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Citizens' Information Behavior in Relation to Electronic-Government Services: A Systematic Review

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Abstract

Purpose – Government information and services are increasingly delivered online through the Internet or other digital means. To benefit citizens, such e-government must be incorporated in their government-related information behavior. This study reviews citizens' information behavior in relation to e-government.

Design/methodology/approach – Following procedures for systematic reviews, this study reviews 53 papers about citizens' e-government information behavior.

Findings – The review finds that citizens (1) employ a rich set of quality, accessibility, and non-utilitarian criteria in their perception of e-government, (2) use e-government in combination with offline channels, (3) choose channels on the basis of demographic and situational factors, (4) make frequent use of interpersonal sources, and (5) may or may not achieve the intended outcome of their e-government information behavior. E-government information behavior has a lot in common with information behaviors in other domains, but it also accentuates certain facets of information behavior, such as the simultaneous use of multiple channels. In addition, mixed findings are common.

Originality – E-government shapes how citizens satisfy their government-related information needs. This study provides an overview of the otherwise scattered research on this information behavior.

Research limitations/implications – Interpersonal sources, both lay and professional, are integral to citizens' e-government information behavior. Yet, theoretical frameworks for understanding information behavior tend to focus on the individual citizen.

Practical implications – On its own, e-government is most suited for simpler problems. More complex problems require an information behavior that combines e-government with interpersonal sources.

Keywords: Electronic government, e-government services, channel choice, interpersonal sources, information behavior

Paper type: review

1 Introduction

Over the last decades, electronic government (e-government) has become a prominent channel in the communication between governments and citizens. E-government refers to "the delivery of government information and services online through the Internet or other digital means" (West, 2004, p. 16). For the citizens, e-government affords new possibilities, requires new competences, and interacts with other channels for communicating with government, such as phone calls. These possibilities, competences, and interactions shape how citizens access and use e-government to

satisfy their government-related information needs. Yet, the research on this information behavior is scattered and mostly not published in information science outlets. The present paper reviews citizens' information behavior in relation to e-government.

This review was triggered by a report stating that 23% of a representative sample of the Danish population had needed help the last time they used an e-government service (Statistics Denmark, 2020). This statement sparked several questions:

- What criteria enter into citizens' perception of the quality and accessibility of e-government?
- How frequently do citizens use, or prefer, e-government compared to offline channels?
- How is citizens' channel choice influenced by demographic and situational factors?
- What interpersonal aspects facilitate citizens' e-government information behavior?
- Are citizens able to achieve the intended outcome of their e-government information behavior?

The present review seeks to answer these five questions. While the research on information behavior is substantial (Case and Given, 2016), no previous study has reviewed the literature for answers to these questions.

Citizens' government-related information behavior concerns issues to do with citizenship, crime reporting, education, elections, legal matters, medical care, public transportation, residence registration, social services, taxes, and so forth (Böhm et al., 2010; Gibson et al., 2009; Li et al., 2005). E-government should not bias access to information about these issues, but it appears to do so. A digital divide makes e-government services most useful to the citizens less likely to be able to use them – the elderly, the poor, and those with limited language skills (e.g., Botric and Bozic, 2021; Jaeger and Thompson, 2004; Nam, 2014). As a result, some local government staff finds that the shift toward e-government decreases the service they provide to citizens (Berger et al., 2016).

The present study is, however, not a review of the digital divide literature. It is also not a review of the technology acceptance models prominent in e-government studies (see, e.g., Dwivedi et al., 2017; Rana et al., 2015). The present study is about information behavior, that is, about the totality of how citizens seek and use information across the available sources and channels (Wilson, 2000). In the context of e-government, information use is often referred to as solving problems, submitting applications, and conducting transactions.

2 Method

Following procedures for systematic reviews, the author selected and analyzed 53 papers.

2.1 Inclusion criteria

Six criteria specified which papers to include in this review. To be included, a paper had to be: (1) about citizens' perception, experience, or use of e-government, (2) about the affective, behavioral, cognitive, or social aspects of e-government, (3) about information seeking and use across e-government and other channels, (4) an empirical study based on data about operational e-government systems, (5) a journal article, book chapter, or conference paper, and (6) in English. The first three criteria meant that papers were excluded if they investigated government staff (as opposed to citizens), technical aspects (as opposed to affective, behavioral, cognitive, and social aspects), or technology acceptance (as opposed to information behavior). The fourth and fifth criteria served to bolster the quality of the included papers by, for example, excluding studies of pre-operational systems. The last criterion ensured that the author could read the papers.

2.2 Paper selection

The paper-selection process consisted of four steps, see Figure 1. First, Google Scholar and Scopus were searched for references about people's information behavior in relation to e-government. To be retrieved a reference had to contain the term 'e-government' (or 'egovernment' or 'electronic government' or 'government website' or 'government websites') in the title. And it had to contain the

term ‘information behavior’ (or ‘information behaviour’ or ‘information seeking’ or ‘help seeking’ or ‘problem solving’ or ‘information need’ or ‘information needs’ or ‘information source’ or ‘information sources’ or ‘information literacy’ or ‘digital divide’) anywhere in the paper. The two last terms were included to capture studies that were not framed as information-behavior studies but still dealt with information-behavior issues. A total of 2154 references matched the queries, which were issued in June 2021. Second, duplicate references were removed and the remaining references were matched against the inclusion criteria by screening their titles and abstracts. The screening of abstracts involved only the references that passed the title screening. Third, the 83 retained references were looked up. While 78 of them could be accessed online in full text, 5 papers could not and were requested from the authors. The authors of one paper supplied a full-text copy. Fourth, the inclusion criteria were matched against the content of the papers. An additional 26 papers were excluded at this stage because they did not match the inclusion criteria (Figure 1). The remaining 53 paper were included.

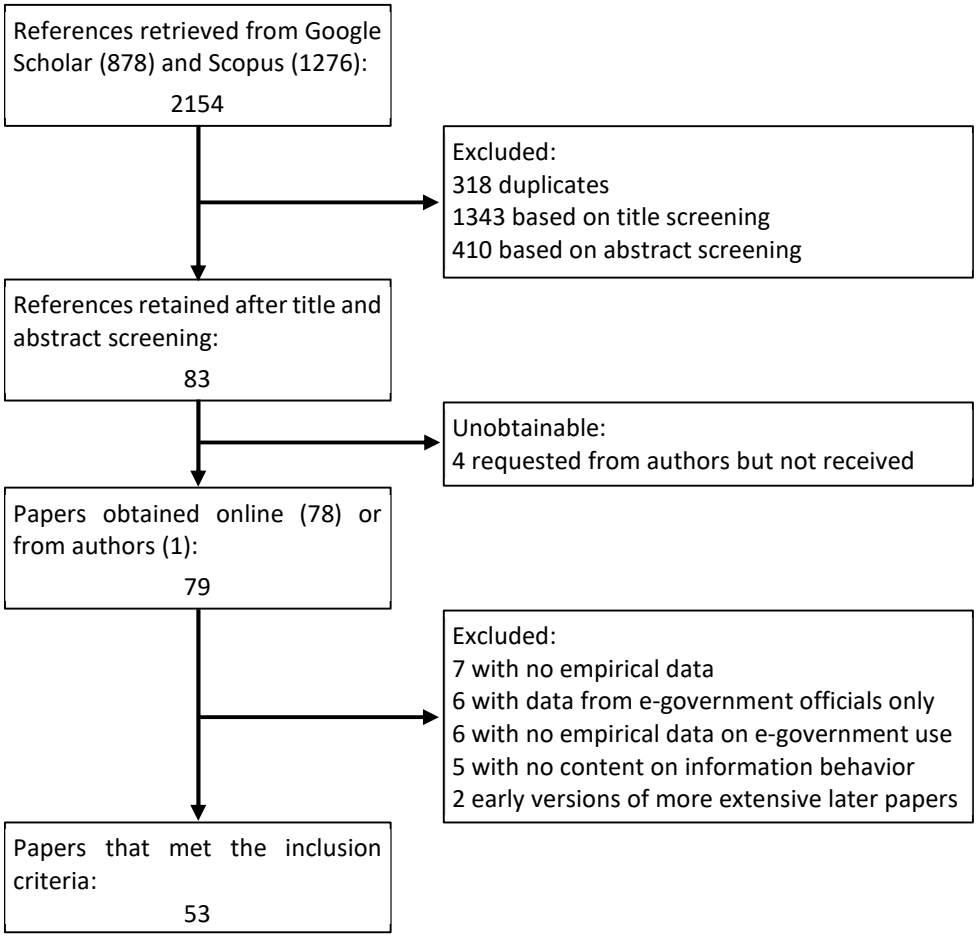

Figure 1. Paper-selection process

2.3 Data analysis

The data analysis involved five steps. First, the papers were skimmed to get a sense of what they contributed. This skimming process was documented in an evolving list of topics. While the papers that contributed to a topic were noted, these notes were necessarily incomplete because the full list of topics was not available until all papers had been skimmed. Second, the list of topics was examined and pruned. Some topics, such a common service centers, libraries, and intermediaries, were related to one another and immediately relevant. Other topics, such as digital divide, were common but tangential to the scope of this review. Third, the papers were read and all passages relevant to this

