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Understanding Citizen Motivation in Digital Co-production: A Study of Security Incident Reporting in Saudi Arabia

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ABSTRACT

Voluntary citizen reporting refers to the use of mobile digital platforms through which citizens contribute information on issues of public interest and participate in the co-production of public services. The effectiveness of such platforms depends on sustained citizen engagement, yet empirical evidence on motivational drivers remains limited in security-focused contexts, especially outside Western settings. Drawing on Self-Determination Theory and recent research on digital co-production, this study examines the intrinsic and extrinsic factors influencing citizens' intention to use a security-oriented reporting application in Saudi Arabia. Survey data were collected from 202 users of the "Kollona Amn" application, which enables citizens to report security-related incidents such as crimes and traffic violations. Multiple regression analysis was used to assess the effects of motivational and technology-related factors on behavioral intention. The findings show that perceived output quality, social responsibility, and ease of use significantly influence citizens' engagement in digital co-production through the application. In contrast, self-concern, rewards, and revenge do not exhibit a significant effect. The results indicate that participation in security reporting is primarily driven by expectations of effective public response, civic responsibility, and platform usability. This study contributes to the literature on digital co-production by providing evidence from a security reporting context and offers practical insights for the design and governance of citizen reporting applications.

Keywords: Volunteering; Co-production of Public Services; Crowdsourcing; Self-Determination Theory; Intrinsic motivation; Extrinsic motivation; Citizen science

INTRODUCTION

The full realization of the Saudi Vision 2030 depends strongly on technological development. Accordingly, the public sector in Saudi Arabia witnessed an upsurge in the adoption of Information and Communication Technologies (ICT) to improve the delivery of its services. Government agencies have launched several mobile e-government applications to provide more efficient service and encourage citizens to participate in reporting and monitoring activities.

On 26 February 2016, the Saudi Public Security Department launched the mobile app "Kollona Amn" (translation: We are all security). The application enables citizens and residents in Saudi Arabia to become part of the security system by reporting security-related incidents. Users can send reports as text messages and attach videos, photos, or audio recordings. Local authorities review and respond to reported incidents and users receive updates on the status of their reports. The system keeps the identities of users confidential and stores all data on a secure server.

Embracing ICTs in governance can enhance citizen-government relationships through increased transparency, engagement, and improved service delivery. The transition from traditional governance to e-governance has enables governments to incorporate the collective intelligence of citizens into decision-making and problem solving (Linders, 2012; Mergel, 2013). Engaging citizens in such activities is often described as citizen-sourcing or citizen-reporting. Citizen-sourcing increases a public administration's responsiveness and effectiveness by empowering agencies to use citizen input for innovation and service improvement (Schmidthuber, Hilgers, Gegenhuber, & Etzelstorfer, 2017).

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Over the last decade, citizen reporting and related digital participation tools have been framed within broader debates on crowdsourcing and citizen coproduction of public services. These tools treat citizens as coproducers who help identify problems, monitor service quality, and co-create solutions (Liu, 2021; Nabatchi, Sancino, & Sicilia, 2017). Recent evidence shows that digital participatory tools can facilitate the flow of information from citizens to governments, although the provision of feedback and accountability information to citizens remains limited (Shin et al., 2024).

Research on online service reporting and civic technology indicates that citizens increasingly use mobile reporting channels to complain about everyday problems such as potholes, dog fouling, or waste management, and that these "everyday complaints" can shape local public policy (Matthews, Parsons, & others, 2022; Offenhuber, 2015). Digital transparency, for example through publishing incident status and follow-up actions, can stimulate participation across socio-economic groups (Zhao, Cheng, Schiff, & Kim, 2023). At the same time, systematic reviews highlight that the ecosystem of digital tools for citizen participation is still fragmented and that many platforms underuse the potential of feedback mechanisms and incentives (Shin et al., 2024).

Despite this growing body of work, relatively few studies examine motivational factors in citizen reporting applications in the Middle East, and even fewer focus on security-related reporting. Most existing empirical studies analyze reporting related to city infrastructure or service failures (Abu-Tayeh, Neumann, & Stuermer, 2018; Susanto, Diani, & Hafidz, 2017; O'Brien et al., 2017; Rodriguez Müller et al., 2024) with only one empirical study analyze reporting related to municipal incidents in the context of Saudi Arabia (Alhammad, Hajar, Alshathry, & Alqasabi, 2021).

