Alsulaimani, A and Ozuem, W (2022) Understanding the role of transparency, participation, and collaboration for achieving open digital government goals in Oman, *Transforming Government: People, Process and Policy, accepted in July 2022*

Understanding the role of transparency, participation, and collaboration for achieving open digital government goals in Oman

Alsulaimani, A and Ozuem, W

University of Cumbria

Abstract

Purpose

This study sets out to understand the roles of transparency, participation, and collaboration in pursuit of achieving open digital government goals in Oman. The study explores the extent to which these interactive digital apps and other initiatives can enhance digital transparency, collaboration, and public participation to achieve ODG goals.

Method

The study has used triangulation of qualitative method by selecting semi-structured interviews, focus group interviews, and public user reviews of ODG apps.

Findings

The current research found that collaboration among institutions and transparency of actions and operations besides citizens' participation in ODG enhances the trust to use ODG services. Therefore, a research framework is devised for synthesizing the significance of public participation and transparency where the aim is to facilitate collaboration among institutions with the purpose to achieve ODG goals. Such collaboration is highly useful for enhancing the ODG public value chain as well as achieving the ODG goals.

Implications:

This study has recommended practical implications for public institutions and IT developers to work collaboratively with the purpose to address the issues of interactivity and compatibility in ODG apps that can enhance public participation and improve the public value chain.

Originality:

This study has used the institutional theoretical support to build a research framework that can extends our understanding that what factors can play role to achieve ODG goals.

Keywords: Participation, transparency, collaboration, interactive apps, emerging technologies, augmented reality, stakeholders.

Introduction

The use of interactive apps and emerging technologies such as augmented and virtual reality increased the engagement and participation of public therefore, they can play their role for helping the government to achieve ODG goals (Bonina & Eaton, 2020; Carnevale, 2017; Kassen, 2020). Other studies highlighted the importance of ODG that it facilitates the collaboration, participation of citizens for improve the public value chain (McBride et al., 2019; Meiling, 2021). However, these studies did not provide understanding how institutional collaboration and participation can play role to achieve ODG goals. Although many previous studies have looked at the importance of public participation (Lin, & Simmons, 2017; Sandoval-Almazan, & Gil-Garcia, 2012; Gagliardi et al., 2017; Lee et al., 2017), and collaboration (Picazo-Vela et al., 2018; Sandoval-Almazan, & Gil-Garcia, 2012) the extent to which these interactive digital apps and other initiatives can enhance digital transparency, collaboration, and public participation has yet to be explored. This study addresses that knowledge gap, and the findings are positioned to help ODGs across the world to increase rates of public participation in initiatives to improve digital transparency and the performance of ODG services.

The transparency of operations and the participation of the public can be helpful to generate support and data to enable collaboration between institutions (Picazo-Vela et al., 2018; Lee, & Kwak, 2012; Lněnička et al., 2022). Nam (2015) points out that collaboration and transparency amongst institutions is critical where the aim is to develop synergies to achieve ODG goals. This research therefore represents an effort to devise a research framework which can synthesize the significance of public participation and transparency to improve institutional collaboration. Such an improvement can help stakeholders to achieve their ODG goals. Such collaboration is especially useful where the aim is to improve the usefulness of interactive apps as a way to facilitate the achievement of ODG goals (Bonina & Eaton, 2020; Magalhaes & Roseira, 2020; Meiling, 2021). A research framework is therefore developed to help ODGs across the world to increase the public's participation in initiatives to improve digital transparency and the performance of ODG services.

Saxena (2018) reviewed secondary online data on ODG frameworks in Arab countries, however the major limitation of this study is that it was not based on real time data gathered from public users and government officials. It was therefore limited in its ability to understand how policy makers can improve and enhance digital transparency, collaboration, and public participation. Saxena (2018) noted the absence of previous research that has examined the link between elements such as public participation, transparency, and institutional collaboration in relation to ODG. This is particularly true in respect of Oman. Saxena (2018) pointed out a number of issues faced by Arab countries when seeking to implement ODG initiatives. These include a lack of awareness, gaps in expertise, cyber security challenges, and low public participation. According to Naeem, (2019) low levels of participation, expertise and awareness are subjective in nature and vary between cultures and contexts. Therefore, this study intends to inductively develop a research framework to help government more effectively use interactive apps and social media platforms to influence digital transparency, collaboration, and public participation in pursuit of their ODG goals. Practically, the results of this study can direct government in terms of how to effectively use interactive apps and social media platforms to influence digital transparency, collaboration, and public participation, and to achieve ODG goals.

Based on the above research gap, this study intends to address two research questions:

RQ1: What factors can help to increase public participation in ODG with the purpose to improve digital transparency and the performance of ODG services?

RQ2: To what extent can interactive digital apps and other initiatives enhance digital transparency, collaboration, and public participation with the purpose of achieving ODG goals?

Literature Review

The concept of digital government was introduced in the 1990s, and since then, different governments across the world have adopted it (Kahne, et al., 2019). The proponents of digital government state that it has increased economies of scale in the provision of services to citizens (Kahne, et al., 2019). Further, Bernhard, & O'Neill, (2018) state that digital government has enhanced the participation of citizens and promoted democratic norms. It has also increased the accountability of government and the transparency of its actions. As such, the concept has come to be widely studied (see for example Kaufmann, et al., 2017; Carolan, 2017; Janowski, 2015). Its purpose is to facilitate the adoption and implementation of ODG to help the public use the services and to enable the public to raise concerns where they perceive of a lack of transparency and few opportunities to participate (Picazo-Vela et al., 2018). Simonofski et al. (2021) argued t\hat such digital transformation can drive the involvement of citizens to achieve the wider citizen-oriented goals of smart cities. According to Castelnovo and Sorrentino (2018), cultures are unique, and understanding culture creates further understanding of change and reforms in public organizations. This can trigger an institutionalization process that gradually introduces core informal norms and values. This study specifically focuses on institutionalization processes in public sector organizations in Oman. It seeks to understand how such processes can influence information needs and whilst driving service improvements amongst public users to achieve ODG goals.

