Jurnal Manajemen Pelayanan Publik Vol. 08 No. 02, June 2024
http://dx.doi.org/10.24198/jmpp.v8i2.55816

Measuring Key Factors in E-Government Participation: A Rasch Modeling Approach with Human Resource Management Considerations

[a] Askolani; [b] Maya Sari; [c] Budhi Pamungkas Gautama; [d] Yoga Perdana; [e] Dibias Lazuardi Maulid
[a b c d e] Faculty of Economics and Business Education, Universitas Pendidikan Indonesia, Bandung, Indonesia

ABSTRAK

Studi ini mengkaji tentang partisipasi e-government di kalangan warga Indonesia, dengan tujuan untuk mengevaluasi efektivitasnya dalam meningkatkan hubungan antara pemerintah dan warga melalui media sosial dan praktik tata kelola yang baik. Tujuan penelitian meliputi konstruksi dan validasi instrumen survei berdasarkan 15 item pengalaman terkait persepsi e-government, dengan menggunakan pemodelan Rasch untuk menganalisis data dari 101 responden. Hasil penelitian menunjukkan tingkat reliabilitas yang tinggi (Cronbach's Alpha = 0.94) dan korelasi yang signifikan (korelasi skor mentah ke kemampuan = 0.99), yang menegaskan kemampuan instrumen dalam mengukur variabel yang mempengaruhi partisipasi e-government secara efektif. Temuan ini sejalan dengan harapan model Rasch (Infit dan Outfit MNSQ dalam rentang yang dapat diterima), menunjukkan kesesuaian instrumen untuk penilaian yang komprehensif. Sebagai kesimpulan, penelitian ini memberikan wawasan dalam meningkatkan transparansi, akuntabilitas, dan responsivitas pemerintah, hal yang penting untuk membangun kepercayaan dan praktik tata kelola yang efektif di era digital.

ABSTRACT

This study examines the subject matter of e-government participation among Indonesian citizens, aiming to assess its effectiveness in enhancing government-citizen relationships through social media and good governance practices. The objectives include constructing and validating a survey instrument based on 15 experience items related to e-government perception, utilizing Rasch modeling to analyze data from 101 respondents. Results indicate strong reliability (Cronbach's Alpha = 0.94) and significant correlations (Person raw score-to-measure correlation = 0.99), affirming the instrument's capability to measure variables influencing e-government participation effectively. The findings align well with Rasch model expectations (Infit and Outfit MNSQ within acceptable ranges), highlighting the instrument's suitability for comprehensive assessment. In conclusion, this research contributes insights into enhancing government transparency, accountability, and responsiveness, crucial for fostering trust and effective governance in the digital era.

ARTICLE HISTORY
Submited: 05 02 2024
Revised: 18 03 2024
Accepted: 25 06 2024
Published: 29 06 2024

KATA KUNCI
Ilmu Pemerintahan; Tata Kelola; Transparansi; Akuntabilitas; Keterlibatan Warga; Manajemen Sumber Daya Manusia

KEYWORDS
Public Administration; Governance; Transparency; Accountability; Citizen Engagement; Human Resource Management

INTRODUCTION

Information, communications, and technology (ICT) have an essential role in enabling governments to implement public policies more effectively. In Indonesia, the government views ICT as an essential tool for managing public services, given its capability to offer a diverse array of services to the public swiftly. The adoption of ICT in public service delivery has grown significantly, emphasizing its importance in ensuring efficient government operations (Garcia-Rio et al., 2023). However, the effective implementation of ICT in public services remains a significant challenge for the government. This challenge is evident from the high public demand for addressing issues and meeting various public service needs. ICT is crucial for enhancing government efficiency in executing public policies, and Indonesia recognizes this by integrating ICT into its public service framework. The technology's ability to deliver multiple services promptly has led to its widespread use, underscoring its vital role in government service delivery.

Correspondence Askolani Email : askolani@upi.edu

Nevertheless, despite its advantages, the government faces ongoing difficulties in leveraging ICT to provide effective public services. These challenges are highlighted by the continuous and high demand from the public to resolve issues and fulfill their diverse service requirements (Nguyen & Tran, 2022; Saleh & Alyaseen, 2021). One notable ICT innovation is e-government, which the government implemented to enhance public service delivery. E-government primarily focuses on the electronic provision of government services, streamlining how information and services are managed and delivered. By leveraging e-government, the government can enhance information management systems and improve public service workflows. Additionally, it supports the broader integration of information technology within the public sector (Agarwal, 2018; Alhanatleh et al., 2022; Garcia-Rio et al., 2023).

The purpose of e-government extends beyond mere service delivery; it aims to facilitate the exchange of information and build strategic partnerships among government entities, the private sector, civil society organizations, and the general public. This electronic governance framework ensures that services and information are accessible, fostering collaboration and engagement among various stakeholders (Alhanatleh et al., 2022; Koniyo et al., 2023). By doing so, e-government helps in building a more integrated and responsive public service infrastructure. Moreover, the implementation of e-government has the potential to significantly boost public trust in governmental decision-making processes. It allows for the creation of policies, dissemination of information, and delivery of services more transparently and cooperatively with the public. The enhanced interaction between the government and society, facilitated by e-government, plays a critical role in shaping public policy and ensuring efficient and effective governance (Hujran et al., 2023; Kurniawan et al., 2023).