This research addresses this gap by investigating the motivational factors that drive people in Saudi Arabia to use the "Kollona Amn" mobile application, which is devoted to security incidents. Building on motivational theory and self-determination theory (SDT), we analyze individuals' perceptions and behavioral intentions regarding voluntary contributions to public security improvement. We distinguish between intrinsic and extrinsic motivations, and we include perceived ease of use as an additional factor. In doing so, the study contributes to both the citizen reporting and digital coproduction literature by focusing on a security-oriented app in a Saudi context and by comparing its findings to more recent international evidence on digital co-production and issue reporting (Rodriguez Müller et al., 2024; Dorner et al., 2024; Shin et al., 2024).

This paper is structured to give a general overview of the literature on citizen-sourcing and motivational factors behind user engagement in section 2. Section 3 states the research hypotheses and model development. The methodology is then reported in section 4 followed by the results in section 5. A discussion of the results is given in section 6 and conclusions are finally drawn in section 7.

LITERATURE REVIEW

Government 2.0 and the emergence of citizen reporting

The last decade witnessed a new epoch in the relationship between government sectors and citizens. Governments are launching innovative platforms and embracing new strategies to enhance communication with citizens, improving governmental transparency and responsiveness (Alotaibi, Ramachandran, Kor, & Hosseinian-far, 2016). The surge in social media usage has encouraged governments to deliver quality services and increase communication and interaction with citizens through Government 2.0. Mergel (2013) defines government 2.0 as "the use of web 2.0 tools within government organizations and their interactions with citizens".

Early work on emergencies, such as the 2011 Japan earthquake and tsunami, showed how citizens used platforms like Twitter and Skype to share locations, information, and photos, producing large volumes of real-time data (Ichiguchi, 2011; Romano, Onorati, Aedo, & Diaz, 2016). With the spread of smartphones and embedded sensors, citizens have become "well-equipped reporters" able to provide geolocated multimedia reports (Kamel Boulos et al., 2011).

Despite these developments, governments face persistent challenges in attracting and retaining audiences for government-affiliated social media accounts and platforms, especially for routine or small-scale incidents that citizens may perceive as sensitive or not worth sharing publicly (Alotaibi et al., 2016; Romano et al., 2016).). This has

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led many local authorities to develop dedicated citizen reporting applications that replicate some features of social media while ensuring privacy, authentication, and secure data processing. Such apps form part of a broader set of digital tools for citizen participation, including online issue reporting systems, co-production platforms, and 311-type services (O'Brien et al., 2017; Young, 2022; Shin et al., 2024).

Citizen Sourcing and Reporting Applications

Citizen sourcing emerged as a derivative of crowdsourcing, which is the engagement of crowds in problem-solving, idea generation, information provision, and task completion through digital platforms (Taeihagh, 2017). Citizen sourcing refers to the engagement of citizens in similar activities for civic purposes. Citizen reporting is a manifestation of citizen sourcing where citizens provide information to the government via dedicated channels, often mobile applications (Hilgers and Ihl 2010; Linders 2012; Schmidthuber and Hilgers 2017). It is often used synonymously with e-Participation or mobile participation (de Reuver et al., 2013). Information provided by citizens can include feedback on services, reports of crimes and security violations; or corruption. The main goal of citizen-reporting applications is the co-production of knowledge between government and citizens and the use of citizens as valuable sources of information.

Most literature on citizen-reporting applications falls into three categories: design studies, empirical analyses of usage data and policy implications, and studies of acceptance and motivational factors (de Reuver et al., 2013; Romano et al., 2016; Taeihagh, 2017; Kamel Boulos et al., 2011; Abu-Tayeh et al., 2018; Alotaibi et al., 2016; Kaschesky & Bouchard, 2011; Schmidthuber et al., 2017). Recent work builds on this foundation in several ways. First, systematic analyses of digital tools for citizen participation document a rich ecosystem of more than one hundred tools, including issue-reporting platforms and 311-type services, and show how these tools channel information from citizens to government and sometimes back to citizens in the form of feedback or accountability information (Shin et al., 2024). Second, empirical studies of local reporting platforms, such as FixMyStreet and similar tools, show that everyday complaints about potholes, dog fouling, or street lighting can affect local public policy and reveal participation biases across neighborhoods (Matthews et al., 2022; Offenhuber, 2015). Third, in smart city contexts, new research focuses on citizen reporting apps as mechanisms to identify and prioritise sustainability and infrastructure problems, examining which design features encourage sustained use (Dorner et al., 2024).

