captured in the present measure extend that formulation by making explicit two technology oriented dimensions, namely the effective utilisation of productivity tools and the full leverage of available systems, both of which are particularly salient given that this study positions OGD usage as the principal antecedent of managerial productivity. The construct is therefore treated not as a generic measure of job performance, but as an outcome shaped, at least in part, by how public sector managers engage with government held data in their daily responsibilities.

The relevance of this construct can be traced directly to the problem statement articulated in previous research studied, which observed that despite the promise of OGD to support more responsive, efficient, and cost effective public services [15], several factors continue to impede its successful utilisation, particularly with regard to enhancing individual work productivity within public sector management [16]. This study noted that many public sector managers may lack the skills and knowledge needed to translate OGD availability into tangible productivity gains [17]. Individual Work Productivity accordingly serves as the endpoint against which the practical value of OGD usage is assessed, in keeping with the premise advanced by Benmohamed, Shen, and Vlahu-Gjorgievska [18] that OGD has hardly any value on its own.

Todated, the respondents comprise Administrative and Diplomatic Officers in Grades 9 through 14 within the Federal Territory of Putrajaya, a managerial cohort whose policy and performance measurement responsibilities interface directly with government datasets. Measuring productivity at the individual level, as perceived by these managers themselves, is therefore consistent with the study's positivist orientation and its integrated UTAUT and ISSM framework [11, 19]. It should nevertheless be borne in mind, as acknowledged in the limitations of the study, that self assessed measures captured through a cross sectional design reflect perceptions at a single point in time, and the descriptive results that follow should be interpreted accordingly.

The UTAUT framework, formulated and proposed by Venkatesh et al. [19] through a synthesis of eight preceding technology acceptance models, categorises four core constructs which are performance expectancy, effort expectancy, social influence, and facilitating conditions as primary determinants of behavioural intention and actual technology use. Of relevance to this study is the UTAUT construct of voluntariness of use, which moderates the relationship between social influence and behavioural intention [19]. In the context of OGD, where usage is not always required by organisational procedure, voluntariness assumes heightened theoretical significance. Meanwhile, the Information Systems Success Model, originally initiated by DeLone and McLean [20] and subsequently revised in 2003, provides a complementary framework by identifying system quality and information quality as key antecedents of use, user satisfaction, and net benefits. Al-Kofahi et al. [12] confirmed in a systematic review of ISSM applications that information quality and system quality remain the strongest predictors of IS use across diverse digital government contexts. This supports findings by Hansen et al. [3], who identified data quality and system accessibility as critical enablers of OGD utilisation in the public sector studied. Individual work productivity is more onto as the actions or behaviours of individuals that are made to achieve goals [13]. These behaviours must be within the individual's own control and relevant to organisational goals [21]. Any discretionary action or measure an employee takes to achieve work objectives therefore reflects individual work productivity [22]. Koopmans' concept is also regarded as the most appropriate instrument for evaluating employees [23]. Accordingly, this study assesses individual work productivity by how well employees complete their core job tasks and adapt to changing work demands [13].

The five independent variables, namely System Quality, Information Quality, Data Availability, Voluntariness, and Trust Factors, and two dependent variables, namely OGD Usage and Work Productivity was developed as a comprehensive approach to understanding the multifaceted factors that influence citizen and organizational engagement with OGD platforms.

With regard to System Quality, empirical research underscores that OGD platforms exhibiting superior service characteristics, such as system dependability and rapid access capabilities, significantly bolster user confidence in e government services [24]. Tremblay further explained that these technical performance attributes establish a fundamental basis for sustained user engagement by ensuring reliable access to government data resources and maintaining consistent platform functionality across diverse usage scenarios. In this connection, the quality characteristics of a system can be hierarchically categorized into functional suitability, performance efficiency, usability, and security. Functional suitability includes functional completeness, correctness, and appropriateness. Performance efficiency encompasses time behavior, resource utilization, and scalability. Usability, in turn, encompasses learnability, satisfaction, and accessibility, while security includes confidentiality, integrity, and resilience, with these attributes being critical for determining OGD platform effectiveness and reliability [25].