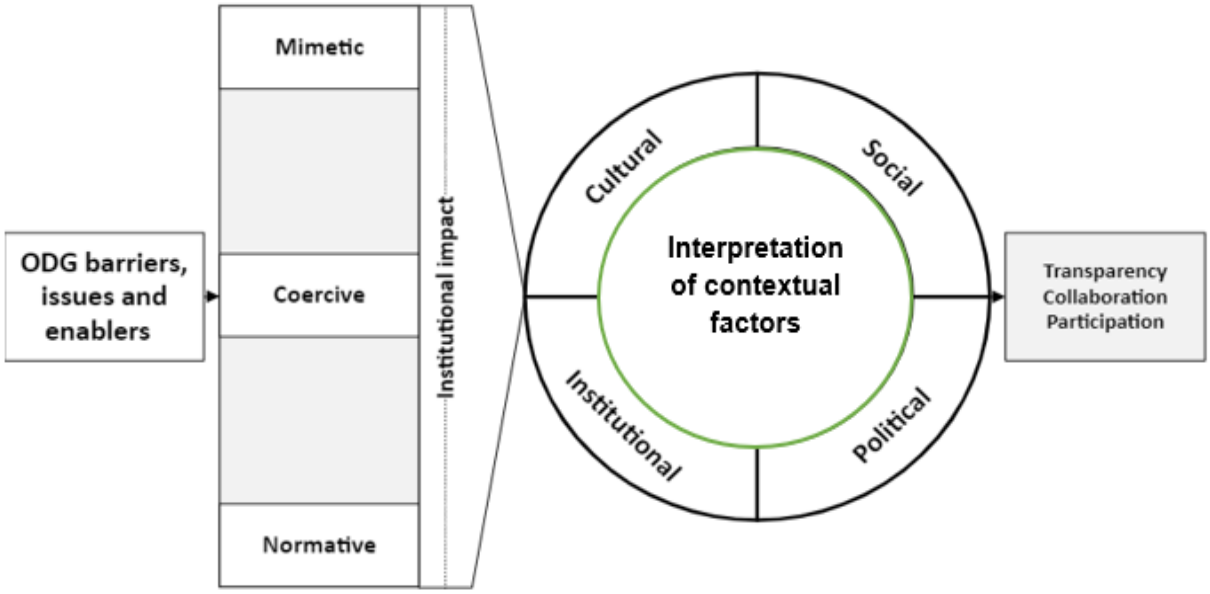
The words 'open' and 'transparency' are used interchangeably in the context of ODG (Shin et al., 2020). However, the existing research on the subject indicate that there is

conceptual difference between the two terms. Nam (2015) highlighted transparency as involving transparency of information whereas open means open or unrestricted availability of data. Reyes et al. (2014) and Worthy (2014) observed that ODG must be based on collaboration among institutions and participation of citizens. Lathrop & Ruma (2010) highlighted the meaning of ODG as a system which provides access to information, documents, and proceedings as well as involving the participation of citizens for co-creation of services. ODG is considered to be transparent when the data and information available on ODG platforms is open and involves citizens' participation (Nam, 2015). However, the literature suggests that the laws, processes, procedures and policies of ODG are generally regarded as complicated by people which is why it is imperative to engage citizens as co-creators of such services (Janssen, et al. 2012; Kassen, 2018).

ODG requires participation from public besides effectively managing several joint efforts (Nam, 2015). ODG requires transparency with respect to involvement of citizens in the engagement and co-creation process (Lee & Kwak, 2012). However, there is dearth of literature concerning the interconnectivity between transparency and citizens' participation in ODG initiatives. The ODG system is influenced by the demands of the systems because the system is intended for dispensing public services and to make information accessible for citizens (Reyes, et al. 2014; Worthy, 2014). Harrison et al. (2012) highlighted the meaning of transparency that it represents the accuracy of data and information available on ODG portals which must also be useful for the average citizens. Harrison et al. (2012) further pointed out the meaning of transparency in the context of ODG that it requires collaboration and participation of citizens for improving the ODG public value chain. Rapceviciene (2014) highlighted the significance of value chain theory for enhancing the utility of ODG for citizens and institutions. Yu (2008) indicated the need for understanding the values of institutions, citizens, businesses and culture prior to implementing the ODG system. Thus, the current research intends to devise a research framework which can be used for engaging administrative bodies, citizens, governmental agencies and other stakeholders for enhancing the public value chain of ODG.

This study uses institutional theory to understand which factors can help to increase the public's participation to improve digital transparency and the performance of ODG services. Institutional theory has been applied in different disciplines of the social sciences such as in political science, sociology, and organizational studies (Altayar 2018; Hinings et al., 2018; Peters, 2019). Institutional theory provides explanations of the legitimacy of organizational actions given the coercive, imitative, and normative forces behind them (DiMaggio & Powell, 1983; Peters, 2019). Previous authors have observed that institutionalized environments embody certain pressures (e.g., normative, coercive, and mimetic pressures) which influence public institutional operations in such environments. Public organizational cultures are unique, and centralized decision making, budget control, political involvement in hiring, a lack of interactive communication and low information sharing are some of the known challenges that can influence the effective implementation of advanced technologies (Aslam et al., 2016; Aslam et al., 2015). Since the culture of the public sector is unique due to the involvement of government, the institutional processes of decision making are often politicised. It is therefore important to understand how normative, coercive, and mimetic forces (collectively: institutional theory) influence transparency, collaboration, and participation. Based on the above discussion, this study culminates in the creation of a conceptual framework.