Focusing on the design aspect, Romano et al. (2016) compared the design of eight emergency notification (EN) mobile applications. Factors such as the type of interaction, functionalities, content that can be shared, and the processing of the received reports were investigated. One of the investigated applications was a crowd-sourced incident reporting platform designed by the ELERTS company[1]. Another was the official emergency mobile application of the city of Madrid: My112[2]. Although the study brings to light the best design and functionality features to be embedded in a citizen reporting application, it does not tackle usability or acceptance issues. Susanto, Diani, & Hafidz (2017), on the other hand, conducted a study to understand the factors that drive a citizen to use citizen reporting applications. They use the application 'City113'[3] developed by the Surabaya city public authority in Indonesia as their case study. They adopted a 'Decomposed Theory of Planned Behavior' (DTPB) model with an additional construct specific to gamification and termed it 'playfulness'. Two factors were found to be significant: perceived ease of use and perceived usefulness. This shows that citizens may be reluctant to use a citizen reporting application if it is difficult or confusing to interact with. Also, if citizens do not expect any useful outcome from their report, it is unlikely they will use the application.

These findings are consistent with recent work that highlights the importance of usability, perceived usefulness, and perceived impact on services as key conditions for the effective use of digital participation tools and city reporting apps (Shin et al., 2024; Rodriguez Müller et al., 2024).

Motivational Theory and Motivational Factors

[1] http://elerts.com/company/
[2] http://www.madrid.org/112/index.php/actualidad/app-de-emergencia
[3] http://city113.id/

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Motivation theory in psychology explains factors (i.e., motivations) that drive individuals to perform a certain action or work towards a goal. It has been extensively used to understand the adoption of new technology (Davis, Bagozzi, & Warshaw, 1992). Self-Determination Theory (SDT) (Deci & Ryan, 1985) studies a human's self-motivation to reach a goal or take an action by distinguishing between the different types of motivations that drive that action. The most basic distinction is between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable; and extrinsic motivation, which refers to doing something because it leads to a separable outcome. In the context of IT applications, participating in online communities, collaborative projects, or contributing to open-source software are driven by many motivations (Schmidthuber et al., 2017). According to Ryan & Deci (2000), such voluntary contributions in tasks and activities can be extrinsically or/and intrinsically driven.

Extrinsic motivation is usually associated with external pressure and the expectation of a certain benefit or positive outcome, such as tangible rewards (Deci& Ryan, 1985; Ryan & Deci, 2000). A perceived benefit is defined as the belief in a positive outcome as a result of a behavior or action. Such positive outcomes could be tangible (e.g., money), or intangible (e.g., service improvement). This perception of a benefit is exploited in the Technology Acceptance Model (TAM) by Davis, Bagozzi, & Warshaw (1989). On the other hand, individuals could perform certain behaviors or actions because they are inherently interested in them or enjoy doing them (Deci & Ryan, 1985; Ryan& Deci, 2000). Previous studies have demonstrated the significant influence of intrinsic motivation (e.g., perceived enjoyment) on behavioral intentions to adopt new technology such as smart devices or engage in online communities (Wang et al., 2012). Additionally, recent work on digital co-production and online service reporting confirms that both intrinsic and extrinsic motivations shape citizen engagement, and that their relative importance depends on the service context and platform design (Rodriguez Müller et al., 2024; Liu, 2021; Neumann & Schott, 2023).

Wijnhoven, Ehrenhard, & Kuhn, (2015) investigate motivational factors driving users to contribute to Free/Libre Open Source Software (FLOSS) and the way these drivers could extend to open government participation. They classified drivers into two categories: motivation and amotivation. Motivation drivers included ideology, pro-social behavior (altruism), kinship, fun, reputation, reciprocity, learning, own use, career, and money. Amotivation drivers included ability beliefs, strategy beliefs, effort beliefs, and helplessness beliefs. Their results showed that fun was a major significant motivational determinant of contribution. The belief that suggestions would not be taken seriously was a significant amotivational determinant of not contributing. They also report that demographic factors had no significant effects on contribution.