review were extracted. This reading and extraction was guided by the list of topics and each extracted passage was annotated with the topics it provided information about. To help avoid oversights, the annotations were matched against the notes from the first step of the data analysis. Fourth, the topics were grouped into themes. This grouping resulted in five themes. Each of the questions listed in the Introduction – and each subsection of the Results section – corresponds to one of these themes. Fifth, the extracted passages were sorted by theme and topic. Writing about a theme involved analyzing the passages further. These analyses resulted in tables, some of which have been condensed and included in this review. The writing process also involved repeated references back into the reviewed papers to double check the extracted information and get more context.

3 Results

The 53 included papers were from 28 different countries, were mostly based on surveys, and involved a variety of citizens, see the appendix. In total, 139,390 citizens participated in the studies.

3.1 Criteria in citizens' perception of e-government

Multiple studies have identified criteria that contribute positively or negatively to e-government use. These criteria show how citizens perceive the quality, accessibility, and other aspects of e-government.

With respect to quality, the criteria identified by the largest number of studies are that e-government is useful and provides reliable information (Table I). While usefulness is about meeting the citizen's information need (e.g., Farhan and Sanderson, 2010), reliability is about the accuracy, credibility, and completeness of the provided information (e.g., Roy et al., 2015). The remaining positive quality criteria add nuance to usefulness and reliability. The negative quality criteria contradict the positive by stating that the information is ambiguous, inadequate, outdated, too general, too specific, or not to be trusted. That is, usefulness and reliability cannot be presumed; they vary with the situation and the citizen's trust in government. For example, Taylor (2018) finds that lack of trust in government reduces middle-school children's inclination to seek information on e-government websites. In addition, quality may suffer from the absence of a physical receipt and a person to hold accountable. These two criteria emphasize that e-government is about matters for which citizens often need to be able to document that they have taken appropriate action.

Table I. Criteria about e-government quality

Criterion	References
Positive	
Good overview of government policies	Cullen (2005)
Important information	Taylor (2018)
Reliable information	Cecchini and Raina (2005), Cullen et al. (2003), Roy et al. (2015), Sharma and Mishra (2017), Taylor (2018)
Rich and exclusive content	Taylor (2018), Wang (2014)
Up-to-date content	Cullen et al. (2003), Farhan and Sanderson (2010)
Useful	Choudrie et al. (2013), Cullen et al. (2003), Delitheou and Maraki (2010), Farhan and Sanderson (2010), Sharma and Mishra (2017), Sweeney (2007), Taylor (2018), Wang (2014)
Negative	
Ambiguous information	Roy et al. (2015)
Inadequate information	Heierhoff and Hofmann (2012), Taylor (2018)
Lack of trust in content	Roy et al. (2015), Taylor (2018)

Lack of trust in government	Abad-Alcalá et al. (2017), Delitheou and Maraki (2010), Taylor (2018)
Not having a person to hold accountable or make reference to	Choudrie et al. (2013), Roy et al. (2015)
Not having a physical receipt	Abad-Alcalá et al. (2017), Singh et al. (2008)
Outdated content	Wang and Chen (2012)
Too general information	Cullen (2005), Roy et al. (2015), Sweeney (2007)
Too specific information	Taylor (2018)

With respect to accessibility, the criteria identified by the largest number of studies are that e-government use saves time, can be used at flexible hours, is easy to use, and is free/cheap (Table II). The remaining positive accessibility criteria include that e-government involves less corruption and harassment than visiting government offices and that citizens feel in control. However, other citizens perceive the accessibility of e-government negatively. They find it time consuming, difficult, and costly; they are concerned about security; they lack the required skills; they fear making mistakes; and they would like support in interpreting the retrieved information. The security concerns are specific to online channels. They range from general concerns about bugs and viruses (Roy et al., 2015), over concerns about providing personal data (Delitheou and Maraki, 2010), to concerns about making online payments (Choudrie et al., 2013). Like for the quality criteria, many of the accessibility criteria contradict one another. Multiple studies argue that these contradictions reflect a digital divide with privileged citizens benefiting from e-government, while disadvantaged citizens lack necessary resources and, therefore, struggle with e-government (e.g., Botric and Bozic, 2021; Choudrie et al., 2013; Distel and Becker, 2017).

Table II. Criteria about e-government accessibility

Criterion	References
Positive	
Being in control	Roy et al. (2015), Sweeney (2007)
Convenient	Abad-Alcalá et al. (2017), Delitheou and Maraki (2010), Singh et al. (2008), Wang (2014)
Ease of access	Cecchini and Raina (2005), Cullen (2005), Gupta and Maurya (2020), Roy et al. (2015), Sweeney (2007)
Ease of finding information	Sweeney (2007)
Ease of use	Cullen et al. (2003), Distel and Becker (2017), Farhan and Sanderson (2010), Roy et al. (2015), Sharma and Mishra (2017), Singh et al. (2008), Sweeney (2007), Wang (2014)
Efficient	Cullen (2005), Roy et al. (2015), Sharma and Mishra (2017)
Eliminates traveling	Criado and Barrero (2014), Delitheou and Maraki (2010)
Flexible	Awer et al. (2016), Roy et al. (2015)
Free/cheap	Cecchini and Raina (2005), Cullen (2005), Delitheou and Maraki (2010), Singh et al. (2008), Wang (2014)
Immediacy of response	Sweeney (2007)
Less corruption and harassment	Cecchini and Raina (2005)
Less intrusive way of interacting with government	Cullen (2005)

Multiple languages	Singh et al. (2008)
Reduced workload	Distel and Becker (2017), Sweeney (2007)
Safe and secure communication	Roy et al. (2015), Taylor (2018)
Saves time	Abad-Alcalá et al. (2017), Cecchini and Raina (2005), Criado and Barrero (2014), Cullen (2005), Delitheou and Maraki (2010), Distel and Becker (2017), Roy et al. (2015), Singh et al. (2008), Sweeney (2007), Wang (2014)
Streamlines information management	Cullen (2005), Roy et al. (2015), Singh et al. (2008), Wang (2014)
Temporally flexible	Criado and Barrero (2014), Cullen (2005), Distel and Becker (2017), Madsen and Kræmmergaard (2015), Roy et al. (2015), Sweeney (2007)
Negative	
Cost of service	Becker et al. (2008), Fröhlich et al. (2020), Niehaves et al. (2008), Yonazi et al. (2010)
Difficult to find information	Choudrie et al. (2013), Cullen (2005), Roy et al. (2015), Sweeney (2007)
Difficult to use	Becker et al. (2008), Choudrie et al. (2013), Criado and Barrero (2014), Delitheou and Maraki (2010), Fröhlich et al. (2020), Gibson et al. (2009), Madsen and Kræmmergaard (2015), Niehaves et al. (2008), Roy et al. (2015), Singh et al. (2008), Stanziola et al. (2006), Van de Walle et al. (2018)
Fear of making mistakes	Abad-Alcalá et al. (2017), Criado and Barrero (2014), Van de Walle et al. (2018)
Immediate response needed	Becker et al. (2008), Niehaves et al. (2008), Roy et al. (2015)
Inconvenient and stressful	Abad-Alcalá et al. (2017), Distel and Becker (2017), Sweeney (2007)
Lack of awareness	Fröhlich et al. (2020), Wang and Chen (2012), Yonazi et al. (2010)
Lack of skills	Botric and Bozic (2021), Choudrie et al. (2013), Fröhlich et al. (2020), Gibson et al. (2009), Li et al. (2005), Madsen and Kræmmergaard (2015), Singh et al. (2008), Van de Walle et al. (2018), Yonazi et al. (2010)
Lack of technology	Cullen (2005), Van de Walle et al. (2018), Yonazi et al. (2010)
Multiple passwords	Abad-Alcalá et al. (2017), Roy et al. (2015)
No support in interpreting information	Abad-Alcalá et al. (2017), Criado and Barrero (2014), Madsen and Kræmmergaard (2015), Roy et al. (2015), Sweeney (2007), Van de Walle et al. (2018)
Only one language	Singh et al. (2008)
Requires electronic id	Botric and Bozic (2021), Criado and Barrero (2014), Van de Walle et al. (2018)
Security concerns	Abad-Alcalá et al. (2017), Becker et al. (2008), Botric and Bozic (2021), Choudrie et al. (2013), Delitheou and Maraki (2010), Li et al. (2005), Niehaves et al. (2008), Roy et al. (2015), Singh et al. (2008), Wang and Chen (2012)
Service not available	Becker et al. (2008), Botric and Bozic (2021), Niehaves et al. (2008), Singh et al. (2008), Wang and Chen (2012)
Session timeouts	Abad-Alcalá et al. (2017), Gibson et al. (2009)
Texts are lengthy and complexly worded	Abad-Alcalá et al. (2017), Cullen (2005), Roy et al. (2015), Sweeney (2007)
Time consuming	Choudrie et al. (2013), Cullen (2005), Delitheou and Maraki (2010), Distel and Becker (2017), Li et al. (2005), Roy et al. (2015)