A 2022 United Nations survey placed Indonesia at 77th in the E-Government Development Index (EGDI), reflecting an 11-rank improvement from 2021. Additionally, a Databox survey from the same year reported that Indonesia ranks fifth in Southeast Asia for EGDI, with an index value nearing 0.80. However, the government needs to assess whether this improvement in ranking translates to the quality of services experienced by the public. Despite its positive ranking, the actual implementation of e-government in Indonesia leaves much to be desired (Hutahaean et al., 2023). E-government research has highlighted that good governance is crucial for the successful implementation of e-government initiatives. Beyond its ICT elements, good governance is vital because it enables community involvement by enhancing government performance in the context of e-government. By applying principles of good governance alongside e-government, the government can boost public participation. However, it is important to explore ways to achieve high levels of public engagement in e-government to enhance the efficiency of public services (Alhanatleh et al., 2022; Garcia-Rio et al., 2023; Hariguna et al., 2022; Karunia et al., 2023). Previous studies have shown that public participation in e-government has increased through various practices, including electronic services that support e-government participation, such as e-informing and e-consulting (Almuraqab et al., 2021; Iglesias-Antelo et al., 2021; Trkman et al., 2023). Factors like national culture, user awareness, experience, and access barriers, which focus on user characteristics and technology awareness, also play significant roles. Effective e-government participation is a key accomplishment for the government, requiring a comprehensive approach that includes cultural considerations, user experience, technology adoption, and the government's efforts to promote e-government through media exposure, including social media (Alhanatleh et al., 2022; Iglesias-Antelo et al., 2021; Putra et al., 2022). Proper implementation of good governance principles is crucial for building public trust in the government.

E-government serves as a tool to enhance public participation in public policy. The rise in public engagement with e-government indicates the effectiveness of these policy instruments.

Deliberative policy theory emphasizes that the involvement of a diverse range of stakeholders is essential for the success of public policies (AlMulhim, 2023; Defitri, 2022; Nguyen & Tran, 2022). For this to be realized, it is necessary for various stakeholders, including the community, to have confidence in the process. Building public trust through good governance and effective e-government implementation can lead to more robust and participatory public policy processes. The government's role in socializing and promoting e-government through various media channels is vital in encouraging public engagement and ensuring that e-government initiatives are successful and widely adopted (Almuraqab et al., 2021; Iglesias-Antelo et al., 2021; Putra et al., 2022). Several challenges hinder the effective implementation of e-government in Indonesia. These include the transparency of legal protections, unclear implementation mechanisms, and limited IT support (Kurniawan et al., 2023; Lee et al., 2024; Rachmawati et al., 2022). Consequently, the public often lacks a clear understanding of how e-government should function, leading to an ineffective approach to public policy deliberation and implementation. Addressing these impediments is crucial for improving the overall efficacy and public perception of e-government services.

Despite extensive research on e-government, significant gaps remain, particularly concerning the specific human resource management (HRM) practices needed to support its implementation, the role of social media in enhancing public engagement, and the detailed impact of good governance policies. Existing literature lacks comprehensive studies on the HRM strategies required to develop the skills necessary for managing e-government systems, as well as empirical analysis of how social media can be effectively integrated into e-government to boost public participation and trust. Furthermore, there is a need for an in-depth exploration of how specific good governance practices and policies, such as transparency of legal protections and clarity of implementation mechanisms, influence e-government outcomes. To address these gaps, this study will use the Rasch model to analyze the effectiveness of HRM practices, social media elements, and governance policies, aiming to provide actionable insights for improving e-government practices and fostering greater public trust and participation.

Literature Review

Online Service

Online services are a crucial element of e-government, though not all e-government platforms offer full access to these services. The primary goal of e-government services is to address public issues efficiently and accurately without the need for intermediaries. By providing a comprehensive and exclusive online engagement platform, users can conduct public e-transactions from a single access point. Analysis and benchmarking suggest that evaluating the performance of online services is fundamental to a modern public administration's e-government strategy. However, research by Chircu highlights significant disparities in the availability of full online services across different countries (Hariguna et al., 2022). Thus, promoting the adoption of online services is essential due to their numerous advantages, such as cost and time savings, which benefit both governments and citizens.

Despite these benefits, Hair et al. indicate a research gap in integrating transactional and inclusive services within online platforms (Hariguna et al., 2022). Current studies often lack empirical examination of the relationship between citizens' usage of online services and their intention to engage with e-government services. Instead, these studies typically present a conceptual framework to assess the maturity of e-government initiatives. This lack of empirical data underscores the need for further research to understand how citizens' experiences with online services influence their willingness to use e-government

portals.

Moreover, the study emphasizes that understanding user behavior and satisfaction with online services is key to improving e-government adoption. By focusing on how online service users' experiences shape their intentions to use city e-government portals, policymakers can develop more effective strategies to enhance user engagement and trust. This approach not only helps in refining the existing e-government services but also in planning future improvements that cater to the evolving needs of the public.

Social Media

In recent years, both profit-driven companies and government agencies have increasingly recognized the advantages of using social networks. Social media offers a dynamic platform for direct interaction with citizens, proving to be more engaging than traditional websites. Between 2010 and 2014, the number of countries employing social media for e-government services nearly doubled. This trend reflects the transformative potential of integrating social media into e-government portals, which can significantly alter public administration processes. This change is largely driven by the fact that citizen participation in administrative processes can enhance transparency and strengthen the relationship between the public and the government. Research by Bonson et al., and Michaelidou and Hassan indicates that delivering e-government services through social media can capture more public interest, aligning with evolving online habits.

Riyanto's research provides a detailed examination of interactive and citizen-centered governance facilitated by social media (Riyanto & Azis, 2021). Their study highlights that a government active on social media creates a forum for discussion, development, implementation, and monitoring of public services. This interactive platform also enables the public to offer solutions to service-related issues. Similarly, Grimsley and Meehan explore the methods by which governments can engage citizens through these platforms (Grimsley & Meehan, 2007). Hair et al. emphasize the importance of visualizing public perceptions of the environment by leveraging data, photographs, and crowdsourcing from various social media channels, thus laying a foundation for more effective incorporation of public values into the planning process (Hair et al., 2017).

Furthermore, modern technologies like social media are essential for governments to foster citizen engagement, as noted by Pang et al. Moore's examination of local governments' use of social media to create public value proposed a paradigm based on the concept of Government 2.0 services. Suhartono and Sari also studied the impact of social media on building public value in e-government, affirming its crucial role. These studies collectively suggest that the strategic use of social media can enhance the delivery and reception of e-government services, fostering a more participatory and transparent governance model (Abdulkareem & Mohd Ramli, 2022).