In another attempt to investigate motivations behind participation in citizen sourcing platforms, Schmidthuber et al., (2017) conducted an analysis to understand citizen-government interaction in open governments. Motivations studied included ease of use, output quality, and many intrinsic motivations. Employing the technology acceptance model, motivation theory, and the theory of planned behavior, they state that citizens who enjoy open government attractiveness and like taking part in city improvement show higher engagement levels. Abu-Tayeh et al., (2018), also, examine the motivational factors behind user engagement in the ZWN application dedicated to reporting damages and issues related to the infrastructure of the city of Zurich in Switzerland. Building upon the motivational theory in social psychology, their findings suggested that both self-concern and social responsibility are significant drivers of citizen reporting engagement. The effect of self-concern was found to have a significantly stronger effect on user engagement than social responsibility.

More recent studies explore similar motivational patterns in different digital reporting and co-production settings. For example, Alhammad et al. (2021) find that in the Saudi Balagh application, extrinsic motivations linked to output quality and self-concern are key drivers, whereas social responsibility and rewards are less influential. Rodriguez Müller et al. (2024) examine a smart public service reporting system and show that expectations regarding service improvement, fairness, and responsiveness play a central role in motivating users to report service-related issues. These studies reinforce the importance of distinguishing between self-interested and community-oriented motives and of examining how platform design shapes the salience of each motive.

In this research, we investigate both extrinsic and intrinsic motivations that drive users to contribute to and engage in citizen-reporting applications. In the context of adopting citizen reporting technologies, participation is voluntary, free of charge, and users are materially unrewarded. However, users still participate, possibly due to a perceived benefit that will occur or because there are other innate motivations. Hence, it is both essential and intriguing to

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investigate user motivation underlying active engagement and participation in voluntarily citizen reporting applications.

HYPOTHESES AND MODEL DEVELOPMENT

Several motivations drive Saudi citizens to contribute to and engage with the "Kollona Amn" citizen reporting application. Based on motivational theory (Davis, Bagozzi, & Warshaw, 1992) and SDT (Ryan & Deci, 2000), we distinguish between intrinsic and extrinsic motivations. Citizens may be self-concerned when reporting accidents that directly affect them, they may feel socially responsible toward others and the wider community, and they may experience revenge-related motives when they wish to punish violators (Abu-Tayeh et al., 2018). We therefore examine the effect of three intrinsic motivations on reporting incidents using "Kollona Amn": self-concern, social responsibility, and revenge. Complementing this, we consider two extrinsic motivations, output quality and rewards, along with perceived ease of use as a key technology-related factor (Davis et al., 1989; Venkatesh, Thong, & Xu, 2012; Rodriguez Müller et al., 2024). The following subsections demonstrate the model components and research hypotheses in detail.

Intrinsic Motivations (IM)

Intrinsic motivation (IM) refers to the inherent satisfaction driving the performance of a specific action or behavior. In this research, based on previous literature, we consider three intrinsic motivations that could drive the use and engagement with citizen reporting applications.

Self-Concern

Self-concern is the consideration of an individual's own well-being and prosperity. In our research context, self-concern is the desire to protect and save oneself from any security threat or harm by reporting security incidents. For example, protecting oneself from road accidents due to reckless driving. In citizen sourcing literature, self-concern had a positive correlation with reporting incidents and engaging with citizen reporting applications (Abu-Tayeh et al., 2018a). Self-concern also is among the main motivations that encourage programmers to contribute to open-source programs (Oreg & Nov, 2007; Wu, Gerlach, & Young, 2007). In the field of work motivation, it is proven that when self-concern is high or activated, job satisfaction and work motivation will increase (De Dreu, 2006). Recent work on digital co-production and 311-type systems shows that self-regarding motives, such as the desire to protect one's immediate environment or improve personally used services, frequently appear among reasons for reporting, although their strength varies by context (O'Brien et al., 2017; Rodriguez Müller et al., 2024). Accordingly, we hypothesize that self-concern drives the use and engagement with the "Kollona Amn" application as an intrinsic motivation.

H1: Self-concern is positively associated with motivation and behavioral intention to use security incident reporting app.