Table III shows that citizens' perception of e-government depends on criteria beyond quality and accessibility. These criteria include no interest in – or need for – e-government and a preference for face-to-face communication. More interestingly, citizens view e-government positively if their friends and relatives use it, negatively if they find its appearance uninviting, and positively or negatively depending on whether it fits their lifestyle. In contrast to quality and accessibility, these three criteria are non-utilitarian. For example, a senior citizen finds that "in the end it always gives a kind of happy feeling" to complete tax declarations via e-government (Abad-Alcalá et al., 2017).

Table III. Other criteria influencing the use of e-government

Criterion	References
Positive	
Facilitates learning	Roy et al. (2015), Singh et al. (2008)
Fit with lifestyle	Fröhlich et al. (2020)
Friends and relatives use it	Fröhlich et al. (2020), Sharma and Mishra (2017), Singh et al. (2008)
Satisfying experience	Abad-Alcalá et al. (2017), Sweeney (2007)
Negative	
No interest or need	Botric and Bozic (2021), Cullen (2005), Distel and Becker (2017), Li et al. (2005), Van de Walle et al. (2018), Wang (2014), Wang and Chen (2012)
Poor fit with lifestyle	Choudrie et al. (2013)
Preference for face-to-face communication	Becker et al. (2008), Choudrie et al. (2013), Cullen (2005), Distel and Becker (2017), Fröhlich et al. (2020), Niehaves et al. (2008), Roy et al. (2015), Van de Walle et al. (2018), Wang and Chen (2012), Yonazi et al. (2010)
Uninviting appearance	Taylor (2018), Wang and Chen (2012)
Unsatisfying past experience	Cullen (2005)

3.2 Channel use and preference

Citizens are sometimes forced to use e-government because it has replaced offline channels (Abad-Alcalá et al., 2017; Choudrie et al., 2013; Cullen, 2005). However, on most occasions, they have a choice of channels. Nine studies provide data about how frequently citizens prefer or use e-government (website, email, or both) compared to channels such as phone calls, physical visits to government offices, and postal letters, see Table IV. It is apparent that citizens use a mix of channels. In terms of preference, citizens are somewhat in favor of offline channels. Reasons for preferring phone calls include that citizens find it easier, that they want quick feedback, and that they have not found the answer to their question online (Bernhard, 2020). Reasons for preferring to visit government offices include better ability to communicate the information need face to face and "I just wanted the reassurance of a person" (Sweeney, 2007). Furthermore, some citizens choose office visits because the offices are conveniently close by (Roy et al., 2015; Wang, 2014). Other citizens, especially in rural areas, find office visits inconvenient because they tend to require two trips to town – one to make the appointment and another to keep it (Cullen, 2005). Making the appointment via email has the prospect of saving the first trip.

Table IV. Use and preference for e-government (website, email, or both) and other channels

Reference	Variable	Website	Email	Phone	Office	Letter
		%	*%*	*%*	*%*	*%*
Reddick (2005)	Use [a]	22	12	25	12	7
	Preference	26	13	40	12	9
Reddick et al. (2012)	Use [b]	13	2	17	93	5
Choudrie et al. (2013)	Preference [b]	13	15	67	42	13
Cerda et al. (2018)	Preference				55	
Fröhlich et al. (2020)	Use			42		
Li et al. (2005)	Use (for contacting gov. officials) [c]	47				
Gauld et al. (2010)	Use (Australia/New Zealand)	32/24				
	Preference (Australia/New Zealand)	39/30		50/56		11/14
Ebbers et al. (2016)	Use for consultation	41		39	18	3
	Use for registration	57		22	16	5
	Use for transaction	44		26	11	19
Delitheou and Maraki (2010)	Use	77				

[a] The remaining 22% use a combination of channels. [b] The respondents could select multiple channels. [c] The remaining 53% use a combination of phone, office, and letter.

Madsen and Kræmmergaard (2015) find that e-government and offline channels are often used simultaneously rather than sequentially. For example, the interviewed citizens would phone their local government while logged on to e-government – because they encountered problems in the online interactions or because they needed ready access to case files during the phone call. Sweeney (2007) makes the related point that starting on e-government is a good way of preparing for a phone call. That way, the citizen has formulated a proper question and feels assured that "I will not be misunderstood because I have asked the right question." Conversely, Cullen (2005) finds that a group of citizens with diverse government-related information needs frequently phoned government agencies to be directed to the relevant website. That is, they used the phone as an entry point to e-government.

3.3 Predictors of channel choice

Several studies have looked for demographic predictors of citizens' channel choice. Table V summarizes the four studies that report beta coefficients (i.e., standardized regression coefficients) for such predictors across e-government and offline channels. Formally, beta coefficients indicate how many standard deviations the dependent variable (e.g., website use) will change per standard-deviation change in the predictor variable (e.g., citizen age).

Table V. Predictors of channel use for e-government (website, email, or both) and other channels

Reference	Predictor variable	Website	Email	Phone	Office	Letter
		Beta	*Beta*	*Beta*	*Beta*	*Beta*
Reddick et al. (2012)	Age	-0.16	0.34	0.12	-0.15	0.29*
	College educated	0.73**	-0.01	0.66**	0.55	0.55
	Employed	0.95**	1.24	0.11	0.83**	0.43
	Female	-0.30	-0.36	0.02	-0.74*	0.10

	Urban	0.07	0.53	0.48*	0.15	0.81
	Low economic status	-0.31	0.51	-1.09**	-0.26	-0.73
	Broadband internet access	2.58**	2.92**	0.62**	-0.44	0.07
	Mobile internet access	1.56**	0.62	0.53	-0.57	0.67
Plattfaut et al. (2013)	Age	-0.25**		0.05*	0.07**	
	Female	0.06*		0.00	0.04	
	Mobility issues	-0.02		0.02	0.02	
Reddick (2005)	Elderly	-0.01		0.01		
	College educated	0.15		-0.39**		
	Hispanic	-0.04		0.36		
	Disability	-0.24		-0.63		
	2002 household income > USD 75,000	0.00		-0.03		
	Trust in federal government	-0.21		0.03		
	Complicated problem	-1.13*		0.59*		
	Urgent problem	-0.33		0.37		
	Satisfied with last gov. contact	1.27**		-0.56**		
	Achieved outcome at last gov. contact	0.21		0.32		
	Broadband connection	0.20		-0.14		
Reddick (2012)	18-29 years of age		1.02**	0.01	-0.23	
	College educated		0.47	-0.14	-0.89**	
	Male		-0.27	-0.17	0.05	
	Urban		-0.43	0.35*	-0.22	
	2006 household income > USD 40,000		0.17	0.20	-0.54*	
	African American		-0.69	0.30	0.35	
	Latino		0.19	-0.02	0.28	
	Infrequent use of internet		0.00	0.29	-0.24	
	Satisfied with the way things are going in their community		0.35	-0.03	-0.18	
	Very successful at finding the information you wanted		0.28	0.16	-0.29	
	Just about always and most of the time trust Washington to do the right thing		0.19	-0.09	0.00	
	Feel overloaded with all the information they receive		-0.80	0.07	0.30	

* $p < .05$, ** $p < .01$

The strongest predictors of e-government use are access to broadband or mobile internet, satisfaction with the last government contact, having an uncomplicated problem, and being young (Table V). Furthermore, these predictors tend to discriminate among the channels. For example, increasing age is not only associated with less e-government use but also with more phone calls, office visits, and letter writing (Plattfaut et al., 2013; Reddick et al., 2012). However, even the strong predictors are only explaining a statistically significant portion of the variance in e-government use for some – not all – of the four studies. Mixed findings and non-significant predictors are common across the studies.