Deliberative Policy Theory

Deliberative policy theory originates from a practice known as "deliberative planning." This method is designed to address complex issues within the public sector. Initially, deliberative planning was seen as an alternative to the standard empirical and analytical methods traditionally used to solve public policy problems. However, this approach has limitations, particularly its inability to produce concrete results that directly influence public policy implementation. Wagenaar and Cook provide a deeper understanding of public policy practices in modern societies by highlighting three key aspects of policy:

interpretative, moral (pragmatic), and emotional (linguistic) (Wagenaar & Cook, 2003). These aspects enhance the interaction between the government and the public (Iglesias-Antelo et al., 2021).

Deliberative policy involves community participation in the policymaking process by encouraging the public to actively engage in discussions and considerations of public policy values. By involving communities as stakeholders, they are allowed to identify, evaluate, and discuss the relevance of public policies to the current societal conditions in a deliberative manner. This process allows the community to express their opinions on policies through discussion activities, to which the government responds. This inclusivity fosters active community participation in policy development, allowing for collaborative efforts between the government and the public to address the evolving challenges in modern society (Alhanatleh et al., 2022; Putra et al., 2022). This collaborative approach ensures a cooperative and communicative solution, strengthening the commitment to implement democracy through deliberative policies. By engaging the community in this way, both the government and citizens work together to create policies that are more reflective of societal needs and values. This method not only enhances the democratic process but also ensures that policies are more effectively tailored to address the complex issues faced by contemporary society.

E-Government Participation

According to Nam, (2014), e-government participation refers to the behavior of citizens that emerges after they trust the process of engaging in e-government, involving interaction and participation in decision-making processes related to public policy. One of the primary advantages of e-government is its ability to encourage citizen participation, serving as an effective method for enhancing the relationship between the government and the community. To foster participation through social media and good governance, governments provide e-government services. Social media facilitates easy access to information and the use of e-government services, catering to the convenience, needs, and benefits of the community. As a result, social media can improve the quality of information, the perception of ease of use, and the perceived usefulness. Additionally, transparency, accountability, and responsiveness in public services contribute significantly to building trust. Thus, social media factors and good governance practices will promote trust in e-government.

Expanding on this, the digital transformation of government services not only streamlines administrative processes but also democratizes access to information. By leveraging social media, governments can disseminate information rapidly and engage with citizens in real time, leading to a more informed and active citizenry. Moreover, integrating social media into e-government frameworks allows for a participatory approach to governance, where public feedback and input directly influence policy decisions. This bidirectional communication channel helps identify and address public concerns more efficiently, fostering a sense of inclusion and empowerment among citizens. In this context, good governance entails ensuring digital platforms are secure, user-friendly, and inclusive, with powerful cyber-security measures, user support, and accessibility for marginalized communities. Transparency in government actions and decisions, facilitated by digital platforms, holds public officials accountable, thereby increasing public trust. In summary, the synergistic effect of social media and good governance in e-government enhances the efficiency and effectiveness of public service delivery while strengthening the trust and relationship between the government and its citizens.

Based on the referenced theoretical model, Table 1 outlines 15 constructs that are part of the user experience with e-government services, focusing on perceptions of e-government in Indonesia. "Information Quality" evaluates trust in the accuracy and timeliness of government-provided information through social media (N1, N2, N3). "Perceived Ease of Use" examines the user-friendliness of government electronic services (N4, N5) and the flexibility of social media in fostering strong citizen-government relationships (N6). "Perceived Usefulness" assesses the belief that using social media can enhance service quality and information exchange (N7, N8). The "Transparency" construct includes items reflecting public perception of transparent government implementation and visibility of plans and programs (N9, N10, N11, N12). Finally, "Accountability" evaluates perceptions of government responsibility, adherence to regulations, and appropriate budget use in e-government programs (N13, N14, N15). These constructs provide a comprehensive framework for analyzing public perceptions and expectations regarding the effectiveness and transparency of e-government in Indonesia.

Table 1.
Operationalization of Variables

CONSTRUCT	ITEMS	CODE
Information Quality	I believe that the government has provided accurate information about e-government through social media.	N1
	The government has provided the latest information on e-government through social media	N2
	The government has provided information about e-government that is easy to understand	N3
Perceived Ease of Use	Most e-government services provided by the government are easy to use	N4
	I believe that learning to use e-government from social media is easy	N5
	I find social media a flexible way to promote a strong relationship between citizens and e-government.	N6
Perceived Usability	Using social media related to government services can improve the quality of services I will receive from e-government	N7
	Using social media can improve my performance in exchanging information about e-government	N8
Transparency	Government plans and programs on e-government are implemented transparently	N9
	the whole process of e-government plans and programs is disclosed transparently	N10
	the public can see the development and ongoing situation of e-government	N11
	the government discloses sufficient information to the public about its performance in implementing e-government	N12
Accountability	The government recognizes its responsibility to society through the implementation of e-government programs.	N13
	The government complies with regulations in all situations in implementing e-government programs	N14
	The government ensures proper use of the budget in legitimate performance in implementing e-government programs.	N15

Source: Processed by the author

RESEARCH METHODS

This research employs a descriptive quantitative approach to investigate relevant field facts (Hermanto & Miftahuddin, 2021). The study focuses on the variable of user experience with e-government services in Indonesia, with data collected through an online survey. The research population consists of e-government service users aged 16 and above, totaling 101 participants, as shown in Table 2. This table provides demographic data of respondents concerning gender, age, and residence. Among the participants, 62.4% are female, and 37.6% are male. Age distribution indicates that the majority of respondents are between 21-24 years old (46.5%), followed by those aged 16-20 years (36.6%), 25-30 years (7.9%), and over 30 years (8.9%). Regarding the data, 74.3% of respondents live in urban areas, while the rest 25.7% reside in rural areas. These demographic details highlight a sample population predominantly young, urban, and female.