Social Responsibility

Social responsibility means considering others' needs and their well-being and the society as a whole. In our research context, social responsibility is the desire to help and aid another individual by reporting security incidents and feeling accountable for fulfilling such a civic duty. In citizen reporting literature, Abu-Tayeh et al. (2018) show that both self-concern and social responsibility significantly drive reporting in an infrastructure-related app, with self-concern often stronger. However, broader co-production research indicates that prosocial motives and civic duty are central when issues concern public goods and community safety (Neumann & Schott, 2023; Liu, 2021). Accordingly, we hypothesize that social responsibility drives the use and engagement with the "Kollona Amn" application as an intrinsic motivation.

H2: Social responsibility is positively associated with motivation and behavioral intention to use security incident reporting app.

Revenge

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Revenge is the act of harming someone in return for an action they had already done. In our research context, revenge is the desire to punish a violator by reporting a security incident they had done. For example, reporting traffic violators who endanger the lives of citizens. Based on a pilot study we conducted, participants suggested adding revenge as an effective motivator in reporting security threats. Revenge has indeed been stated as a significant driver of some actions and behaviors in other fields of study. For example, in business, a customer, driven by a desire for revenge (for any perceived reason), could report a company as a violator (Grégoire, Laufer, & Tripp, 2010). In the context of citizen reporting apps, systematic evidence on revenge-related motives is still limited, which justifies its inclusion here as an exploratory intrinsic factor in a security-focused setting. Accordingly, we hypothesize that revenge drives the use and engagement with the "Kollona Amn" application as an intrinsic motivation.

H3: Revenge is positively associated with motivation and behavioral intention to use security incident reporting app.

Extrinsic Motivations (EM)

Extrinsic motivation (EM) refers to engaging in an activity because it leads to outcomes that are separable from the activity itself, such as rewards, recognition, or improved services (Deci& Ryan, 1985; Ryan & Deci, 2000). In this research, based on previous literature, we consider two extrinsic motivations that could drive the use and engagement with citizen reporting applications: perceived output quality and rewards. We also add an extra motivation, the perceived ease of use of the application, which is central to most technology acceptance models.

Output Quality

Output quality and perceived service improvement are central in recent evaluations of citizen reporting and co-production platforms, where expectations of responsive and effective follow-up motivate users to submit reports (Alhammad et al., 2021; Rodriguez Müller et al., 2024; Young, 2022). In our research context, output quality is the perception of better-quality service and performance by reporting security incidents. For example, reporting a security violation with the perception of quick and efficient response from authorities. Accordingly, we hypothesize that output quality drives the use and engagement with the "Kollona Amn" application as an extrinsic motivation.

H4: Output quality is positively associated with motivation and behavioral intention to use security incident reporting app.

Reward

Individuals could be motivated to perform an activity for the sake of receiving money, promotion, rewards, as well as other tangible benefits. From an extrinsic motivational perspective, an individual's behavior is driven by its perceived values and the benefits of the action. Rewards are useful for motivating individuals to perform desired behaviors (Lin, 2006). Monetary reward is found to be positively associated with users' willingness to participate in collaborative projects such as crowdsourcing (Wijnhoven et al., 2015). Experimental evidence on financial incentives in co-production and crowdsourcing shows that their impact on engagement can be mixed and context-dependent, and in some cases limited (Voorberg et al., 2018; Lee, 2024). This makes it important to test whether rewards matter in a security-oriented citizen reporting app. Accordingly, we hypothesize that reward drives the use and engagement with the "Kollona Amn" application as an extrinsic motivation.

H5: Reward is positively associated with motivation and behavioral intention to use security incident reporting app.

Ease of use is a core determinant in most technology acceptance models and remains critical for digital participation tools and city reporting apps (Venkatesh et al., 2012; Shin et al., 2024). We therefore hypothesize:

H6: Ease of use is positively associated with motivation and behavioral intention to use security incident reporting app.

RESEARCH METHODOLOGY

To meet the objectives of the study, a close-ended structured questionnaire was developed to collect the data. The questionnaire aimed to investigate factors that motivate Saudi citizens to use the online reporting application "Kollona Amn". Measurement items were adapted from previous literature i.e. items previously used in research on crowdsourcing (e.g., Schmidthuber et al., 2017; Wijnhoven et al., 2015), open government (e.g., Bertot & Jaeger,

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2010; Susanto et al., 2017), and user acceptance of technology (Davis et al., 1989) and adjusted them to our context. We developed a set of statements between two to five to measure each motivational factor. Table 2 outlines the items used in the survey with their reliability. A five-point Likert scale (strongly disagree to strongly agree) was applied to measure each individual item. The questionnaire also included questions related to demographic factors. The questionnaire was developed using Smart Survey - an online survey software and a questionnaire tool. Different methods were used to distribute the survey including e-mail, WhatsApp, and social media platforms such as Twitter and Facebook. Participation in the survey was voluntary and all participants signed a consent form before commencing the questionnaire. In total, there were 202 participants. The demographic information of the survey participants is displayed in Table 1.