For example, having a college education predicts significantly more phone calls in Reddick et al. (2012), significantly fewer in Reddick (2005), and neither more nor fewer in Reddick (2012). Demographic predictors – such as economic status, ethnicity, and gender – are mostly non-significant. This pattern is reinforced by Ebbers et al. (2016), who find that none of age, gender, education, language, and digital skills explain a statistically significant portion of the variance in the use of e-government, phone calls, and office visits. However, Botric and Bozic (2021) find that gender, household size, population density, and education significantly influence e-government adoption.

The studies in Table V also include situational predictors. Of these, having a complicated problem and being satisfied with the last government contact significantly predict the use of e-government and phone calls. In a study reporting odds ratios rather than beta coefficients, Reddick and Turner (2012) investigated another situational predictor: whether the citizen interacted with government to get information or solve a problem. They find that e-government websites are used significantly more to get information (odds ratio: 3.03), while phone calls are used significantly more for solving problems (odds ratio: 4.32). This finding is consistent with several other studies (Becker et al., 2008; Cullen et al., 2003; Singh et al., 2008).

3.4 Interpersonal aspects

E-government use is often a collaborative accomplishment. In addition to phoning and visiting government offices, the reviewed studies show that citizens involve other persons in their e-government use by engaging with common service centers, libraries, professional intermediaries, friends and relatives, and unspecified persons (see Table VI).

Table VI. Interpersonal aspects of e-government information behavior

Interpersonal aspect	References
Common service centers	Bernhard (2020), Cecchini and Raina (2005), Gupta and Maurya (2020), Kumar et al. (2018), Sharma and Mishra (2017), Van de Walle et al. (2018), Wang (2014)
Libraries	Fisher et al. (2010), Gibson et al. (2009), Jaeger et al. (2012), Møller (2018)
Professional intermediaries	Cullen (2005), Dombrowski et al. (2014), Stanziola et al. (2006), Weerakkody et al. (2013)
Friends and relatives	Abad-Alcalá et al. (2017), Cullen (2005), Fisher et al. (2010), Gracia et al. (2012)
An unspecified person	Botric and Bozic (2021)

Common service centers, such as staffed tele kiosks, provide local access to computers and knowledgeable staff. Citizens value that these centers make it possible to ask additional questions and get quick feedback (Bernhard, 2020; Sharma and Mishra, 2017; Van de Walle et al., 2018). Sometimes, the center staff can resolve the issue altogether and there is no need to proceed to e-government (Wang, 2014). Mostly, the centers are intermediaries between the citizen and government. In that capacity, they reduce the bureaucratic power of government officials and thereby help improve accountability and combat corruption (Cecchini and Raina, 2005). In addition, the centers have a social function by enabling citizens to socialize with other center users (Van de Walle et al., 2018).

The library is a local resource that is used extensively for e-government access (Fisher et al., 2010). Librarians have embraced a guiding role in which they refer the citizen to e-government services, co-use services with the citizen, operate them for the citizen, or provide other kinds of e-government assistance (Møller, 2018). Jaeger et al. (2012) find that most libraries – urban as well as rural – offer several types of e-government assistance and that this assistance is crucial to citizens' successful use of e-government.

For some social services, outreach workers act as professional intermediaries between citizens and government. These outreach workers attempt to ease citizens into social services by facilitating the application process on e-government. To succeed, they must earn the citizens' trust (Weerakkody et al., 2013). For example, citizens may question the outreach workers' competence, fear that receiving the social service will affect their immigration status, or simply be reluctant to divulge personal information to the outreach worker (Dombrowski et al., 2014). If trust is established, then social workers are also a valued advocate to bring to appointments with government staff to ensure the citizens are treated politely and informed about all their entitlements (Cullen, 2005). Some citizens hire a professional intermediary to operate e-government services on their behalf. Such hired intermediaries may in some contexts constitute as much as one in four e-government users (Stanziola et al., 2006). These hired intermediaries visit e-government websites a lot, but also mask that their clients find e-government exceedingly difficult.

Friends and relatives are key to the adoption and use of e-government (Gracia et al., 2012). This group shows that e-government is often a household issue rather than an individual issue. For example, Abad-Alcalá et al. (2017) quote a senior citizen for saying that "I'm the husband so I have to do it." In some cultures, community members routinely help one another with e-government (Cullen, 2005), thereby extending the group of friends and relatives beyond the household. Fisher et al. (2010) find that 42% of 11738 citizens who accessed e-government at the library also did it for others. They had not necessarily been asked by others to retrieve the information and did not necessarily follow up on whether it was subsequently used; they simply took it upon themselves to convey the information. In some cases, teenagers visited the library to access e-government on behalf of their families because their parents lacked computer or language skills.

Finally, Botric and Bozic (2021) do not specify the type of interpersonal source. In a Europe-wide survey, they find that the respondents' most frequent reason for not using e-government was that another person has done it for them. This reason was selected by 34% of the respondents.

3.5 Outcomes

Only four studies provide numbers about the outcome of citizens' e-government information behavior. The results of these studies are mixed. On the one hand, Fisher et al. (2010) report that 86% of 6441 citizens got the help they needed when they used e-government to "get help from a gov't official or agency" and that 83% of 4451 citizens found the legal help they needed when using e-government to "look for advice/assistance w/ a legal question or problem." In addition, Bernhard (2020) reports that with the assistance of an intermediary 18 of the 21 interviewed citizens received answers to their questions immediately and the remaining 3 almost immediately.

On the other hand, Cullen et al. (2003) report that only 52% of 543 citizens who approached e-government with a specific purpose in mind were able to fulfil their purpose. And Cestnik and Kern (2014) report that as much as 62% of 287 citizens who filled out an application form on e-government submitted an incomplete application. In contrast, only 18% of 327 citizens who filled out the form on paper submitted an incomplete form.

4 Discussion

An overarching finding in this review is the importance of the interpersonal aspects of e-government information behavior. This finding cuts cross the other main findings, as discussed in the following.

4.1 Citizens use a combination of channels

E-government is often introduced to shift citizens from interpersonal channels to self-service e-government websites. However, the reviewed studies show that citizens use e-government in combination with other channels, in particular interpersonal ones (Tables IV and VI). This finding accords with studies outside of e-government. These studies suggest that documentary and interpersonal sources are complementary and interdependent (Hertzum, 2014). Citizens consult

interpersonal sources as a preparatory step before they complete their transactions on e-government; they start on e-government to find information in preparation for interpersonal consultations; they use online and offline channels simultaneously to expedite interactions; and they choose different channels on different occasions, depending on the character of their need. Often, needs restricted to finding information are handled online, while needs that involve problem solving prompt a phone call.

By combining channels, citizens' information behavior shows the important role of intermediaries – both lay and professional – in e-government use. Professional intermediaries have the specialist background to provide assistance. The reviewed studies span contexts in which citizens consult government staff to get information (e.g., Madsen and Kræmmergaard, 2015) and contexts in which citizens involve other professional intermediaries because they lack trust in government (e.g., Cullen, 2005). For example, many librarians have become semi-professional e-government intermediaries in an effort by libraries to extend their public service (Jaeger and Bertot, 2011; Jaeger et al., 2012). Friends and relatives are trusted but lay intermediaries. Lay intermediaries are exceedingly common (Abrahamson and Fisher, 2007). For example, one person may handle e-government for the entire household, children may assist adults with the technology, and friends may help interpret e-government information. While professional intermediaries act on request, lay intermediaries may act on their own initiative and volunteer the resulting information (Fisher et al., 2010). Lay intermediaries show the impact of citizens' social network on their information behavior and e-government use.