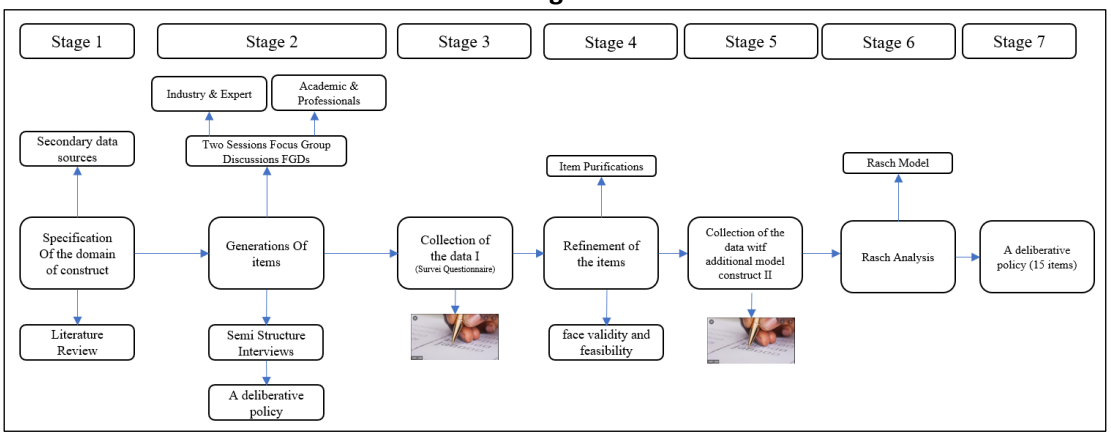
Table 2.
The Profile of Research Respondents

Variable	Frequency	Per cent
Gender		
Female	63	62.4%
Male	38	37.6%
Age		
16-20	37	36.6%
21-24	47	46.5%
25-30	8	7.9%
>30	9	8.9%
Domicile		
City	75	74.3%
Village	26	25.7%

Source: Processed by the author

The researchers employed a systematic and rigorous theoretical framework to achieve their research objectives, as illustrated in Figure 1. The research methodology comprises eight stages: Stage 1 involves defining relevant domains and structures of e-government service user experiences by reviewing existing literature and secondary data sources (e.g., newspapers, and government reports). In Stage 2, two focus group discussions are conducted with business stakeholders, academics, and experts, supplemented by semi-structured interviews with service recipients. Stage 3 includes the initial administration of the survey questionnaire. In Stage 4, the survey items are refined and validated based on face validity and feasibility, eliminating items that do not meet the established criteria.

Figure 1.
Research Design and Process



Source: Processed by the author

In Stage 5, a second survey incorporating the refined structural design is administered. Stage 6 employs Rasch analysis to rigorously evaluate the variables of e-government service experiences. This analysis ensures that the variables are valid and reliable, contributing to the robustness of the study's findings. Finally, Stage 7 culminates in establishing the final version of the factors influencing e-government participation. The methodological steps ensure that each stage of the research systematically contributes to achieving the study's objectives, thereby enhancing the validity and reliability of the research outcomes.

RESULTS AND DISCUSSIONS

This research employs a quantitative approach, measuring respondents' answers using nominal scales and Likert, then processing this statistical data in main tables using the Winstep software based on the Rasch Model (Miftahuddin et al., 2020). The study's design is descriptive, outlining respondent characteristics and the quality of statement items developed from each variable, and explaining the results based on Winstep software analysis. The data source consists of 101 respondents, selected through purposive sampling, who evaluate factors influencing the optimal participation in e-government. The Rasch Model analysis technique is used to measure and analyze the quality of statements developed from each research variable and to assess respondent quality based on their answers. The findings are then discussed and concluded. The research framework is a pre-experimental quantitative method to evaluate phenomena, processing data collected through online questionnaires in line with established empirical and mathematical standards. The Rasch analysis allows Likert scale data from the questionnaires to be converted into interval scales (Hermanto & Miftahuddin, 2021). The Rasch Model transforms the ordinal Likert scale data into an interval scale using "logit" units. The fit statistics for items and persons indicate the reliability and validity of the data. Results are tabulated using Microsoft Excel and processed with Winstep 3.7, with data meeting all system validity and reliability requirements being analyzed using the Rasch Model.

Summary Statistics

Table 3 provides a statistical analysis of test results from a group of participants. The average (MEAN) total score is 56.1 with a standard deviation (S.D.) of 9.0, indicating a variation in scores among respondents. The highest score achieved is 73, while the lowest is 15. The measure, or the estimated ability of participants, has a mean value of 1.71 with a standard deviation of 1.87, ranging from a minimum of -7.58 to a maximum of 6.18. The average measurement error is 0.49

with a standard deviation of 0.20. The Infit and Outfit Mean Square (MNSQ) and Z-standard (ZSTD) for the model served data conformity with the used model, where the minimum value is 0.08 with a ZSTD of -4.2.

Furthermore, the table also demonstrates the test reliability. The Real RMSE (Root Mean Square Error) is 0.59 and the model RMSE is 0.53, indicating a relatively low measurement error. The True SD (Standard Deviation) for real data is 1.78, and for the model, it is 1.80. Separation, which shows the test's ability to distinguish between different ability levels of participants, is 3.02 for real data and 3.40 for the model, with participant reliabilities of 0.90 and 0.92, respectively. The high person raw score-to-measure correlation of 0.99 indicates a strong relationship between raw scores and ability estimates. The Cronbach's Alpha (KR-20) value of 0.94 signifies very hightest reliability, ensuring consistent and dependable test results. These values conclude that the factors affecting the optimization of e-government participation are well measured in this study, confirming that the research instrument effectively identifies and measures the variables contributing to e-government participation optimization.

Table 3.
Summary Statistics of 101 Measured (Extreme and Non-Extreme) Person

	Total		Model		Infit		Outfit	
	Score	**Count**	**Measure**	**Error**	**MNSQ**	**ZSTD**	**MNSQ**	**ZSTD**
MEAN	56.1	15.0	1.71	.49	0	0	0	0
S. D.	9.0	.0	1.87	.20	0	0	0	0
MAX.	73.0	15.0	6.18	1.84	0	0	0	0
MIN.	15.0	15.0	-7.58	.38	.08	-4.2	.08	-4.2
REAL RMSE .59 TRUE SD 1.78 SEPARATION 3.02 Person RELIABILITY .90								
MODEL RMSE .53 TRUE SD 1.80 SEPARATION 3.40 Person RELIABILITY .92								
S.E. OF Person MEAN = .19								
Person RAW SCORE-TO-MEASURE CORRELATION = .99								
CRONBACH ALPHA (KR-20) Person RAW SCORE "TEST" RELIABILITY = .94								

Source: Processed by the author

In summary, Table 3's analysis confirms the reliability and validity of the test in evaluating participant abilities and measuring factors influencing e-government participation. The high reliability scores, low measurement error, and strong correlations underscore the effectiveness of the research instrument in capturing relevant data accurately.