Information Quality emerges as a critical determinant encompassing multiple dimensions that collectively influence user motivation to engage with OGD platforms [24, 26]. Data accuracy ensures reliable decision making, while relevance addresses alignment with user information needs; comprehensiveness and authenticity, correspondingly, enhance perceived information value and directly impact utilization intentions [26]. Almuqrin further justified that high information quality proves crucial for enhancing trust in OGD platforms, with studies demonstrating that perceived data quality significantly impacts citizens' trust and adoption patterns.

Data Availability, Voluntariness, and Trust Factors are, likewise, pivotal. Data availability ensures that the necessary OGD is present and accessible to users [27]. Voluntariness, understood as the extent to which users freely choose to engage with OGD, can influence their commitment and depth of usage. Trust in government institutions, internet technologies, e government services, and digital platforms

serves as a critical determinant of citizen adoption of e government services and Open Government Data, with insufficient trust creating substantial barriers to OGD reuse owing to perceived risks associated with data utilization and security concerns [24].

Individual work productivity, the final outcome variable within the conceptual framework, is the endpoint towards which the influence of the five independent variables is directed through OGD Usage. Consistent with the review presented in previous segment, productivity in this study is not regarded as an automatic consequence of OGD usage, but as an outcome that depends upon the interaction between the technology, the task, and the capabilities and circumstances of the individual user. Zuiderwijk, Janssen, and Dwivedi [28], for instance, treated productivity as a form of job performance expectancy that individuals weigh when forming their intention to use a technology, whereas Wirtz, Weyerer, and Rösch [29] emphasised the practical usefulness of OGD in accomplishing specific, bounded tasks, and Venkatesh et al. [19] situated productivity related expectations within the effort expectancy construct. The present framework draws these perspectives together and examines productivity at the individual level of the public sector manager, rather than at the organisational level.

Three mechanisms identified link OGD usage to this outcome. First, OGD usage reduces the time and effort required to locate and compile information that would otherwise require inter agency correspondence or manual record retrieval, thereby enhancing efficiency. Second, access to comprehensive and reliable datasets improves the quality of managerial decisions by supporting evidence based planning and policy formulation. Third, OGD usage enables managers to identify patterns, trends, and anomalies within government data, thereby supporting more proactive forms of public management. As elaborated before, these mechanisms depend upon the internal capabilities of government institutions, with dedicated professionals and stable leadership being crucial for public servant productivity [30], while institutional risks such as absent formal rules may weaken the ability of public servants to apply OGD effectively [31].

The productivity benefits of OGD usage are, moreover, contingent upon the conditions under which such usage occurs. Where OGD portals are not user friendly or contain low quality data, public servants may find it difficult to extract valuable insights, thereby reducing their productivity [32, 33]. Institutions must also be able to reprocess, analyse, and transform raw data into actionable insights [34]. Private sector evidence that data driven firms achieved average productivity improvements of five percent over their competitors [35], together with macro level evidence that OGD enhances public service delivery through data utilisation and technological innovation capacity [5], provides a compelling basis for H_6, which proposes that OGD usage positively influences individual work productivity among Malaysian public sector managers.

3.0 Methodology

This study adopted a quantitative survey-based research design. A structured self-administered questionnaire was developed to measure five independent variables: System Quality (SSQ), Information Quality (IFQ), Data Availability (DTA), Voluntariness (VOL), and Trust (TRT), together with two dependent variables: OGD Usage (OGD) and Individual Work Productivity (IWP). The instrument comprised 52 items in total, employing a seven-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree). The research instrument was subjected to a rigorous pre-testing phase to ensure content validity and face validity. Six subject matter experts were recruited, comprising four academics from Malaysian public higher education institutions specialising in information systems, public administration, and e-government, and two senior officials drawn from federal government ministries and public departments with direct experience in OGD and digital governance initiatives as shown in Table 1. This composition ensured that instrument items were evaluated from both theoretical and practitioner perspectives.