4.2 Quality, accessibility, and non-utilitarian criteria

Quality and accessibility are multifaceted constructs that span a rich set of criteria (Tables I and II). The criteria resemble, but also extend, those previously identified for other information sources (e.g., Fidel and Green, 2004; Hertzum, 2002). The common criteria reiterate the importance of convenience, ease, reliability, and trust. The most apparent new quality criteria are about the (unmet) need for a physical receipt or person to hold accountable. These criteria emphasize that citizens need documentation for their dealings with government, not just information from government. The most apparent new accessibility criteria are lack of skills, lack of technology, and security concerns. These criteria relate to the online medium. An important feature of the of quality and accessibility criteria is that they vary across persons and situations. Depending on the citizen and situation, e-government is easy to use or difficult to use, it saves time or is time consuming, it provides safe and secure communication or raises security concerns, and so forth.

In addition to quality and accessibility, citizens' e-government use is also influenced by criteria such as uninviting appearance, fit with lifestyle, and whether friends and relatives use it (Table III). Contrary to quality and accessibility, these criteria are not utilitarian. An uninviting appearance is mainly an aesthetic issue, fit with lifestyle is about the citizens' self-image, and whether friends and relatives use e-government is about social influence. The potential power of self-image is illustrated by an Indian male who says that using e-government "gives high value and respect to me in the society", whereas waiting in line at a government office "defames my image" (Kumar et al., 2017, p. 303). Social influence is an established factor in studies of technology acceptance (Venkatesh et al., 2003). For some citizens, these non-utilitarian criteria are decisive. However, information behavior research often bypasses non-utilitarian criteria in favor of a focus on the quality/accessibility dichotomy (Lu and Yuan, 2011) or the dimensions of relevance (Saracevic, 2017).

4.3 Demographic and situational predictors

Consistent with research on the digital divide, some of the reviewed studies find that socioeconomic variables explain part of the variance in channel choice (e.g., Botric and Bozic, 2021). However, other studies do not (e.g., Ebbers et al., 2016). Situational variables appear to be equally good, if not better, predictors of e-government use. This finding reiterates Atwood and Dervin's (1981) argument that the situation in which information seeking takes place is a stronger predictor of people's thoughts and behavior than is their personal background. That is, the situational demands on people's information

behavior will vary more, and in more important respects, than their personal information-behavior resources. Among the situational variables, the strongest predictors of e-government use are that the situation is about getting information (as opposed to solving a problem), that the citizens have an uncomplicated problem, and that they were satisfied with their last government contact.

Because the demographic and situational predictors investigate different empirical relations, they also suggest different theoretical frameworks. Demographic predictors lend themselves to frameworks such as information literacy (Bruce, 1997) and the digital divide (Rogers, 2001). Situational predictors lend themselves to frameworks such as sense-making (Dervin, 1992) and everyday life information seeking (Savolainen, 2010). Furthermore, predictors that focus on the features of the channel, for instance its accessibility, suggest frameworks such as media richness theory (Trevino et al., 1987) and the technology acceptance models (Venkatesh et al., 2003). While the reviewed studies make reference to these frameworks, the studies assign primacy to the empirical phenomena rather than to theory development. With respect to possibilities for theory development, it should be noted that the above-mentioned frameworks share a primary focus on the individual person and, thereby, relegate interpersonal aspects to the periphery. As a result, they tend to under-recognize the multiple ways in which the interpersonal aspects of information behavior are integral to citizens' e-government use. A framework such as collaborative information seeking may help appreciate the interpersonal aspects (see, e.g., Hertzum, 2017; Wei et al., 2022).

4.4 Link from behavior to outcome is unclear

Most studies of citizens' e-government information behavior stop short of investigating the outcome of the behavior. The studies that investigate outcomes yield mixed results. Thus, we know quite a bit about how citizens experience and interact with e-government but less about whether their needs for information and other outcomes are resolved. It appears that e-government on its own is most suited for simpler problems and that more complex problems require combining e-government with interpersonal sources. This overall finding corresponds with studies outside of e-government, which find that people increasingly turn to other people, as opposed to documents, when their information needs are more complex (e.g., Byström, 2002). Contrary to documents, people can help tailor information to the specifics of the situation in which the information is needed. Future work should link e-government information behavior to outcomes in a more detailed manner.

4.5 Limitations

Three limitations should be remembered in interpreting the results of this review. First, the reviewed papers were selected and analyzed by one person (the author). An additional coder would have provided for validating the selection and analysis of the papers. The quality of the selection and analysis was bolstered by the systematic process, but the author acknowledges that the absence of a validation is a limitation. Second, the literature on e-government technology acceptance provides a related, but different, perspective on channel choice. A few studies from this literature have been included in this review because they investigated information behavior. However, most have been excluded because they are about the intention to use e-government rather than the actual behavior. E-government technology acceptance is reviewed elsewhere (e.g., Dwivedi et al., 2017; Rana et al., 2015). A synthesis of the literatures on e-government information behavior and e-government technology acceptance is left for future work. Third, this review is about citizens' information behavior in relation to e-government. Another important user group is the government staff. Their information behavior in relation to e-government has, for example, been studied by Svarre and Lykke (2013). Because their information behaviors are intertwined, it would be interesting to compare how these two user groups experience and interact with e-government.

5 Conclusion

Returning to the report that triggered this review, the frequent need to enlist help from interpersonal sources is not specific to Denmark but a general finding across the 53 reviewed studies. By using a

combination of channels, citizens assemble a resource with the combined quality, accessibility, and non-utilitarian features they need to accomplish their government-related information behavior. The rich set of criteria in citizens' perception of e-government is a testament to the nuanced considerations involved in assembling this combined resource. In conclusion, this review has three implications:

First, citizens' e-government information behavior has a lot in common with information behaviors in other domains, but it also accentuates certain facets of information behavior. The former shows the potential for information-behavior research to enrich e-government studies, many of which are not informed by this research. The latter shows how the reviewed studies call increased attention to, for example, the simultaneous use of multiple channels, the influence of non-utilitarian criteria on channel choice, and the need for receipts and people to hold accountable in case acquired or submitted information is later contested.

Second, mixed findings are common, in particular with respect to the criteria that help predict how e-government is perceived and channels chosen. The mixed findings reflect an insufficient understanding of the conditions under which the findings from a specific study apply. To improve this state of affairs, future studies must discuss and compare their findings with reference to the demographic, situational, and channel-related characteristics they share and do not share. More studies should also incorporate the link from behavior to outcomes.

Third, interpersonal sources, both lay and professional, are integral to citizens' e-government information behavior. Yet, theoretical frameworks for understanding information behavior tend to focus on the individual citizen. Future work should investigate and theorize the information behavior of interpersonal units such as households and the triad of citizen, caseworker, and e-government. A practical implication of such theorizing may be to inform the design of e-government services that are suitable for individual use as well as household use.

Appendix

List of the 53 included studies. The list gives the reference to the study, the country in which it was conducted, the method of data collection, the number of study participants, and the kind of participants.