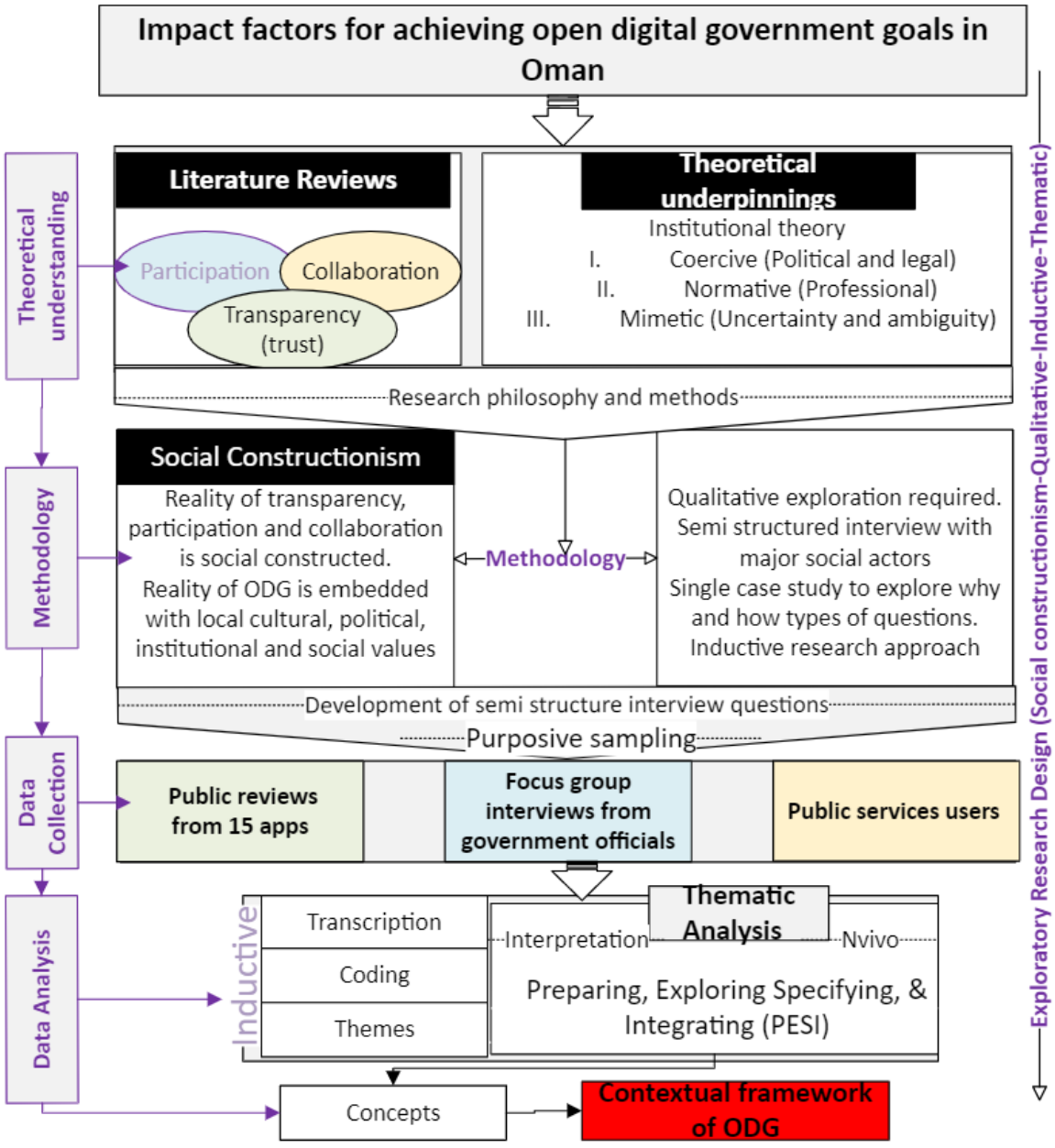
Figure 1: Conceptual framework



Research Methodology

The subjective realities differ from one country to another, from one culture to another and even from one social setting to another. Therefore, such insights can rightly be captured by using interpretivist data collection and analysis methods (Saxena, 2017). For example, there are numerous issues faced by the Arab countries negatively impacting the ODG related initiatives such as lack of awareness, low human capital, lack of knowledge, security problems, private issues, lack of support from stakeholders, and lack of standard in data (Saxena, 2018). Therefore, both influencing factors and ODG goals may vary across countries and cultures. The figure 2 has been that provides the summarize form of research process used in this study.

Figure 2: Research process



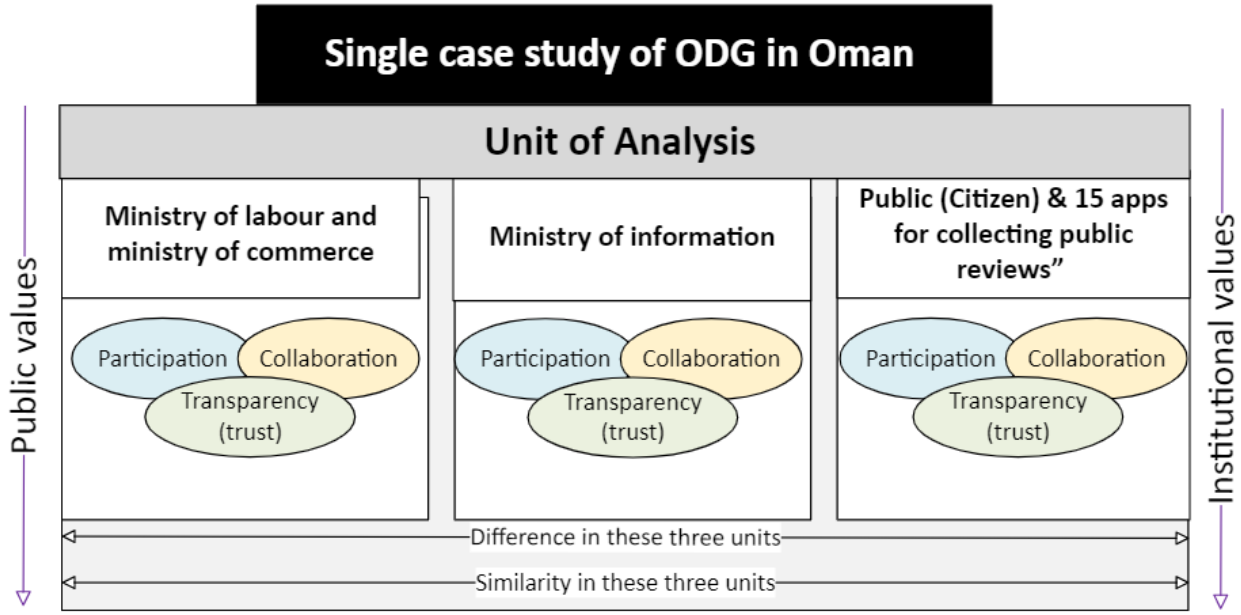
According to Naeem and Ozuem (2021), the triangulation of qualitative methods provides an opportunity to use multiple methods to gain rich insights from diverse sources which can be helpful to develop a theoretical research framework. According to Malamatidou (2017), the triangulation of qualitative methods allows researchers to collect data from multiple sources to obtain more trustworthy and generalizable results, compared to using a single qualitative data collection method. Therefore, this study triangulates qualitative

methods of data collection including semi-structured interviews, focus group interviews, and a review of public ODG apps to develop a research framework that can help government to effectively use interactive apps and social media platforms. This will enable them to influence digital transparency, collaboration, and public participation and it will help them to achieve their ODG goals.

Population and sampling

The Omani government has recently undertaken the initiative of ODG as they have established Oman Portal as part of Digital Transformation Program which is also referred to as digital government portal. Therefore, the portal is regarded as a single case study (See figure 3).

Figure 3: Single case study of ODG in Oman



Research by Saunders et al. (2018) and Naeem and Ozuem (2021) highlights that the saturation point (i.e., that point where the repetition of ideas begins) decides the number of participants in qualitative studies Thus, the researcher found that by applying the data saturation concept, a sample size of 25 citizens and 15 government officers was sufficient to conduct interviews (See appendices 1 and 2). By taking into account the views of these participants, the researcher was able to identify the key variables in terms of

transparency, collaboration and participation. Selecting respondents from different ministries proved helpful when it came to understanding the influence of ODG initiatives on organizations associated with public value chains. In terms of focus group discussions, the researcher was limited to 15 participants from the selected Omani ministries so that the institutional views over transparency, participation and institutional collaboration concerning ODG could be taken into account. These 15 participants all serve at local and federal government offices (See appendix 2).

The researcher selected the city of Muscat in Oman to draw sample and conduct semi-structured and focused group interviews. To know the public point of view, there is also a mobile application in place for providing different public services in the city which makes the ODG initiative in Muscat distinct from ODG initiatives taken by other local governments. Online reviews also proved helpful to understand public user points of view as regards interactive apps, social media, transparency, collaboration, and participation. It has also become possible for the citizens using this mobile application to connect in real time with city officials. Purposive sampling is highly useful in this regard to collect data because the researcher exercised his own judgment to only select those participants who are directly involved with the ODG initiative either as public officer or as user.