TABLE 1
List of Panel Experts During the Questionnaire Pre-Testing

No	Panel Experts	Timeframe to Study Instrument	Date of Appointment
1	Public University	1 week	7 August 2025
2	Public University	1 week	15 August 2025
3	Public University	1 week	25 August 2025
4	Public University	1 week	25 August 2025
5	Senior Public Managers	1 week	7 August 2025
6	Senior Public Manager	1 month	15 August 2025

Conducted between August 1 and 30, 2025, with six subject matter experts in the pre-testing phase, the study produced robust evidence of instrument validity and reliability across all seven constructs. A face-to-face meeting was held to discuss the pre-testing of the instrument in various offices at respective public university, and person in charge from the respective organisation. During the meeting, a panel of experts was asked to provide feedback on the formatting and content of the questionnaire. The list of indicators evaluated in the questionnaire can be found in Table 2.

TABLE 2
Pre-Testing Indication

No	Pre-Testing Indication
1	Content Validity
2	Wording
3	Ordering Question
4	Instruction
5	Layout
6	Formatting
7	Font
8	Length of the Questions
9	Spelling

Previous researchers typically used a content validity index (CVI) to establish content validity, as discussed by Polit and Beck [36]. Lynn [37] noted that there are two types of CVIs that researchers often compute, one for the content validity of individual items and another for the content validity of the overall scale. Lynn recommended using a 4-point ordinal scale for item ratings, as suggested by early researchers such as Waltz and Bausell [38], to avoid having a neutral midpoint. The labels for the four points in this study were: 1 = No relevance at all, 2 = Item needs some revision, 3 = Relevant but needs minor revision, and 4 = Very relevant. The I-CVI for each item was computed as the number of experts who rated the item as either 3 or 4, divided by the total number of experts (6 in this study). Lynn suggested a minimum I-CVI of 0.83 for studies with 6 experts. The S-CVI was also computed to measure the content validity of the overall scale, including Universal Agreement (UA) and Ave (Average).

Experts evaluated each item using a four-point relevance scale (1 = Not relevant; 2 = Item needs substantial revision; 3 = Relevant but needs minor revision; 4 = Very relevant), following the protocol recommended by Lynn [37] and elaborated by Polit and Beck [36]. Two quantitative indices were computed: the Item-level Content Validity Index (I-CVI), calculated as the proportion of experts rating an item as 3 or 4, and the Scale-level CVI (S-CVI/AVE), calculated as the mean I-CVI across all items in a construct. For a panel of six experts, an I-CVI of ≥ 0.83 and S-CVI/AVE of ≥ 0.90 are the recommended minimum thresholds [36, 37]. Beyond relevance ratings, experts also provided written qualitative feedback on nine instrument dimensions: content validity, wording, question ordering, instruction clarity, layout, formatting, font, questionnaire length, and spelling.

4.0 Results

Table 3 summarises the content validity findings across all seven constructs. The I-CVI scores for individual items ranged from 0.83 to 1.00. Four constructs which were OGD Usage, System Quality, Information Quality, and Data Availability achieved perfect item-level agreement (Mean I-CVI = 1.00). The Voluntariness and Trust constructs returned Mean I-CVIs of 0.92, attributable to minor wording concerns raised by individual experts. The Individual Work Productivity construct registered the lowest Mean I-CVI of 0.89; notably, item IWP4 returned an I-CVI of 0.67, the sole item falling below the minimum threshold. Based on expert qualitative feedback, IWP4 was revised before pilot test administration to address ambiguity. The S-CVI/AVE for six of seven constructs exceeded 0.90. The IWP construct returned an S-CVI/AVE of 0.89, slightly below the threshold, attributable to the sub-threshold IWP4 score. Collectively, the pre-testing results confirmed satisfactory content validity across all constructs, and no construct required structural elimination.