Reference	Country	Method	No. of p.	Participants
Abad-Alcalá et al. (2017)	Spain	Focus groups	28	Senior citizens
Al-Shafi and Weerakkody (2007)	Qatar	Survey	60	General population
Awer et al. (2016)	Afghanistan	Survey	180	Urban citizens
Becker et al. (2008)	Germany	Survey	21160	General population
Bélanger and Carter (2009)	US	Survey	105	General population
Bernhard (2020)	Sweden	Interviews	21	General population
Böhm et al. (2010)	Germany	Survey	319	Expatriates
Botric and Bozic (2021)	Europe	Survey	56388	Young and senior citizens
Brazier and Harvey (2017)	UK	Lab experiment	10	English-as-a-second-language students
Cecchini and Raina (2005)	India	Survey	365	Rural citizens
Cerda et al. (2018)	Mexico	Survey	330	General population
Cestnik and Kern (2014)	Slovenia	Field study	614	Applicants for low-rent flats
Choudrie et al. (2013)	UK	Survey	179	Senior citizens
Criado and Barrero (2014)	Spain	Survey	2500	General population
Cullen (2005)	New Zealand	Focus groups	41	Six population sub groups

Cullen et al. (2003)	New Zealand	Survey	589	E-government users
Delitheou and Maraki (2010)	Greece	Survey	300	General population
Distel and Becker (2017)	Germany	Interviews	18	General population
Dombrowski et al. (2014)	US	Interviews	20	Outreach workers
Ebbers et al. (2016)	Netherlands	Survey	779	Urban citizens
Farhan and Sanderson (2010)	Kuwait	Survey	229	Library users
Fisher et al. (2010)	US	Survey + case studies	1130	General population
Fröhlich et al. (2020)	Namibia	Survey	62	Marginalized citizens
Gauld et al. (2010)	Australia + New Zealand	Survey	933	General population
Gibson et al. (2009)	US	Survey	210	Library users
Gracia et al. (2012)	Spain	Survey	403	E-government users
Gupta and Maurya (2020)	India	Survey	358	E-government users
Heierhoff and Hofmann (2012)	Germany	Survey	103	Urban citizens
Hujran et al. (2013)	Jordan	Survey	356	General population
Jaeger et al. (2012)	US	Survey	8000	Public libraries
Kumar et al. (2018)	India	Survey	382	General population
Lee and Porumbescu (2019)	South Korea	Survey	5426	General population and disabled citizens
Li et al. (2005)	Singapore	Survey	1016	General population
Madsen and Kræmmergaard (2015)	Denmark	Interviews	37	Single parents
Møller (2018)	Denmark	Interviews	18	Citizens receiving e-gov guidance from librarians
Niehaves et al. (2008)	Germany	Survey	21160	General population
Plattfaut et al. (2013)	Germany + Australia	Survey	1205	General population
Reddick (2005)	US	Survey	1833	General population
Reddick (2012)	US	Survey	686	General population
Reddick and Turner (2012)	Canada	Survey	6743	General population
Reddick et al. (2012)	Egypt	Survey	1191	General population
Roy et al. (2015)	Canada	Focus groups	24	Rural citizens
Sharma and Mishra (2017)	India	Survey	328	Rural citizens
Singh et al. (2008)	Australia	Survey	192	Urban citizens
Stanziola et al. (2006)	Argentina	Survey	1832	General population
Sweeney (2007)	Australia	Interviews	18	General population
Taylor (2018)	US	Interviews etc.	37	Youth
Van de Walle et al. (2018)	Latvia	Interviews	141	E-government non-users
Wang (2014)	China	Interviews	51	General population
Wang and Chen (2012)	China	Survey	139	Migrant farmers
Weerakkody et al. (2013)	Saudi Arabia	Survey	502	Urban citizens
Yang (2017)	China	Survey	605	Urban citizens
Yonazi et al. (2010)	Tanzania	Interviews	34	Staff and citizens

References

Abad-Alcalá, L., Llorente-Barroso, C., Sanchez-Valle, M., Viñarás-Abad, M. and Pretel-Jiménez, M. (2017), "Electronic government and online tasks: Towards the autonomy and empowerment of senior citizens", *El Profesional de la Información*, Vol. 26 No. 1, pp. 34-42. https://doi.org/10.3145/epi.2017.ene.04

Abrahamson, J.A. and Fisher, K.E. (2007), "'What's past is prologue': Towards a general model of lay information mediary behaviour", *Information Research*, Vol. 12 No. 4, article colis15. http://InformationR.net/ir/12-4/colis/colis15.html

Al-Shafi, S. and Weerakkody, V. (2007), "Exploring e-government in the state of Qatar: Benefits, challenges, and complexities", in *EMCIS2007: Proceedings of the European and Meditterranean Conference on Information Systems*, Polytechnic University of Valencia, Valencia, Spain, pp. 1-19.

Atwood, R. and Dervin, B. (1981), "Challenges to sociocultural predictors of information seeking: A text on race versus situation movement state", *Annals of the International Communication Association*, Vol. 5 No. 1, pp. 549-569. https://doi.org/10.1080/23808985.1981.11923862

Awer, M.A., Esichaikul, V., Rehman, M. and Anjum, M. (2016), "E-government services evaluation from citizen satisfaction perspective: A case of Afghanistan", *Transforming Government: People, Process and Policy*, Vol. 10 No. 1, pp. 139-167. https://doi.org/10.1108/TG-03-2015-0017

Becker, J., Niehaves, B., Bergener, P. and Räckers, M. (2008), "Digital divide in eGovernment: The eInclusion gap model", in *EGOV2008: Proceedings of the International Conference on Electronic Government*, Springer, Berlin, pp. 231-242. https://doi.org/10.1007/978-3-540-85204-9_20

Bélanger, F. and Carter, L. (2009), "The impact of the digital divide on e-government use", *Communications of the ACM*, Vol. 52 No. 4, pp. 132-135. https://doi.org/10.1145/1498765.1498801

Berger, J.B., Hertzum, M. and Schreiber, T.L. (2016), "Does local government staff perceive digital communication with citizens as improved service?", *Government Information Quarterly*, Vol. 33 No. 2, pp. 258-269. https://doi.org/10.1016/j.giq.2016.03.003

Bernhard, I. (2020), "Incentives for inclusive e-government: The implementation of contact centers in Swedish municipalities", in *Open Government: Concepts, Methodologies, Tools, and Applications*, IGI Global, Hershey, PA, pp. 60-85. https://doi.org/10.4018/978-1-5225-9860-2.ch005

Böhm, K., Wolf, P. and Krcmar, H. (2010), "Context oriented structuring of eGovernment services - An empirical analysis of the information demand of expatriates in Germany", in *HICSS2010: Proceedings of the Hawaii International Conference on System Sciences*, IEEE, New York, pp. 1-10. https://doi.org/10.1109/HICSS.2010.120

Botric, V. and Bozic, L. (2021), "The digital divide and e-government in European economies", *Economic Research*. https://doi.org/10.1080/1331677X.2020.1863828

Brazier, D. and Harvey, M. (2017), "E-government and the digital divide: A study of English-as-a-second-language users' information behavior", in *ECIR2017: Proceedings of the European Conference on Information Retrieval* (Vol. LNCS 10193), Springer, Cham, pp. 266-277. https://doi.org/10.1007/978-3-319-56608-5_21

Bruce, C. (1997), *The seven faces of information literacy*, Auslib Press, Blackwood, Australia.

Byström, K. (2002), "Information and information sources in tasks of varying complexity", *Journal of the American Society for Information Science and Technology*, Vol. 53 No. 7, pp. 581-591. https://doi.org/10.1002/asi.10064

Case, D.O. and Given, L.M. (2016), *Looking for information: A survey of research on information seeking, needs, and behavior* (4th ed.), Emerald, Bingley, UK.

Cecchini, S. and Raina, M. (2005), "Electronic government and the rural poor: The case of Gyandoot", *Information Technologies and International Development*, Vol. 2 No. 2, pp. 65-75.

Cerda, A.B.N., Martinez, M.C.V. and Gaeta, J.C.L. (2018), "Electronic government and social satisfaction: An analysis of social conditions for Tijuana", *Public Administration Issues* No. 6, pp. 84-97. https://doi.org/10.17323/1999-5431-2018-0-6-84-97

Cestnik, B. and Kern, A. (2014), "Administrative and digital literacy: The legend or myth in e-government", in Janssen, M.F.W.H.A., Bannister, F., Glassey, O., Jochen, H., Tambouris, E., Wimmer, M.A. and Macintosh, A. (Eds.), *Electronic Government and Electronic Participation*, IOS Press, Amsterdam, pp. 216-223. https://doi.org/10.3233/978-1-61499-429-9-216

Choudrie, J., Ghinea, G. and Songonuga, V.N. (2013), "Silver surfers, e-government and the digital divide: An exploratory study of UK local authority websites and older citizens", *Interacting with Computers*, Vol. 25 No. 6, pp. 417-442. https://doi.org/10.1093/iwc/iws020

Criado, J.I. and Barrero, D.F. (2014), "Analyzing the digital divide and electronic government demand: An empirical research of the Spanish case", in Rodríguez-Bolívar, M.P. (Ed.), *Measuring E-Government Efficiency: The Opinions of Public Administrators and Other Stakeholders*, Springer, New York, pp. 213-232. https://doi.org/10.1007/978-1-4614-9982-4_12

Cullen, R. (2005), "E-government, A citizens' perspective", *Journal of E-Government*, Vol. 1 No. 3, pp. 5-28. https://doi.org/10.1300/J399v01n03_02

Cullen, R., O'Connor, D. and Veritt, A. (2003), "An evaluation of local government websites in New Zealand", *Journal of Political Marketing*, Vol. 2 No. 3-4, pp. 184-211. https://doi.org/10.1300/J199v02n03_11

Delitheou, V. and Maraki, M. (2010), "Research into citizens' attitude towards electronic municipal services (e-local government)", *Journal of Public Administration and Policy Research*, Vol. 2 No. 3, pp. 39-45. https://doi.org/10.5897/JPAPR.9000046

Dervin, B. (1992), "From the mind's eye of the user: The sense-making qualitative-quantitative methodology", in Glazier, J.D. and Powell, R.R. (Eds.), *Qualitative Research on Information Management*, Libraries Unlimited, Englewood, CO, pp. 61-84.