Data collection

The researcher designed the interview questions in the light of literature review to understand the result of ODG initiatives in Oman by focusing on institutional collaboration, participation and transparency. The researcher collected primary data through focused group discussions and semi-structured interviews to draw information about why, how and what type of questions (Waller et al., 2015). Focused group discussions and semi-structured interviews are widely being used in qualitative study due to their flexibility as well as their potential to draw more information. The technique is useful for both the researcher and the respondents to ask questions from each other by staying within the parameters of the overall purpose of the research (Waller et al., 2015). The criterion of selection is highlighted below:

Table 1: inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
They must be aged above 18 years of age.	Disability of the potential participant or suffering from some disease.
They must be employed in either of these ministries: Labour; Information; or Commerce -and- public users of ODG services.	Their employment is not directly concerned with developing and implementing ODG initiative. A public member lacking knowledge about ODG was also excluded.
The public officials must be associated directly with developing and implementing ODG.	A person unable to converse in English language was also excluded.
They participated in data collection drive on voluntary basis and could communicate in English.	Any participant who is not experienced in using Smartphone applications and the website of Omani government concerning ODG is also to be excluded.
Those citizens were selected for data collection who understood the aim and objectives of the research.	Any person lacking awareness about ODG is also to be excluded.

The selection of these ODG apps and its reviews can provide rich understanding regarding how much citizens are satisfied from the services and what barriers they have faced with respect to transparency, collaboration, and participation. The details of selected ODG apps for collecting the public reviews provided in table 2.

Table 2: Information about selected ODG apps

Apps Name	Use-case	Rating	Available for download
Pocketcarage (App 1)	Vehicle-related services	4.5/5	https://play.google.com/store/apps/details?id=pc.com.pocketcarage&hl=en_CA&gl=US
Government Apps Directory (App 2)	Information about various ministries apps and its services.	4.8/5	https://play.google.com/store/apps/details?id=com.ita.omanuna&hl=en&gl=US
iTrans (App 3)	Transport and track of packages, parcels, and goods	4.6/5	https://apps.apple.com/us/app/itrans/id1429556638
Nafith (App 4)	Services for teachers and parents who are dealing with special persons and autism patients.	4.5/5	https://play.google.com/store/apps/details?id=com.nafith.nafith_makhazen&hl=en_CA&gl=US
Official Donations App (App 5)	Total amount and distribution of donations to NGOs by ministry of social development	4.3/5	https://play.google.com/store/apps/details?id=com.om.donate&hl=en_CA&gl=US

National Subsidy System-NSS (App 6)	Offered fuel subsidies from government	4/5	https://apps.apple.com/in/app/national-subsidy-system/id1341464145
Tabseet (App 7)	Ministry of defence e-services access for customers, suppliers, and SMEs.	4.7/5	https://play.google.com/store/apps/details?id=com.modsg&hl=en_CA&gl=US
Public Authority for Radio and TV (App 8)	For watching Oman tv, radio, and its schedules.	3.6/5	https://play.google.com/store/apps/details?id=part.oman.com.part&hl=en&gl=US
Rafeeq (App 9)	Online grocery related services.	3/5	https://play.google.com/store/apps/details?id=com.gorafeeq.qatar&hl=en_CA&gl=US
Qada Platform (App 10)	Information about hearing schedules and court cases.	2.8/5	https://play.google.com/store/apps/details?id=com.caaj.Qada&hl=en_CA&gl=US
HEAC (App 11)	Providing data related to Higher education institutions and its locations.	2.7/5	https://apps.apple.com/om/app/%D8%A7%D9%84%D8%AA%D8%AD%D9%82/id1373609516
eFloos (App 12)	Secure, quick and easy payments	2.7/5	https://apps.apple.com/om/app/efloos/id1437741129
Tarassud (App 13)	Up to date information and statistics on current infectious diseases.	2.7/5	https://play.google.com/store/apps/details?id=om.gov.moh.tarassudapplication&hl=en_CA&gl=US
Be'ah (App 14)	Licenses, nature reserves, environmental events, regulations, and law related information provided by Ministry.	-	https://play.google.com/store/apps/details?id=com.beah.beah&hl=en&gl=US
Waqudi-NCSI (App 15)	Search, navigate, and locate petrol stations.	-	https://play.google.com/store/apps/details?id=om.gov.ncsi.waqudi&hl=en_CA&gl=US

Thematic analysis

Once the semi-structured, focused group interviews, and apps reviews data collection were done, the researcher conducted the data analysis using thematic analysis approach. Guest et al. (2011) observed that thematic analysis is helpful in generating theory on the subject by deeply understanding the phenomenon. Their responses were interpreted by using thematic analysis technique which then helped the researcher to generate research framework on the subject. The first stage of thematic analysis involves examining the response of the respondents and allocate primary codes. Subsequently, the codes are then explored further during second stage to generate subthemes. Finally, the third stage involves identifying the final themes and resultantly a final research framework is devised in the light of interpretation.

Findings and analysis

Main theme 1: ODG 2030 goals

Code: ODG performance

The e-Oman 2030 set a vision for bringing the digital transformation in Oman therefore they have set various goals related to leadership, smart public services, safe and secure services, trust in system security, and digitally skilled workers and smart workplaces. For example, one of the government officials shared the digital transformation goals which are "*"leadership in digital transformation and innovation to boost the performance and the prosperity of the society so no one in Oman should be at a major disadvantage or miss out in the digital future" (focus group, GO: 15).* Although Omanuna (ODG system) offering the various services related to 28 sectors and 15 mobile apps and these services are offered by 30 data providers, but these are not fully inclusive. Consequently, they have admitted about this fact and motivated to improve the level of performance *"as there are still so many sectors that are not completely accessible through ODG program so the ODG plans are that all public services are digitized, smart and inclusive that can help to improve performance" (focus group, GO: 3).* It is found that they have developed several goals which are directly associated with the services of ODG. For example, one of the government officials shared the detail of these 17 ODG 2030 goals *"I want to share some of our important seventeen goals through digital transformation such as sustainable performance, life on land, clean water and sanitation, responsibility production and consumption, gender equality, well-being and good health, economic growth and decent work, clean energy and affordability" (Interview, PU: 5).* These

digital transformation and inclusive public services can increase the open data quality and accessibility for citizens which ultimately increase their involvement for improving the public services performance.