Rating Scale

Table 4 presents a category analysis for a measurement instrument, such as a rating scale in a test or questionnaire. This table shows five categories, ranging from 1 to 5, with different observed counts in each category. Category 1 has 39 observations (3% of the total sample), category 2 has 68 observations (4%), category 3 has 340 observations (22%), category 4 has 870 observations (57%), and category 5 has 198 observations (13%). The observed average scores (OBSVD AVRGE) and the expected sample scores (SAMPLE EXPECT) for each category are also displayed, with values ranging from -2.50 to 3.31 for observed scores and from -2.26 to 3.36 for expected scores, indicating that observed scores closely match the expected values across all categories.

Table 4.
Rating Scale Summary of Category Structure Model=" R"

CATEGORY		OBSERVED		OBSVD	SAMPLE	INFIT	OUTFIT	ANDRICH THRESHOLD	CATEGORY MEASURE	
LABEL	SCORE	COUNT	%	AVERAGE	EXPECT	MNSQ	MNSQ			
1	1	39	3	-2.50	-2.26	.89	.93	NONE	(-4.72)	1
2	2	68	4	-.80	-.62	.83	.84	-3.55	-2.47	2
3	3	340	22	1.10	1.05	.98	.99	-1.31	-.30	3
4	4	870	57	2.15	2.14	1.04	1.04	.67	2.45	4
5	5	198	13	3.31	3.36	1.04	1.02	4.19	(5.31)	5

Source: Processed by the author

The Infit and Outfit Mean Square (MNSQ) values indicate the data's fit to the Rasch model used. The Infit MNSQ values range from 0.83 to 1.04, and the Outfit MNSQ values range from 0.84 to 1.04, all within the acceptable range (generally 0.6 to 1.4), indicating a good fit to the model. The category thresholds, or Andrich thresholds, show the points at which the probability of selecting a category is higher than the previous category, with values ranging from -4.72 (implied for category 1) to 5.31 (implied for category 5). The category measure values indicate the relative difficulty of each category, ranging from -3.55 for Category 2 to 4.19 for Category 5. Overall, this table shows that the categories in this instrument are well-distributed and fit the expected model, with acceptable infit and outfit values. This indicates that respondents can clearly distinguish between the categories, and each category provides valid information about the factors influencing e-government participation. Therefore, the instrument used in this study is effective and reliable in identifying and measuring the factors contributing to the optimization of e-government participation.

In summary, Table 4 demonstrates that the measurement instrument's categories are well-calibrated and fit the Rasch model, ensuring valid and reliable data on the factors influencing e-government participation. The observed and expected scores align closely, and the fit statistics fall within acceptable ranges, confirming the instrument's efficacy in capturing nuanced respondent perceptions.

Uni-dimensionality

Table 5 provides a variance analysis of observations from a measurement instrument. The total raw variance in observations is 26.7, representing 100% of the overall variance. Of this, the raw variance explained by the measurements is 11.7 (43.7%), closely matching the modeled variance of 42.9%. This indicates that the measurement model effectively accounts for a significant portion of the data variance. The variance explained by individuals (persons) is 7.2 (27.2%) empirically and 26.7% in the model, while the variance explained by items is 4.4 (16.5%) empirically and 16.2% in the model.

Table 5.
Uni-dimensionality of Standardized Residual Variance (In Eigenvalue Units)

	-- Empirical --			Modeled
Total raw variance in observations	= 26.7	100.0%	0	100.0%
Raw variance explained by measures	= 11.7	43.7%	0	42.9%
Raw variance explained by persons	= 7.2	27.2%	0	26.7%
Raw Variance explained by items	= 4.4	16.5%	0	16.2%
Raw unexplained variance (total)	= 15.0	56.3%	100.0%	57.1%
Unexplained variance in 1st contrast	= 2.7	10.0%	17.7%	0
Unexplained variance in 2nd contrast	= 2.1	7.8%	13.9%	0
Unexplained variance in 3rd contrast	= 1.8	6.6%	11.7%	0
Unexplained variance in 4th contrast	= 1.5	5.6%	9.9%	0
Unexplained variance in 5th contrast	= 1.2	4.3%	7.7%	0

Source: Processed by the author

However, there remains 15.0 (56.3%) of the variance unexplained empirically, slightly less than the model's unexplained variance of 57.1%. This unexplained variance is further broken down into several contrasts: the first contrast is 2.7 (10.0%), the second is 2.1 (7.8%), the third is 1.8 (6.6%), the fourth is 1.5 (5.6%), and the fifth is 1.2 (4.3%). These contrasts indicate residual variances that might be due to unmeasured factors or noise in the data. Overall, while the significant portion of variance is explained, these findings suggest additional factors influencing e-government participation that require further investigation to ensure the instrument's reliability and validity in comprehensively measuring these factors. In summary, Table 5 shows that the measurement model explains a substantial portion of the data variance, but also highlights unexplained variances suggesting potential additional factors affecting e-government participation. This underscores the need for further research to enhance the instrument's thoroughness and accuracy in capturing all relevant variables.

Item Measure

Table 6 presents an item analysis for a test or measurement instrument, showing various statistics for each item. Each item is identified by an entry number (ENTRY NUMBER) and item name (Item). The TOTAL SCORE column indicates the total score obtained for each item, and the TOTAL COUNT shows the number of respondents who answered the item, with all items having 101 respondents. MEASURE and S.E. (Standard Error) reflect the estimated ability measured by the item and the standard error of that estimate, with MEASURE ranging from -0.90 to 0.82 and S.E. consistently around 0.18.