Distel, B. and Becker, J. (2017), "All citizens are the same, aren't they? - Developing an e-government user typology", in *EGOV2017: Proceedings of the International Conference on Electronic Government* (Vol. LNCS 10428), Springer, Cham, pp. 336-347. https://doi.org/10.1007/978-3-319-64677-0_28

Dombrowski, L., Hayes, G.R., Mazmanian, M. and Voida, A. (2014), "E-government intermediaries and the challenges of access and trust", *ACM Transactions on Computer-Human Interaction*, Vol. 21 No. 2, article 13. https://doi.org/10.1145/2559985

Dwivedi, Y., Rana, N.P., Janssen, M., Lal, B., Williams, M.D. and Clement, M. (2017), "An empirical validation of a unified model of electronic government adoption (UMEGA)", *Government Information Quarterly*, Vol. 34 No. 2, pp. 211-230. https://doi.org/10.1016/j.giq.2017.03.001

Ebbers, W.E., Jansen, M.G.M. and van Deursen, A.J.A.M. (2016), "Impact of the digital divide on e-government: Expanding from channel choice to channel usage", *Government Information Quarterly*, Vol. 33 No. 4, pp. 685-692. https://doi.org/10.1016/j.giq.2016.08.007

Farhan, H.R. and Sanderson, M. (2010), "User's satisfaction of Kuwait e-government portal: Organization of information in particular", in *EGES2010: Proceedigs of the International Conference on E-Government and E-Services*, Springer, Berlin, pp. 201-209. https://doi.org/10.1007/978-3-642-15346-4_16

Fidel, R. and Green, M. (2004), "The many faces of accessibility: Engineers' perception of information sources", *Information Processing & Management*, Vol. 40 No. 3, pp. 563-581. https://doi.org/10.1016/S0306-4573(03)00003-7

Fisher, K.E., Becker, S. and Crandall, M. (2010), "eGovernment services use and impact through public libraries: Preliminary findings from a national study of public access computing in public libraries", in *HICSS2010: Proceedings of the Hawaii International Conference on System Sciences*, IEEE, New York, pp. 1-10. https://doi.org/10.1109/HICSS.2010.451

Fröhlich, K., Nieminen, M. and Pinomaa, A. (2020), "Assessing the e-readiness of marginalised communities for e-government services: A case of Oniipa, Namibia", in *InterSol2020:*

Proceedings of the International Conference on Innovations and Interdisciplinary Solutions for Underserved Areas, Springer Nature, Cham, pp. 149-163. https://doi.org/10.1007/978-3-030-51051-0_11

Gauld, R., Goldfinch, S. and Horsburgh, S. (2010), "Do they want it? Do they use it? The 'demand-side' of e-government in Australia and New Zealand", *Government Information Quarterly*, Vol. 27 No. 2, pp. 177-186. https://doi.org/10.1016/j.giq.2009.12.002

Gibson, A.N., Bertot, J.C. and McClure, C.R. (2009), "Emerging role of public librarians as e-government providers", in *HICSS2009: Proceedings of the Hawaii International Conference on System Sciences*, IEEE, New York, pp. 1-10. https://doi.org/10.1109/HICSS.2009.183

Gracia, D.B., Arino, L.V.C. and Blanco, C.F. (2012), "Understanding the influence of social information sources on e-government adoption", *Information Research*, Vol. 17 No. 3, article 531. informationr.net/ir/17-3/paper531.html

Gupta, K.P. and Maurya, H. (2020), "The role of access convenience of common service centers (CSCs) in the continued use of e-government", *Digital Policy, Regulation and Governance*, Vol. 22 No. 5-6, pp. 437-453. https://doi.org/10.1108/DPRG-06-2019-0046

Heierhoff, L. and Hofmann, S. (2012), "Adoption of municipal e-government services - A communication problem?", in *AMCIS2012: Proceedings of the Americas Conference on Information Systems*, AIS, Atlanta, GA. https://aisel.aisnet.org/amcis2012/proceedings/EGovernment/7

Hertzum, M. (2002), "The importance of trust in software engineers' assessment and choice of information sources", *Information & Organization*, Vol. 12 No. 1, pp. 1-18. https://doi.org/10.1016/S1471-7727(01)00007-0

Hertzum, M. (2014), "Expertise seeking: A review", *Information Processing & Management*, Vol. 50 No. 5, pp. 775-795. https://doi.org/10.1016/j.ipm.2014.04.003

Hertzum, M. (2017), "Collaborative information seeking and expertise seeking: Different discourses about similar issues", *Journal of Documentation*, Vol. 73 No. 5, pp. 858-876. https://doi.org/10.1108/JD-04-2016-0053

Hujran, O.A., Aloudat, A. and Altarawneh, I. (2013), "Factors influencing citizen adoption of e-government in developing countries: The case of Jordan", *International Journal of Technology and Human Interaction*, Vol. 9 No. 2, article 1. https://doi.org/10.4018/jthi.2013040101

Jaeger, P.T. and Bertot, J.C. (2011), "Responsibility rolls down: Public libraries and the social and policy obligations of ensuring access to e-government and government information", *Public Library Quarterly*, Vol. 30 No. 2, pp. 91-116. https://doi.org/10.1080/01616846.2011.575699

Jaeger, P.T., Greene, N.N., Bertot, J.C., Perkins, N. and Wahl, E.E. (2012), "The co-evolution of e-government and public libraries: Technologies, access, education, and partnerships", *Library & Information Science Research*, Vol. 34 No. 4, pp. 271-281. https://doi.org/10.1016/j.lisr.2012.06.003

Jaeger, P.T. and Thompson, K.M. (2004), "Social information behavior and the democratic process: Information poverty, normative behavior, and electronic government in the United States", *Library & Information Science Research*, Vol. 26 No. 1, pp. 94-107. https://doi.org/10.1016/j.lisr.2003.11.006

Kumar, R., Sachan, A. and Mukherjee, A. (2017), "Qualitative approach to determine user experience of e-government services", *Computers in Human Behavior*, Vol. 71, pp. 299-306. https://doi.org/10.1016/j.chb.2017.02.023

Kumar, R., Sachan, A. and Mukherjee, A. (2018), "Direct vs indirect e-government adoption: An exploratory study", *Digital Policy, Regulation and Governance*, Vol. 20 No. 2, pp. 149-162. https://doi.org/10.1108/DPRG-07-2017-0040

Lee, J.B. and Porumbescu, G.A. (2019), "Engendering inclusive e-government use through citizen IT training programs", *Government Information Quarterly*, Vol. 36 No. 1, pp. 69-76. https://doi.org/10.1016/j.giq.2018.11.007

Li, H., Detenber, B.H., Lee, W.P. and Chia, S. (2005), "E-government in Singapore: Demographics, usage patterns, and perceptions", *Journal of E-Government*, Vol. 1 No. 3, pp. 29-54. https://doi.org/10.1300/J399v01n03_03

Lu, L. and Yuan, Y.C. (2011), "Shall I google it or ask the competent villain down the hall? The moderating role of information need in information source selection", *Journal of the American Society for Information Science and Technology*, Vol. 62 No. 1, pp. 133-145. https://doi.org/10.1002/asi.21449

Madsen, C.Ø. and Kræmmergaard, P. (2015), "The efficiency of freedom: Single parents' domestication of mandatory e-government channels", *Government Information Quarterly*, Vol. 32 No. 4, pp. 380-388. https://doi.org/10.1016/j.giq.2015.09.008

Møller, M.H. (2018), "Guidance practices for citizens' interactions with e-government solutions", in Dohn, N.B. (Ed.), *Designing for Learning in a Networked World*, Routledge, London, pp. 232-250.