Code: Interactive digital apps

There is need of time to introduce ODG dashboard as it is capable to produce high quality that is useful to bring improvement in public values such as accountability, transparency, safety, and security. For example, one of government policy makers shared the useful information about their ODG goals to improve public value: *"we are targeting to develop and introduce "data driven dashboard" as it is helpful to discuss the policy process and other important information related to decision making of government which can improve transparency and citizen participation in important decisions" (focus group, GO: 11).* The public users of various institutional services are satisfied from the quality of social, economic, and statistical information that really helped them to achieve their individual goals. For example, *"I found NCSI Geo app is helpful for getting social - economic statistical information about Sultanate of Oman through smart phone with a fast, modern and easy to use way to get required information on an interactive map" (Interview, PU: 11).* Results reveal that dashboard is need of time as it can provide inclusive and interactive services which can involve both citizens and institutions participation for offering public chain value co-creation. Although there are 15 mobile apps are offering services of 28 sectors of Oman. For example, some of these apps are tarassud (e.g., information about infectious diseases), Qada Platform (e.g., for court hearing and schedules), Rafeeq (e.g., online grocery delivery), eSehaty (e.g., digital health services), and Royal Oman police (e.g., for visa status, traffic violation, and other police related services). Some of these app services experiences shared by participates such as *"I have used the Waqudi app that offer tools to search, locate, and navigate to petrol stations. This app will help users to search for fuel stations by type or/and by available nearby facilities. It also provides routing, rating, and other features" (Interview, PU: 17).*

Code: Collaboration

The collaboration is one of the important factors for improving the performance of OGD as it focuses to involve public, departments, teams, and other stakeholders for improving the data quality and accessibility. Therefore, there is need to increase collaboration among various stakeholders for brining public value chain. For example, one of

government official shared experience *"the information asymmetry is overcome by providing more information and collaboration through digital strategic projects (e.g., information security, unified government network, electronic transactions law, e-payment Gateway, Oman e-governance framework, government e-services portal, and national IT training framework) which are at improvement stage" (focus group, GO: 13).* The ODG services are operated through different team and departments which are accountability and responsible for their services.

Code: Skills and resources

The Omani government is working to develop skilled and capable system and users so that they can reap the benefits during this digital era. It is an important that operating system, system of app, and system users should be capable to fulfil their individual and collective goals. Present government is conducting various public events for increasing the involvement of digital experts who can contribute for high quality digital services. For example, one of the public users shared some experiences "*I have attended different expo and other events which hare sponsored by government to give reward and appreciate the help of those who bring new ideas such as developing emerging apps that can help to offer segment-based services to disable, older, and children (Interview, PU: 17).* The government officials are collaboratively working with educational institutions and other stakeholders for improving the public value chain, for example, *"we are working through education system, so we are continuously developing content and transferring it through curriculum, experts, seminars, social media, workshops, and trainings" (Interview, PU: 7)*. Currently in Arab countries, there are many foreign experts who have prior practical experiences of ODG and work for different countries to improve their public value chain. For example, *"there are many foreign and national experts who are working collaboratively to use resources and develop skills that are useful to develop digital, proactive, interactive, and smart services" (Interview, PU: 20)*.

Main theme 2: Institutional influencing factors

Code: Digital participation

There are different smart phone apps as well as interactive platforms are introduced by Omani government so that they are provide transparent and high-quality services to people for getting their engagement and trust in ODG. Some digital platforms are

established where the professionals of different sectors can create visual context for transferring their skills for the betterment of other people in Oman. For example, *"I have used the edlal platform which is engaging by providing short visual content in order to share knowledge and skills with experts and professionals in Oman" (Interview, PU: 25).* The digital participation is increased through "Daleel1010" because it is helpful to grow local businesses and brands in Oman, for example, *"I really liked the information shared and inquiry facility about business, products, service & brands through Daleel1010 in Oman" (Interview, PU: 15).* Some users shared a digital platform and interactive app that introduced the Omani culture especially for foreigners who are either working or visiting this state, for example, *"I shared an app (Omani culture) with my relatives in Canada who did not know much about Omani culture, and they find really useful information about Sultans, cuisines, folklore, tourist destinations, festivals, main events, and traditional clothes" (Interview, PU: 2).* There is digital platform such as Nafith which is introduced for engaging the teachers, parents, and special children for their support and improvement in digital services.

Code: ODG policies

The OPG policies are system related procedures, intention and plans that ensure the transparency, accountability, and participation among stakeholders. The official shared information related to information security policies *"the information security policies are made by focusing on availability, integrity, proportionality, and confidentiality" (focus group, GO: 11).* The digital policy maker should focus to develop instructions in information security policies for the public institutions of Oman as it can help to conduct the risk assessment and suitable risk treatment for securing the confidential information of all stakeholders. For example, *"there is need to develop online participation related policies such as engaging the online users through Facebook, twitter, YouTube, RSS, discussion forms" (focus group, GO: 6).* To overcome information asymmetry and increasing the online participation, they are distributing information through social media platforms as it can provide useful and interactive discussion for transferring the transparent information and accountable for their actions based on accessible record of social media for everyone. For example, "*the government has given digital accessibility policies such as providing equal digital job opportunities and information to disable people the way it useful for non-disabled people" (focus group, GO: 13).* Findings reveal that the Omani policy makers have to work on digital accessibility

related policies to provide accessible and transparent services to disable and other people so that everyone can take equal benefits from the ODG services. These information transparency, accessibility, security, and participation related policies increase the trust of public for giving their feedback and improving the public value chain.

Code: Digital transparency

The digital transparency can be analysed through how much ODG system is capable to provide useful information, usability of ODG apps and website, facilitate to exchange information at other platforms, freedom to use any information, complete and accessible documents. For example, *"there are many documents which are either not accessible or offered in Arabic language while there are many Omani nationals who do not know the Arabic" (Interview, PU: 13).* It is found that many participants have reported that either the data available in interactive apps or available documents on ODG website cannot translate in other languages as a result it reduces the freedom to access and use information. For example, *"there are many documents available for consumer prices and transportation in excel sheet, but they should provide some videos and charts as just providing the information in simplest form is not useful" (Interview, PU: 18).* Although the ODG system is providing 355 datasets to public users that can fulfil the need of investors, developers, researchers, and citizens but they public users suggested that they should educate the people and present the data in charts for increasing the usefulness of data. Another major challenge for transparency is reported by a public user *"some of information about defence, sensitive research, civil servant identities, and national interests are never shared accurately or with source that limited the transparency and trust" (Interview, PU: 11).*

Code: ODG challenges

There are various digital challenges such as security concerns, IT experts and skills for emerging technologies, execution and support for digital transformation strategy, motivation to learn and use advance technologies, and decentralized decisions making. *"Sometimes you face authoritative challenges in decision making as you need approval for budget, hiring, and investing" (focus group, GO: 11).* The Arab countries mostly operate under

the leadership of royal families such as Al Said family in Oman therefore top leadership and decision-making power remain at top levels a result the officials of public institutions are sometimes unable to take timely decision about budgeting, hiring skilled labour, and investing in advance digital technologies. Another challenge is reported by a public user "*there are many stories of cybercrime attack on women but in our culture these incidents usually not reported due to family respect and lack of culture support" (Interview, PU: 23).* It is found that there is need to support those technology users such as women who have more chances to face cyber security attack and there is lack of support/platform for empowering these Omani women.