Table 6.
Item Person Statistics: Measure Order

Item Person Statistics: Measure OrderENTRY	TOTAL	TOTAL	MODEL	INFIT	OUTFIT	PT-MEASURE			EXACT	MATCH		Item
NUMBER	SCORE	COUNT	MEASURE	S.E.	MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%	
10	351	101	.82	.17	1.03	.2	.99	.0	.74	.70	69.7	60.6	N10
11	357	101	.65	.17	.84	-1.1	.84	-1.0	.79	.71	62.6	61.5	N11
9	359	101	.59	.17	.95	-.3	.95	-.2	.75	.71	62.6	61.6	N9
15	359	101	.50	.17	1.08	.6	1.08	1.1	.67	.71	61.6	61.6	N15
12	362	101	.35	.17	.74	-1.8	.74	-1.7	.78	.71	65.7	61.7	N12
14	367	101	.07	.18	.98	-.1	.98	-.1	.73	.72	64.6	62.8	N14
13	376	101	-.09	.18	.95	-.3	.95	-.4	.77	.72	63.6	64.5	N13
2	381	101	-.09	.18	1.02	.2	1.02	.0	.68	.73	68.7	65.4	N2
3	383	101	-.15	.18	.77	-1.5	.77	-1.6	.77	.73	69.7	65.6	N3
1	384	101	-.18	.18	1.05	.4	1.05	.6	.66	.73	67.7	65.7	N1
4	392	101	-.45	.18	1.29	1.8	1.29	2.0	.67	.73	66.7	66.6	N4
6	394	101	-.52	.18	1.18	1.2	1.18	.9	.67	.73	63.6	66.6	N6
5	395	101	-.55	.18	.86	-.9	.86	-.9	.74	.73	67.7	66.6	N5
7	400	101	-.73	.19	.87	-.9	.87	-.8	.72	.74	66.7	66.4	N7
8	405	101	-.90	.19	1.19	1.3	1.19	1.0	.69	.74	61.6	66.2	N8
MEAN	377.7	101.0	.00	.18	.99	-.1	.99	-.1			65.5	64.2	
S.D.	16.9	.0	.54	.01	.15	1.0	.16	1.0			2.7	2.2	

Source: Processed by the author

The INFIT MNSQ and OUTFIT MNSQ columns show the Mean Square values for each item, indicating how well the data fit the Rasch model. These values generally fall within the acceptable range (0.74 to 1.29), with some items showing slight deviations. The ZSTD values provide the z-standard for INFIT and OUTFIT, indicating how far these values are from the model's expectations. The PT-MEASURE CORR. column shows the correlation between item scores and overall ability estimates, ranging from 0.66 to 0.79, indicating a fairly high correlation. The EXACT MATCH column indicates the percentage of observations that match the model's expectations, ranging from 61.6% to 69.7%. Overall, the items in this table demonstrate a good fit with the measurement model used, with minor variations in individual item fit. Thus, the research instrument is proven effective in measuring the factors influencing the optimization of e-government participation. In summary, Table 6 illustrates that the items on the measurement instrument align well with the Rasch model, showing reliable estimates of abilities and high correlations between item scores and overall ability measures. Despite minor deviations, the

overall fit is strong, confirming the instrument's effectiveness in assessing the factors that contribute to optimal e-government participation.

Person Measure

This table provides an analysis of individual abilities in a measurement or test, presenting statistics for each person identified by entry number (ENTRY NUMBER) and name (Person). The TOTAL SCORE column shows the total score obtained by each individual, with a consistent TOTAL COUNT of 15 for all individuals. MEASURE and S.E. (Standard Error) indicate the estimated ability and the standard error of that estimate, with MEASURE values ranging from -7.58 to 6.18, reflecting a wide range of abilities among individuals, from very low to very high.

Table 7.
Person measure

ENTRY	TOTAL	TOTAL		MODEL	INFIT		OUTFIT		PT-MEASURE		EXACT	MATCH	Person
NUMBER	SCORE	COUNT	MEASURE	S.E.	MNSQ	ZSTD	MNSQ	ZSTD	COR.	EXP.	OBS%	EXP%	
50	73	15	6.18	.77	1.02	.2	.99	.2	.12	.17	86.7	86.7	050DLK
18	69	15	4.69	.53	.95	-.1	.97	.0	.21	.26	66.7	63.0	018RPK
60	68	15	4.42	.51	3.36	5.9	3.51	6.1	-.25	.27	40.0	61.5	060RLK
42	67	15	4.16	.50	.91	-.3	.91	-.3	.20	.27	60.0	60.1	042DLK
72	67	15	4.16	.50	1.19	.8	1.21	.8	-.33	.27	33.3	60.1	072RPK
95	66	15	3.92	.49	1.61	1.9	1.60	1.9	-.23	.27	26.7	60.4	095DLK
8	65	15	3.67	.49	1.14	.6	1.15	.6	-.50	.27	53.3	61.3	008DLD
84	64	15	3.43	.49	1.21	.6	1.19	.6	.12	.27	53.3	63.9	084DLK
88	64	15	3.43	.49	1.19	.7	1.20	.7	.14	.27	53.3	63.9	088DLK
89	64	15	3.43	.49	1.00	.2	1.01	.2	.44	.27	66.7	63.9	089DLK
96	64	15	3.43	.49	1.49	1.3	1.46	1.3	.37	.27	53.3	63.9	096DLK
25	63	15	3.19	.49	.82	-.3	.83	-.3	-.36	.27	80.0	66.8	025RPK
92	63	15	3.19	.49	.59	-1.2	.59	-1.2	.17	.27	80.0	66.8	092DPK
5	62	15	2.94	.49	1.05	.3	1.06	.3	.64	.27	60.0	69.4	005DPK
13	62	15	2.94	.49	2.44	2.7	2.42	2.7	.02	.27	33.3	69.4	013DPK
29	62	15	2.94	.49	.39	-1.9	.38	-1.9	.32	.27	86.7	69.4	029DPK
67	62	15	2.94	.49	2.07	2.2	2.08	2.2	.45	.27	53.3	69.4	067DPD
68	62	15	2.94	.49	1.70	1.6	1.71	1.6	.35	.27	46.7	69.4	068RPK
87	62	15	2.94	.49	2.05	2.1	2.04	2.1	-.11	.27	46.7	69.4	087RPK