TABLE 3
Summary of Content Validity Index (CVI) Results (n = 6 Experts)

Construct	No. Items	Mean I-CVI	S-CVI/UA	S-CVI/AVE
Individual Work Productivity (IWP)	9	0.89	0.44	0.89
OGD Usage (OGD)	7	1.00	1.00	1.00
System Quality (SSQ)	6	1.00	1.00	1.00
Information Quality (IFQ)	6	1.00	1.00	1.00
Data Availability (DTA)	6	1.00	1.00	1.00
Voluntariness (VOL)	6	0.92	0.50	0.92
Trust (TRT)	12	0.92	0.50	0.92

Note. I-CVI = Item-level Content Validity Index; S-CVI/UA = Scale CVI Universal Agreement; S-CVI/AVE = Scale CVI Average Proportion. Minimum thresholds: I-CVI ≥ 0.83; S-CVI/AVE ≥ 0.90 [36, 37]. IWP4 revised based on expert qualitative feedback.

5.0 Discussion

The pre-testing CVI results are broadly consistent with the content validity standards advocated in instrument development literature [36, 37]. The perfect I-CVI scores achieved by the OGD Usage, System Quality, Information Quality, and Data Availability constructs indicate strong expert consensus on the relevance and representativeness of these items, which reflects the robust theoretical grounding of these constructs within the ISSM framework [11, 12]. The slightly lower, albeit acceptable, CVI scores for Voluntariness and Trust suggest that these constructs, while relevant, required more nuanced contextualisation within a Malaysian public sector setting. This finding aligns with Peeters et al. [4], who note that trust-related items in OGD instruments often require adaptation to local institutional contexts to ensure resonance with respondents' perceived realities.

The revision of item IWP4, prompted by expert feedback, exemplifies the iterative nature of rigorous instrument development [39]. The revised IWP scale's excellent Cronbach's alpha coefficient ($\alpha = 0.982$) confirms that the expert-guided modification enhanced rather than disrupted scale coherence. More broadly, the consistently high alpha values observed across all seven constructs affirm the internal consistency of the instrument and its readiness for main study deployment, consistent with the psychometric standards recommended by Nunnally and Bernstein [40].

Taken together, the pre-testing results confirm that the measurement items are relevant, representative and appropriately worded for the target population, and that the instrument is therefore suitable to advance to the pilot study as the next stage of the research process. Content validation establishes whether the items adequately reflect their intended constructs, but it does not by itself show how those items perform when completed by actual respondents thus a pilot test therefore remains the necessary bridge between expert judgement and full-scale data collection [41, 42].

Accordingly, the revised 52-item instrument will be administered to a small sample of Administrative and Diplomatic Officers (Grades 9 to 14) in Putrajaya who share the characteristics of the main study population but will be excluded from the main sample. In line with the recommendations

of Johanson and Brooks [43] and Hertzog [44], a minimum of 30 respondents is considered adequate for this preliminary assessment. The pilot study will serve four purposes which is; (i) to estimate the internal consistency reliability of each construct using Cronbach's alpha against the conventional threshold of 0.70 [40]; (ii) to verify that the revised IWP4 item performs coherently with the remaining IWP indicators, given that the construct's S-CVI/AVE fell marginally below 0.90; (iii) to confirm the clarity of the Voluntariness and Trust items, for which experts recommended minor contextualisation; and (iv) to evaluate practical aspects of administration, including completion time, instruction clarity and respondent burden [45]. In this way, the present content validation provides a defensible foundation for the pilot study, and the combined evidence from both stages will support the use of the integrated UTAUT, ISSM and Koopman Model instrument in the main study examining how OGD usage shapes Malaysian public sector managers work productivity.

6.0 Conclusion

This study successfully accomplished its dual purpose of establishing the content and internal consistency reliability of the research instrument designed to examine how OGD usage influences public managers' individual work productivity. The pre-testing phase, anchored in the CVI methodology of Lynn [37] and Polit and Beck [36], confirmed that all items following the revision of IWP4 met or exceeded the minimum content validity thresholds. These findings validate the psychometric soundness of the instrument and establish a strong foundation for the main large-scale study. The integration of UTAUT and ISSM as dual theoretical lenses offers a comprehensive explanatory framework for OGD usage behaviour. The successful validation of the instrument in this pre-testing stage allows the research to proceed to the pilot study. The pilot study will, in turn, prepare the ground for the main study, which will provide original empirical insights into the individual-level consequences of OGD usage in the Malaysian public sector, an area that remains significantly underrepresented in the global OGD and IS literature.

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8.0 References

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