Table 1. Demographic information of respondents.

Variable	Value	Frequency	Percentage
Gender	Male	84	39.81 %
	Female	127	60.19 %
Nationality	Saudi	197	94.63 %
	Non-Saudi	5	5.37 %
Age	Under 18	11	5.21 %
	18-24	43	20.38 %
	25-34	63	29.83 %
	35-54	89	42.18 %
	Over 55	5	2.37 %
Educational level	High school	30	14.22 %
	Bachelor's degree	144	68.25 %
	Master's degree	26	12.32 %
	PhD.	5	2.37 %
	Other	6	2.84 %
Frequency of use	Never used	150	75.36 %
	Monthly	40	18.96 %
	Every 2 weeks	6	2.84 %
	Weekly	6	2.84 %

The Statistical Package for the Social Sciences (SPSS) was used for data analysis. SPSS is considered the most widely used statistical tool adopted by market researchers, education researchers, health researchers, marketing organizations, and for other purposes. Cronbach's alpha was used to perform the reliability analysis and test the internal consistency of model constructs. Moreover, correlation tests and path analysis pioneered by Wright (1921) were used to find the relationships between the model components.

RESULTS

Reliability Analysis

This analysis aimed to examine the internal consistency of the measuring items. Reliability is concerned with measurement accuracy and it reflects the extent to which the respondent can answer the same question or close approximations the same way each time. The assessment was based on Cronbach's alpha, which represents how a set of items are closely related. According to Nunnally (1978), an alpha value of 0.60 or higher indicates sufficient internal reliability. As the survey was designed in English then translated to Arabic, we should make sure that the questions have the same meaning and are linguistically consistent. To address this matter, the questionnaire was reviewed by more than one linguist. Table 2 shows that the resulting values of Cronbach's alpha ranged from 0.600 to 0.879, which is acceptable for exploratory research and shows that the questionnaire had adequate reliability.

Hypotheses Testing

Correlation Analysis

Correlation analysis measures relationships among variables. The correlation coefficient is a measure of linear association between two variables (Cohen and Cohen, 1975). Values of the correlation coefficient are always between

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-1 and +1; where -1 means a strong negative association and +1 means a strong positive association. Correlations among the model constructs are shown in Table 3. The results indicate there is a strong significant positive correlation between output quality, social responsibility, and the motivation to report an incident using the "Kollona Amn" application (i.e., behavioral intention). In addition, the constructs of perceived ease of use, self-concern, and revenge have a moderate positive significant correlation with BI. Reward has no significant association with the motivation to report.

However, the correlation coefficient measures only the degree of linear association between two variables. In other words, correlation does not necessarily imply causation (Wright, 1921). Therefore, to study the relationship among a predictor structure model such as the motivational model, an estimate of the magnitude and significance of connections should be investigated by multiple regression, path analysis, or structural equation modeling.

Table 2. Reliability test of the model constructs.

Construct	Item	α value	Adopted from
Ease of Use (EU)	- Learning how to use this application is easy for me. - My interaction with this application is clear and understandable. - I find this application is easy to use.	0.873	(Venkatesh, V., Thong, J. Y., & Xu, 2012)
Output quality (OQ)	- Using this application will improve city safety - Using this application will improve local authority services. - Using this application will enhance the overall quality of the provided services.	0.825	(Venkatesh, V., Thong, J. Y., & Xu, 2012)
Behavioural Intention (BI)	- I am considering using this app to report incidents. - I would seriously contemplate using this app. - It is likely that I am going to use this app. - I am likely to make future reports using this app.	0.879	(Venkatesh, V., Thong, J. Y., & Xu, 2012)
Social Responsibility (SR)	- I took part in Kollona Amn application because it gives me opportunities to help others - I took part in Kollona Amn because I could help society by doing so. - I want to contribute to city improvement by using this application. - I would feel bad about myself if I didn't share knowledge. - I participate in this application because I feel that this is something that I have to do itfor the society.	0.854	(Wu et al., 2007)
Self-concern (SC)	- I took part in "Kollona Amn" because I could report problems that concerned me personally. - I took part in "Kollona Amn" because I could report problems that prevented me from fulfilling my needs - I participate in this application because I am doing it for my own good. - I participate in this application because I think that this reporting is good for me. - I participate in this application because I believe that this kind of reporting is important for me.	0.709	(Abu-Tayeh, Neumann, & Stuermer, 2018b)
Rewards (RW)	- My willingness to participate in this application would increase if there were monetary rewards. - I will really like to participate in this application if I would receive monetary rewards in return for my knowledge sharing. - I will not participate in reporting incidents if I will not receive a bonus in return for my knowledge sharing.	0.806	(Lin, 2007; Wijnhoven et al., 2015)