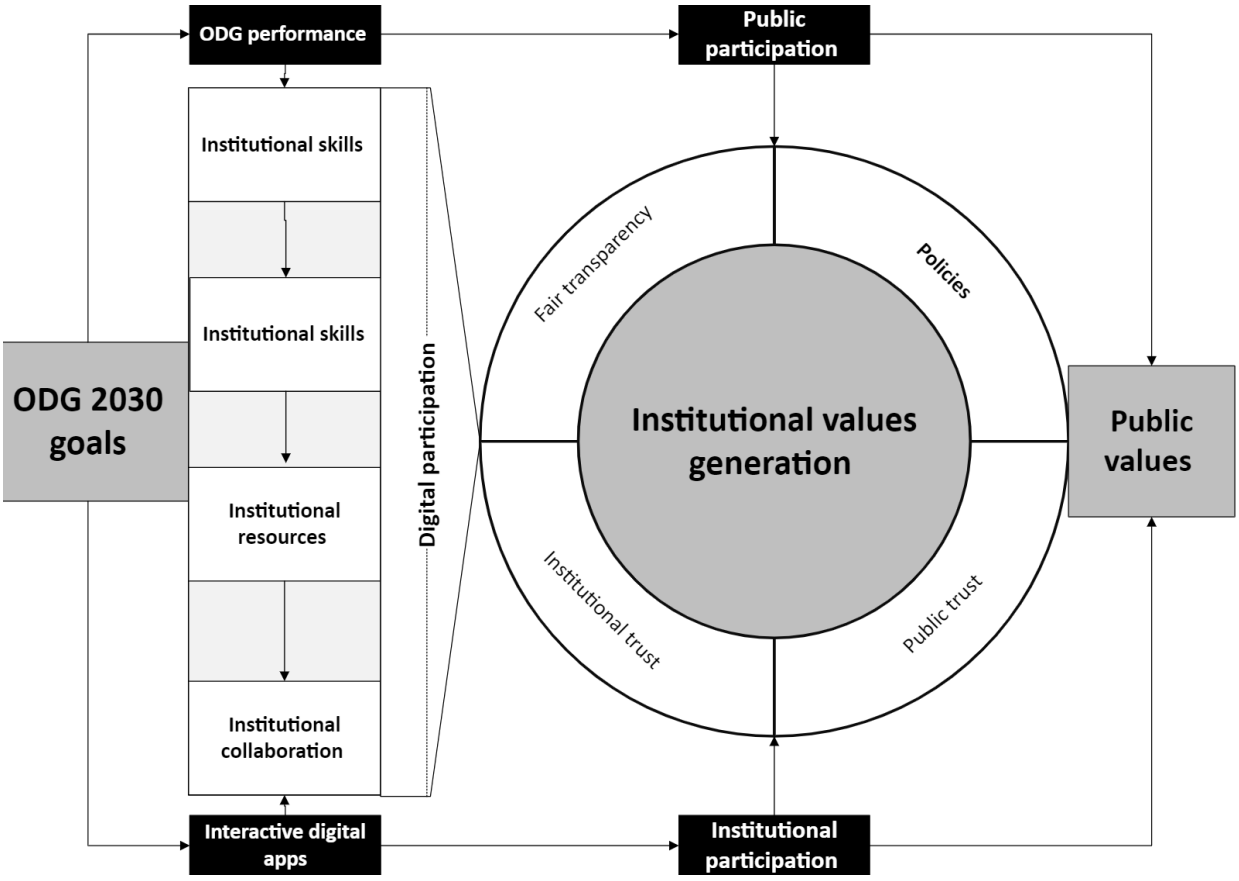
Discussion and contribution

Although ODG services provider made the information sharing policies for public institutions to fulfil the needs of special people and older, but public users shared that the government fifteen apps did not have those features such audio/touchable format that can create ease for disabled and old people. Therefore, the authors of this study suggest that public institutions should capture the experiences of disabled and older people, as well as disability experts who can help them to develop features that can address the needs of such users. Public users of digital applications felt that most interactive apps offer too few options to translate ODG services into English. There is therefore a need for service providers to offer their services in more languages to address the needs of a diverse user group (see figure 5). Therefore, the authors of this study believe that public institutions, developers and service performance experts should work together to develop standards of service performance and digital access to ODG apps. It is found that there are many cybercrimes are reported in Oman that increase fear among public for their personal and financial information security therefore Omani government established cyber defence system which have regained the public involvement and trust in ODG services. Findings reveal that ODG 2030 vision is to build digital skills for smarter workplaces so they can reap the benefits from emerging technologies such as augmented reality, virtual reality, and internet of things (IOT). Therefore, they have organized many trainings, workshops, and visual content exchange through social media as it can increase motivation in public to use these technologies and give feedback to government how they can improve the ODG services. The augmented reality and virtual reality

services are usually available through 15 interactive apps which have been used for offering ODG services to citizens.

Contribution

Figure 5: research framework



The institutional theory has been applied in different disciplines of social sciences such as that in political science, sociology, and organizational studies (Altayar 2018; Hinings et al., 2018; Peters, 2019). Institutional theory provides explanation concerning legitimacy of organizational actions given the coercive, imitative, and normative forces (DiMaggio & Powell, 1983; Peters, 2019). They observed that institutionalized environments embody certain pressures (e.g., normative, coercive, and mimetic) which influence the public institutions operations in such environments. The coercive environment represents the informal pressure on organizations from those organizations on whom they depend for part of their operations (DiMaggio & Powell, 1983; Peters, 2019). For example, ODG portal in Oman involve the 28 sectors information in the form of 355 datasets which are

satisfying the needs of investors, developers, researchers, and citizens. These stakeholders have built the pressure on ODG units to engage all these public institutions who are accountable and responsible to address their concerns and provide the public value chain. For example, some public users have recommended to adopt and introduce data drive dashboard as it can help to offer inclusive and interactive services which can involve both citizens and institutions participation for offering public chain value co-creation (see figure 5).

Mimetic isomorphism represents the imitation or copying of other organizational strategies and techniques because they believe that such structures are conducive to its operations as well (DiMaggio & Powell, 1983; Peters, 2019). For example, by following the adoption of interactive apps and use of emerging technologies in developed countries public institutions (augmented and virtual reality), Oman also used these interactive apps and emerging technologies so that they can increase the participation of public for improve the digital transparency and performance of ODG services. Furthermore, these interactive apps also provide the platform of online reviews that increase the institutional collaboration of IT organizations and public institutions for improving the interactivity, compatibility, and creditability as it can help to achieve public user goals. Normative isomorphism represents the changes driven by the rules and regulations as well as professional standards of a profession or industry thereby influencing the ones operating in the industry to abide by such norms (Altayar 2018; Hinings et al., 2018; Peters, 2019). For example, ODG website published information security policies for the public institutions who are stakeholder of ODG therefore they are fully responsible to perform the risk assessment and suitable risk treatment for securing the confidential information of all stakeholders.