Nam, T. (2014), "Determining the type of e-government use", *Government Information Quarterly*, Vol. 31 No. 2, pp. 211-220. https://doi.org/10.1016/j.giq.2013.09.006

Niehaves, B., Bergener, P., Räckers, M. and Becker, J. (2008), "You got e-government? A quantitative analysis of social in- and exclusiveness of electronic public service delivery", in *ECIS2008: Proceedings of the European Conference on Information Systems*, AIS, Atlanta, GA. https://aisel.aisnet.org/ecis2008/32

Plattfaut, R., Kohlborn, T., Hofmann, S., Beverungen, D., Niehaves, B., Räckers, M. and Becker, J. (2013), "Unravelling (e-)government channel selection: A quantitative analysis of individual customer preferences in Germany and Australia", in *HICSS2013: Proceedings of the Hawaii International Conference on System Sciences*, IEEE, New York, pp. 1983-1991. https://doi.org/10.1109/HICSS.2013.585

Rana, N., Dwivedi, Y.K. and Williams, M.D. (2015), "A meta-analysis of existing research on citizen adoption of e-government", *Information Systems Frontiers*, Vol. 17 No. 3, pp. 547-563. https://doi.org/10.1007/s10796-013-9431-z

Reddick, C.G. (2005), "Citizen-initiated contacts with government: Comparing phones and websites", *Journal of E-Government*, Vol. 2 No. 1, pp. 27-53. https://doi.org/10.1300/J399v02n01_03

Reddick, C.G. (2012), "Comparing citizens' use of e-government to alternative service channels", in *Digital Democracy: Concepts, Methodologies, Tools, and Applications*, IGI Global, Hershey, PA, pp. 1090-1104. https://doi.org/10.4018/978-1-4666-1740-7.ch053

Reddick, C.G., Abdelsalam, H.M.E. and Elkadi, H.A. (2012), "Channel choice and the digital divide in e-government: The case of Egypt", *Information Technology for Development*, Vol. 18 No. 3, pp. 226-246. https://doi.org/10.1080/02681102.2011.643206

Reddick, C.G. and Turner, M. (2012), "Channel choice and public service delivery in Canada: Comparing e-government to traditional service delivery", *Government Information Quarterly*, Vol. 29 No. 1, pp. 1-11. https://doi.org/10.1016/j.giq.2011.03.005

Rogers, E.M. (2001), "The digital divide", *Convergence*, Vol. 7 No. 4, pp. 96-111. https://doi.org/10.1177/135485650100700406

Roy, M.-C., Chartier, A., Crête, J. and Poulin, D. (2015), "Factors influencing e-government use in non-urban areas", *Electronic Commerce Research*, Vol. 15, pp. 349-363. https://doi.org/10.1007/s10660-015-9193-4

Saracevic, T. (2017), *The notion of relevance in information science: Everybody knows what relevance is. But what is it really?* , Morgan & Claypool, San Rafael, CA. https://doi.org/10.2200/S00723ED1V01Y201607ICR050

Savolainen, R. (2010), "Everyday life information seeking", in Bates, M.J. and Maack, M.N. (Eds.), *Encyclopedia of Library and Information Science, Third Edition*, CRC Press, Boca Raton, FL, pp. 1780-1789. https://doi.org/10.1081/E-ELIS3-120043920

Sharma, R. and Mishra, R. (2017), "Investigating the role of intermediaries in adoption of public access outlets for delivery of e-government services in developing countries: An empirical

study", *Government Information Quarterly*, Vol. 34 No. 4, pp. 658-679. https://doi.org/10.1016/j.giq.2017.10.001

Singh, M., Sarkar, P., Dissanayake, D. and Pittachayawa, S. (2008), "Diffusion of e-government services in Australia: Citizens' perspectives", in *ECIS2008: Proceedings of the European Conference on Information Systems*, AIS, Atlanta, GA. https://aisel.aisnet.org/ecis2008/197

Stanziola, E., Espil, M.M., Landoni, L. and Montoya, S. (2006), "Hidden negative social effects of poor e-government services design", in *EGOV2006: Proceedings of the International Conference on Electronic Government* (Vol. LNCS 4084), Springer, Berlin, pp. 150-161. https://doi.org/10.1007/11823100_14

Statistics Denmark. (2020), *It-anvendelse i befolkningen 2020 [IT use in the population 2020]*, Statistics Denmark, Copenhagen, Denmark.

Svarre, T. and Lykke, M. (2013), "Professional e-government seeking behavior", *Proceedings of the American Society for Information Science and Technology*, Vol. 50 No. 1, pp. 1-10. https://doi.org/10.1002/meet.14505001078

Sweeney, A.D.P. (2007), "Electronic government-citizen relationships: Exploring citizen perspectives", *Journal of Information Technology & Politics*, Vol. 4 No. 2, pp. 101-116. https://doi.org/10.1080/19331680802076165

Taylor, N.G. (2018), "Youth information-seking behavior and online government information: Tweens' perceptions of US federal government websites", *Journal of Documentation*, Vol. 74 No. 3, pp. 509-525. https://doi.org/10.1108/JD-06-2017-0093

Trevino, L.K., Lengel, R.H. and Daft, R.L. (1987), "Media symbolism, media richness, and media choice in organizations: A symbolic interactionist perspective", *Communication Research*, Vol. 14 No. 5, pp. 553-574. https://doi.org/10.1177/009365087014005006

Van de Walle, S., Zeibote, Z., Stacenko, S., Muravska, T. and Migchelbrink, K. (2018), "Explaining non-adoption of electronic government services by citizens: A study among non-users of public e-services in Latvia", *Information Polity*, Vol. 23 No. 4, pp. 399-409. https://doi.org/10.3233/IP-170069

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), "User acceptance of information technology: Toward a unified view", *MIS Quarterly*, Vol. 27 No. 3, pp. 425-478. https://doi.org/10.2307/30036540

Wang, F. (2014), "Explaining the low utilization of government websites: Using a grounded theory approach", *Government Information Quarterly*, Vol. 31 No. 4, pp. 610-621. https://doi.org/10.1016/j.giq.2014.04.004

Wang, F. and Chen, Y. (2012), "From potential users to actual users: Use of e-government service by Chinese migrant farmer workers", *Government Information Quarterly*, Vol. 29 No. supplement 1, pp. S98-S111. https://doi.org/10.1016/j.giq.2011.08.007

Weerakkody, V., El-Haddadeh, R., Al-Sobhi, F., Shareef, M.A. and Dwivedi, Y.K. (2013), "Examining the influence of intermediaries in facilitating e-government adoption: An empirical investigation", *Government Information Quarterly*, Vol. 33 No. 5, pp. 716-725. https://doi.org/10.1109/HICSS.2013.585

Wei, W., Munteanu, C. and Halvey, M. (2022), "Partners in life and online search: Investigating older couples' collaborative information seeking", in *Proceedings of the CHIIR2022 Conference on Human Information Interaction and Retrieval*, ACM, New York.

West, D.M. (2004), "E-government and the transformation of service delivery and citizen attitudes", *Public Administration Review*, Vol. 64 No. 1, pp. 15-27. https://doi.org/10.1111/j.1540-6210.2004.00343.x

Wilson, T.D. (2000), "Human information behavior", *Informing Science*, Vol. 3 No. 2, pp. 49-56. https://doi.org/10.28945/576

Yang, Y. (2017), "E-government services adoption in a Chinese municipality", *Future Internet*, Vol. 9 No. 3, article 53. https://doi.org/10.3390/fi9030053

Yonazi, J., Sol, H. and Boonstra, A. (2010), "Exploring issues underlying citizen adoption of eGovernment initiatives in developing countries: The case of Tanzania", *Electronic Journal of e-Government*, Vol. 8 No. 2, pp. 176-188.