ENTRY	TOTAL	TOTAL		MODEL	INFIT		OUTFIT		PT-MEASURE		EXACT	MATCH	Person
NUMBER	SCORE	COUNT	MEASURE	S.E.	MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	OBS%	EXP%	
91	62	15	2.94	.49	1.67	1.5	1.68	1.5	.39	.27	46.7	69.4	091DPK
98	62	15	2.94	.49	1.90	1.9	1.90	1.9	.65	.27	33.3	69.4	098DLD
33	61	15	2.70	.49	.68	-.7	.69	-.7	.23	.27	80.0	70.9	033RPK
45	61	15	2.70	.49	.28	-2.3	.28	-2.3	.09	.27	93.3	70.9	045DLD
64	61	15	2.70	.49	.24	-2.6	.24	-2.6	.26	.27	93.3	70.9	064DLK
73	61	15	2.70	.49	1.59	1.3	1.60	1.4	.25	.27	53.3	70.9	073RLD
83	61	15	2.70	.49	.89	-.1	.88	-.2	.64	.27	66.7	70.9	083DPK
14	60	15	2.46	.49	.08	-3.8	.08	-3.9	.00	.27	100.0	71.4	014DLK
47	30	15	-2.49	.40	3.06	4.0	2.99	3.9	.64	.33	20.0	56.5	047DPK
61	15	15	-7.58	1.84	MINIMUM MEASURE				.00	.00	100.0	100.0	061DLD
62	15	15	-7.58	1.84	MINIMUM MEASURE				.00	.00	100.0	100.0	062DLD
	56.1	15.0	1.71	.49	.99	-.5	.99	-.5			65.5	64.2	
	9.0	.0	1.87	.20	.80	2.2	.81	2.2			24.9	6.8	

Source: Processed by the author

The INFIT MNSQ and OUTFIT MNSQ columns provide the Mean Square values for assessing data fit to the Rasch model, with INFIT MNSQ values ranging from 0.08 to 3.36 and OUTFIT MNSQ values from 0.08 to 3.51. ZSTD values indicate the z-standard for INFIT and OUTFIT, showing how far these values are from the model's expectations. PT-MEASURE CORR. shows the correlation between individual scores and overall ability estimates, ranging from -0.50 to 0.65, indicating variation in how individual scores relate to overall abilities. The EXACT MATCH column indicates the percentage of observations that match the model's expectations, ranging from 20.0% to 100.0%. Overall, the data reveals significant variation in individual abilities and fit to the model, with some individuals showing a very good fit and others requiring further attention.

In summary, this table highlights the diverse range of abilities among individuals and their varying levels of fit to the Rasch model. The statistics show that while some individuals' scores align well with the model, others do not, indicating areas that may need further investigation to ensure the measurement's accuracy and reliability.

CONCLUSIONS

Based on the comprehensive analysis conducted throughout the discussions, the conclusion drawn from this study provides a synthesis of the findings derived from empirical data analysis rather than a mere recapitulation of theoretical concepts. The research has effectively utilized quantitative methods to explore and measure various facets of e-government participation among respondents. Through the application of statistical tools such as Rasch modeling, the study has successfully assessed individual abilities and their alignment with the expectations of e-government engagement. This empirical approach has enabled a nuanced understanding of how different factors influence public engagement with e-government initiatives.

Moreover, the findings underscore the efficacy of the measurement instrument employed in capturing a wide range of individual abilities and their correspondence with the Rasch model's expectations. The analysis of metrics like MEASURE, INFIT MNSQ, OUTFIT MNSQ, PT-MEASURE CORR., and EXACT MATCH has revealed both the strengths and potential areas for improvement in the measurement of e-government participation. These metrics have provided insights into the reliability and validity of the instrument, highlighting its ability to discern meaningful patterns in respondents' responses.

Furthermore, the conclusion emphasizes the significance of continuous refinement and validation of measurement tools in social research contexts, particularly concerning complex constructs such as e-government participation. The study's findings suggest avenues for future research, including the exploration of additional factors that may influence public engagement with e-government services and policies. By leveraging robust statistical analyses and empirical data, this research contributes to the broader scholarly discourse on enhancing governance effectiveness through digital platforms, offering insights that can inform policy-making and improve citizen-government interactions in the digital age.

REFERENCES

Abdulkareem, A. K., & Mohd Ramli, R. (2022). Does trust in e-government influence the performance of e-government? An integration of information system success model and public value theory. *Transforming Government: People, Process and Policy*, *16*(1), 1–17. https://doi.org/10.1108/TG-01-2021-0001

Agarwal, P. K. (2018). Public Administration Challenges in the World of AI and Bots. *Public Administration Review*, *78*(6), 917–921. https://doi.org/10.1111/puar.12979

Alhanatleh, H., Aboalganam, K., & Awad, H. (2022). Electronic government public value of public institutions in Jordan. *International Journal of Data and Network Science*, *6*(1), 27–36. https://doi.org/10.5267/J.IJDNS.2021.10.007

AlMulhim, A. F. (2023). The impact of administrative management and information technology on e-government success: The mediating role of knowledge management practices. *Cogent Business and Management*, *10*(1). https://doi.org/10.1080/23311975.2023.2202030

Almuraqab, N. A. S., Jasimuddin, S. M., & Mansoor, W. (2021). An Empirical Study of the Perception of the End-User on the Acceptance of Smart Government Service in the UAE. *Journal of Global Information Management*, *29*(6), 1–29. https://doi.org/10.4018/JGIM.20211101.oa11

Defitri, S. Y. (2022). The role of political will in enhancing e-government: An empirical case in Indonesia. *Problems and Perspectives in Management*, *20*(1), 69–79. https://doi.org/10.21511/ppm.20(1).2022.07