Practically, it is suggested that they should adjust the features of these interactive apps for older people so that content become comfortable for eyesight as well as easy to understand. Although they made the information sharing policies for public institutions to fulfil the needs of special people and older, but public users shared that the government fifteen apps did not have those features such audio/touchable format that can create ease for disabled and old people. Therefore, the authors of this study suggesting that public

institutions should capture the experiences of these disable and older people as well as disability experts who can help them to develop those features that can address the needs of maximum disable and older users. The public users of digital application shared that most of interactive apps having not options to translate the ODG services into English therefore there is need that services should be providing into maximum languages to address the needs of diversified users (see figure 5). Therefore, the authors of this study believe that the public institutions, developers and service performance experts should work together for developing the standards of services performance and digital accessibility of ODG apps. There is need address issues of interactivity features of ODG apps such as slow speed, login issue, crash, and updated version is operatable. The compatibility feature of ODG apps also require attention as these apps are not operatable on different mobile models which are not declared by IT developer that these are not compatible.

Research limitations and future directions

There is, however, limited understanding about the use of interactive apps and social media to collectively improve transparency, participation, or collaboration in the context of achieving ODG goals. Although triangulated qualitative methods increase the trustworthy and generalizability of data, there are some important limitations linked to the use of a single case study research design. For example, current study results have somewhat issues of generalization until unless future studies will not test the research framework of this study in the context of other Arab countries as well as in the context of western culture. The current research was conducted using social constructivist epistemological approach which is why the researcher utilized inductive approach in line with qualitative methods so that rich insights can be generated by using interviews and interactive apps reviews. This is different from structured approach which is used in positivist ideology necessitating using deductive approach.

References

Adams, C., & Thompson, T. L. (2016). *Researching a posthuman world: Interviews with digital objects*. London: Palgrave Macmillan UK.

Alenizi, A. S. (2020). A systematic literature review for understanding the antecedents of the Digital Open Government matrix. *International Journal of Electronic Government Research (IJEGR)*, *16*(1), 1-17.

Altayar, M. S. (2018). Motivations for open data adoption: An institutional theory perspective. *Government Information Quarterly*, *35*(4), 633-643.

Aslam, U., Arfeen, M., Mohti, W. and Rahman, U.u. (2015), "Organizational cynicism and its impact on privatization (evidence from federal government agency of Pakistan)", Transforming Government: People, Process and Policy, 9 (4), 401-425.

Aslam, U., Ilyas , M., Imran, M.K. and Rahman, U.-.U.-. (2016), "Detrimental effects of cynicism on organizational change: An interactive model of organizational cynicism (a study of employees in public sector organizations)", Journal of Organizational Change Management, 29 (4), 580-598.

Balakrishnan, V., & Shuib, N. L. M. (2021). Drivers and inhibitors for digital payment adoption using the Cashless Society Readiness-Adoption model in Malaysia. *Technology in Society*, *65*, 101554.

Bates, J. (2014). The strategic importance of information policy for the contemporary neoliberal state: The case of Open Government Data in the United Kingdom. *Government Information Quarterly*, *31*(3), 388-395.

Bhattacherjee, A., & Sanford, C. (2006). Influence processes for information technology acceptance: An elaboration likelihood model. *MIS quarterly*, 805-825.

Bonina, C., & Eaton, B. (2020). Cultivating open government data platform ecosystems through governance: Lessons from Buenos Aires, Mexico City and Montevideo. *Government Information Quarterly*, *37*(3), 101479.

Castelnovo, W., & Sorrentino, M. (2018). The digital government imperative: a context-aware perspective. *Public management review*, *20*(5), 709-725.

Forstenlechner, I., & Mellahi, K. (2011). Gaining legitimacy through hiring local workforce at a premium: The case of MNEs in the United Arab Emirates. *Journal of World Business*, *46*(4), 455-461.

Gagliardi, D., Schina, L., Sarcinella, M. L., Mangialardi, G., Niglia, F., & Corallo, A. (2017). Information and communication technologies and public participation: interactive maps and value added for citizens. *Government Information Quarterly*, *34*(1), 153-166.

Gioia, D. (2021). A systematic methodology for doing qualitative research. *The Journal of Applied Behavioral Science*, *57*(1), 20-29.

Harrison, T. M., & Sayogo, D. S. (2014). Transparency, participation, and accountability practices in open government: A comparative study. *Government information quarterly*, *31*(4), 513-525.

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: An institutional perspective. *Information and Organization*, *28*(1), 52-61.

Irani, Z. and Kamal, M. (2016), "Transforming Government: People, Process, and Policy", Transforming Government: People, Process and Policy, 10 (2), 190-195.

Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, adoption barriers and myths of open data and open government. *Information systems management*, *29*(4), 258-268.

Kassen, M. (2018), "Adopting and managing open data: Stakeholder perspectives, challenges and policy recommendations", Aslib Journal of Information Management, 70 (5), 518-537.

Kassen, M. (2020), "Open data and its peers: understanding promising harbingers from Nordic Europe", Aslib Journal of Information Management, 72 (5), 765-785.

Lee, G., & Kwak, Y. H. (2012). An open government maturity model for social media-based public engagement. *Government information quarterly*, *29*(4), 492-503.

Lee, H., Tsohou, A., & Choi, Y. (2017). Embedding persuasive features into policy issues: Implications to designing public participation processes. *Government Information Quarterly*, *34*(4), 591-600.

Lin, D., & Simmons, D. (2017). Structured inter-network collaboration: Public participation in tourism planning in Southern China. *Tourism Management*, *63*, 315-328.

Magalhaes, G., & Roseira, C. (2020). Open government data and the private sector: An empirical view on business models and value creation. *Government Information Quarterly*, *37*(3), 101248.

Malamatidou, S. (2017). *Corpus triangulation: Combining data and methods in corpus-based translation studies*. Routledge.

Matheus, R., & Janssen, M. (2020). A systematic literature study to unravel transparency enabled by open government data: The window theory. *Public Performance & Management Review*, *43*(3), 503-534.

Matheus, R., Janssen, M., & Maheshwari, D. (2020). Data science empowering the public: Data-driven dashboards for transparent and accountable decision-making in smart cities. *Government Information Quarterly*, *37*(3), 101284.

McBride, K., Aavik, G., Toots, M., Kalvet, T., & Krimmer, R. (2019). How does open government data driven co-creation occur? Six factors and a 'perfect storm'; insights from Chicago's food inspection forecasting model. *Government Information Quarterly*, *36*(1), 88-97.

Mergel, I. (2013). A framework for interpreting social media interactions in the public sector. *Government information quarterly*, *30*(4), 327-334.

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. *Government information quarterly*, *36*(4), 101385.

Naeem, M. (2019). Uncovering the enablers, benefits, opportunities and risks for digital open government (DOG): Enablers, benefits, opportunities and risks for DOG. *International Journal of Public Administration in the Digital Age (IJPADA)*, *6*(3), 41-58.