Garcia-Rio, E., Palos-Sanchez, P. R., Baena-Luna, P., & Aguayo-Camacho, M. (2023). Different approaches to analyzing e-government adoption during the Covid-19 pandemic. *Government Information Quarterly*, *40*(4), 101866. https://doi.org/10.1016/j.giq.2023.101866

Grimsley, M., & Meehan, A. (2007). e-Government information systems: Evaluation-led design for public value and client trust. *European Journal of Information Systems*, *16*(2), 134–148. https://doi.org/10.1057/palgrave.ejis.3000674

Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management and Data Systems*, *117*(3), 442–458. https://doi.org/10.1108/IMDS-04-2016-0130

Hariguna, T., Rahardja, U., & Sarmini, U. (2022). The Role of E-Government Ambidexterity as the Impact of Current Technology and Public Value: An Empirical Study. *Informatics*, *9*(3), 1–19. https://doi.org/10.3390/informatics9030067

Hermanto, B., & Miftahuddin, A. (2021). Tourism experience in Indonesia: A new approach using the rasch model scale. *Geojournal of Tourism and Geosites*, *38*(4), 1051–1056. https://doi.org/10.30892/GTG.38409-743

Hujran, O., Al-Debei, M. M., Al-Adwan, A. S., Alarabiat, A., & Altarawneh, N. (2023). Examining the antecedents and outcomes of smart government usage: An integrated model. *Government Information Quarterly*, *40*(1), 101783. https://doi.org/10.1016/j.giq.2022.101783

Hutahaean, M., Eunike, I. J., & Silalahi, A. D. K. (2023). Do Social Media, Good Governance, and Public Trust Increase Citizens' e-Government Participation? Dual Approach of PLS-SEM and fsQCA. *Human Behavior and Emerging Technologies*, *2023*. https://doi.org/10.1155/2023/9988602

Iglesias-Antelo, S., López-López, V., & Vázquez-Sanmartín, A. (2021). Assessing the influence of strategic resources on the quality of life in spanish cities. *Sustainability (Switzerland)*, *13*(23). https://doi.org/10.3390/su132313048

Karunia, R. L., Budiaji, R., Suzana, R., Dewi, K. S., & Prasetyo, J. H. (2023). Analysis of the Factors that Affect the Implementation of E-Government in Indonesia. *International Journal of Membrane Science and Technology*, *10*(3), 46–54. https://doi.org/10.15379/ijmst.v10i3.1216

Koniyo, M. H., Giriantari, I. A. D., Sudarma, M., & Wirastuti, N. M. A. E. D. (2023). Electronic government system measurement model: a systematic testing of e-government implementation. *Indonesian Journal of Electrical Engineering and Computer Science*, *32*(2), 845–856. https://doi.org/10.11591/ijeecs.v32.i2.pp845-856

Kurniawan, C., Pribadi, U., & Iqbal, M. (2023). the Role of E-Governance in Improving Local Governments Performance (Case Study: Sumbawa Regency). *Jurnal Ilmiah Peuradeun*, *11*(3), 1139–1154. https://doi.org/10.26811/peuradeun.v11i3.795

Lee, K. L., Amin, A. J., Alzoubi, H. M., Alshurideh, M., Khatib, M. El, Joghee, S., & Nair, K. (2024). Investigating the factors affecting e-procurement adoption in supply chain performance: An empirical study on Malaysia manufacturing industry. *Uncertain Supply Chain Management*, *12*(2), 615–632. https://doi.org/10.5267/j.uscm.2024.1.021

Miftahuddin, A., Hermanto, B., Raharja, S. J., & Chan, A. (2020). City brand attractiveness on tourism using rasch model approach. *International Journal of Supply Chain Management*, *9*(2), 150–156. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85085379587&partnerID=40&md5=6559f1383021d7fe2fd21f5f1afaaa79

Nam, T. (2014). Determining the type of e-government use. *Government Information Quarterly*, *31*(2), 211–220. https://doi.org/https://doi.org/10.1016/j.giq.2013.09.006

Nguyen, H. N., & Tran, M. D. (2022). Stimuli To Adopt E-Government Services During Covid-19: Evidence From Vietnam. *Innovative Marketing*, *18*(1), 12–22. https://doi.org/10.21511/im.18(1).2022.02

Putra, R., Sobri, K. M., Azhar, & Santoso, A. D. (2022). Antecedents of e-government perceived net benefits: a study of e-filing in Indonesia. *Telkomnika (Telecommunication Computing Electronics and Control)*, *20*(5), 1016–1025. https://doi.org/10.12928/TELKOMNIKA.v20i5.22560

Rachmawati, Aswar, K., Sumardjo, M., Wiguna, M., & Hariyani, E. (2022). Personal and reliability factors affecting adoption and utilization of e-government: An effect of intention to use. *Problems and Perspectives in Management*, *20*(2), 281–290. https://doi.org/10.21511/ppm.20(2).2022.23

Riyanto, & Azis, A. (2021). Application of the Vector Machine Support Method in Twitter Social Media Sentiment Analysis Regarding the COVID-19 Vaccine Issue in Indonesia. *Journal of Applied Data Sciences*, *2*(3), 102–108. https://doi.org/10.47738/jads.v2i3.40

Saleh, A. A., & Alyaseen, I. F. T. (2021). Successful factors determine the significant relationship between e-governance system and government operational excellence. *Bulletin of Electrical Engineering and Informatics*, *10*(6), 3460–3470. https://doi.org/10.11591/eei.v10i6.2447

Trkman, M., Popovič, A., & Trkman, P. (2023). The roles of privacy concerns and trust in voluntary use of governmental proximity tracing applications. *Government Information Quarterly*, *40*(1). https://doi.org/10.1016/j.giq.2022.101787

Wagenaar, H., & Cook, S. D. N. (2003). Understanding policy practices: action, dialectic and deliberation in policy analysis. In M. A. Hajer & H. Wagenaar (Eds.), *Deliberative Policy Analysis: Understanding Governance in the Network Society* (pp. 139–171). Cambridge University Press. https://doi.org/DOI: 10.1017/CBO9780511490934.007