Naeem, M. and Ozuem, W. (2021), "Understanding misinformation and rumors that generated panic buying as a social practice during COVID-19 pandemic: evidence from Twitter, YouTube and focus group interviews", Information Technology & People, Vol. ahead-of-print No. ahead-of-print.

Nam, T. (2015). Challenges and concerns of open government: A case of government 3.0 in Korea. *Social Science Computer Review*, *33*(5), 556-570.

Omanuna (2022) Digital Oman open government strategy. Avaiable at: https://omanportal.gov.om/wps/portal/index/eomanstrategy (Accessed and updated on 9 Feb, 2022)

Picazo-Vela, S., Gutiérrez-Martínez, I., Duhamel, F., Luna, D. E., & Luna-Reyes, L. F. (2018). Value of inter-organizational collaboration in digital government projects. *Public Management Review*, *20*(5), 691-708.

Purwanto, A., Zuiderwijk, A. and Janssen, M. (2020), "Citizen engagement with open government data: Lessons learned from Indonesia's presidential election", Transforming Government: People, Process and Policy, 14 (1), 1-30.

Sandoval-Almazan, R., & Gil-Garcia, J. R. (2012). Are government internet portals evolving towards more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities. *Government Information Quarterly*, *29*, S72-S81.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., ... & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & quantity*, *52*(4), 1893-1907.

Saxena, S. (2017). Significance of open government data in the GCC countries. *Digital Policy, Regulation and Governance*.

Saxena, S. (2018). Open government data (OGD) in six Middle East countries: An evaluation of the national open data portals. *Digital Policy, Regulation and Governance*.

Simonofski, A., Vallé, T., Serral, E., & Wautelet, Y. (2021). Investigating context factors in citizen participation strategies: A comparative analysis of Swedish and Belgian smart cities. *International Journal of Information Management*, *56*, 102011.

Waller, L. and Genius, A. (2015), "Barriers to transforming government in Jamaica: Challenges to implementing initiatives to enhance the efficiency, effectiveness and service delivery of government through ICTs (e-Government)", Transforming Government: People, Process and Policy, 9 (4), 480-497.

Wirtz, B. W., & Birkmeyer, S. (2015). Open government: Origin, development, and conceptual perspectives. *International Journal of Public Administration*, *38*(5), 381-396.

Zuiderwijk, A., Shinde, R., & Janssen, M. (2019). Investigating the attainment of open government data objectives: Is there a mismatch between objectives and results?. *International Review of Administrative Sciences*, *85*(4), 645-672

Appendix 1: Public users as interviewees

Number	Gender	Age	Occupation	Education
PU1	M	18-30 years	Police officer	Master's degree
PU2	F		Lawyer	Master's degree
PU3	F		Accountant	ACCA
PU4	F		Private business owner	CA
PU5	M		Manager in NGO	Master's degree
PU6	M		Assistant professor	PhD
PU7	M		Senior Lecturer	PhD
PU8	M	31-45 years	IT Manager	Master's degree
PU9	M		Private business owner	Master's degree
PU10	M		Private business owner	Master's degree
PU11	F		Homemaker	Bachelor's degree
PU12	F		Homemaker	Bachelor's degree
PU13	F		Homemaker	Bachelor's degree
PU14	F		Doctor	MBBS
PU15	M		Doctor	MBBS
PU16	M		Head Nurse	Master's degree
PU17	M		Office worker	Master's degree
PU18	F		IT manager	Master's degree
PU19	F	46-60 years	Lecturer	PhD
PU20	M		Doctor	MBBS
PU21	M		Lecturer	PhD
PU22	F		Investor	Bachelor's degree
PU23	M		Student	PhD in progress
PU24	M		Student	Bachelor's degree
PU25	F		Homemaker	Bachelor's degree

Appendix 2: Government officials as group Interview participants

Number	Gender	Age	Occupation	Education
GO1	M	18-30 years	Assistant Director general (DG) of planning in commerce ministry	Master's degree
GO2	F		Assistant DG commerce in commerce ministry	Master's degree
GO3	F		Assistant DG financial affairs and administrative in investment promotion ministry	Master's degree
GO4	F		Assistant DG Directorate General of Commerce and Industry in Dhofar Governorate	Master's degree
GO5	M		DG commerce in commerce ministry	PhD
GO6	M		DG development of SMEs	PhD
GO7	M		Assistant DG measurement and standardization	Master's degree
GO8	M	31-45 years	Assistant DG in information ministry	Master's degree
GO9	M		Assistant DG in economy ministry	Master's degree
GO10	M		DG in information ministry	PhD
GO11	F		IT manager in ministry of economy	Master's degree
GO12	F		DG financial affairs and administrative in investment promotion ministry	Master's degree
GO13	F		IT project developer in information ministry	Master's degree
GO14	F		Social media Manager in information ministry	Master's degree
GO15	M		DG in ministry of labour	Master's degree

Appendix 3: Interview questions for group discussion

Q1: How you are engaging your users for achieving their trust and participation for improving ODG services?

Q2: Do you using any emerging technologies such as augmented reality, platform, or interactive apps that increase institutional collaboration and public engagement for offering best services through ODG?

Q3: How you engaging your users for improving the information quality as well as overcoming the issues of information asymmetry?

Q4: Do you have any future plans and gathering the suggestions of your valuable public users for improving the services of interactive apps?

Q5: As Oman public and private institutions have faced many cyber-attacks that can create negative perception among ODG users so what initiatives you have taken at institutional level for achieving public user goals?

Q6: Have you divided the responsibilities among different units and team to increase inter institutional collaboration for increasing the digital transparency and public user trust in ODG?

Q7: Do you want to mention any specific apps or platforms that are playing role for increasing public user engagement for achieving the ODG goals?

Q8: What are digital challenges/barriers that you faced and what initiatives are taken to address these challenges?

Appendix 4: Interview questions for public users

Q1: As you have tried ODG through different interactive apps so what challenges you have faced with respect to improve the accessibility and interactivity of these apps?

Q2: Do you face any digital transparency related challenges that negatively influence your trust to use ODG services?

Q3: Do you think that interactive apps and other social platforms helped achieve open government goals?

Q4: Do you think that interactive apps and other social platforms increase your participation for improving the ODG services?

Q5: Do you have any suggestion related to adopt any advance technology that can increase your collaboration for services co-creation with ODG services provider?

Q6: Which ODG app you find most useful and what features you want to see that can improve the value for offered services?

Q7: Which experts, platforms, and public institutions are raised the awareness, skills, and trust to use ODG apps/website?

Q8: Do you find that all the information which is provided through ODG system is useful to support your personal/financial/business needs?

Q9: Do you think that quality of information and freedom of information is useful to address the needs of disable, older, and other people who have health issues?

Q10: Do you provide any complain/feedback that can really help to improve the services of ODG?

Appendix 5: Thematic analysis flow process