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Revenge (RV)	- My angriness feelings toward the offenders of traffic and security system motivate me to report the incident. - I use this application to post and punish the offenders' practices. - I make a complaint through the application to avenge the offenders.	0.600	(Grégoire et al., 2010)

Table 3. Correlation Analysis

		Ease of Use	Output Quality	Social Resp.	Self-Concern	Reward	Revenge
Behavioral Intention (BI)	**Pearson Correlation**	.484*	.722**	.688**	.428*	.021	.426*
	Sig. (2-tailed)	.000	.000	.000	.000	.767	.000
	N	202	202	202	202	202	202

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Path Analysis

Path analysis is a straightforward extension of multiple regression (Scheiner et al., 2000). It is concerned with estimating the magnitude and significance of hypothesized connections between variables (Wright, 1921). These estimations are helpful in providing information regarding the statuses of the structural relationships. In addition, path analysis is considered a special case of structural equation modeling (SEM) because all variables are collectively observed (Bollen, 1998).

The proposed model has one layer of hypothesized relationships, which collectively propose as factors affecting the citizen behavioral intentions towards using the "Kollona Amn" citizen reporting application. These factors classify into two groups:

(1) *Intrinsic motivational factors,* which are self-concern (SC), social responsibility (SR), and revenge (RV);

(2) *Extrinsic motivational factors*, which are output quality (OQ) and reward (RW).

We also add ease of use (EU) as a factor that can encourage citizens to participate in reporting applications.

Therefore, the path equation of our model hypotheses is as follows:

$$\boldsymbol{BI} = \mathrm{SC} + \mathrm{SR} + \mathrm{RV} + \mathrm{OQ} + \mathrm{RW} + \mathrm{EU} + c$$

The coefficients' beta weight (β) was used to evaluate the structural model, which represents the level of strength of the relationships between the dependent variable (BI) and the independent variables (SC, SR, RV, OQ, RW, and EU). Path coefficients for the full model were derived by conducting regression analyses. The standardized level of path coefficients must be around 0.20 and ideally above 0.30 to be considered meaningful (Chin, 2010). The values of the coefficients explain the variance in factors that drives motivation to use citizen reporting applications and their significance. Table 4 and Table 5 display the results of the path analysis.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.775	.601	.589	.491	.601	48.949	6	195	.000

***Predictors:** (Constant), Revenge, Rewards, Ease of Use, Output Quality, Self-Concern, Social Responsibility

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Table 5. Path coefficients of the hypothesized model.

Predictor	B	Std. Error	Beta (β)	t-value	Sig.	Zero-order	Partial	Part
Constant	.362	.245	—	1.481	.140	—	—	—
Ease of Use	.186	.055	.176	3.382	.001	.484	.235	.153
Output Quality	.426	.077	.416	5.538	.000	.722	.369	.251
Social Responsibility	.239	.078	.229	3.046	.003	.688	.213	.138
Self-Concern	.045	.060	.044	0.756	.450	.428	.054	.034
Rewards	−.055	.030	−.089	−1.829	.069	.021	−.130	−.083
Revenge	.089	.052	.096	1.696	.092	.426	.121	.077

Table 4 indicates that the proposed model is statistically significant and explains a substantial proportion of variance in behavioral intention. The coefficient of determination (R^2 = .601) shows that approximately 60% of the variance in citizens' intention to use the reporting application is accounted for by the proposed predictors, namely self-concern, social responsibility, revenge, output quality, rewards, and ease of use. These results suggest that the model provides an adequate explanatory framework for examining citizen engagement with security reporting applications.

The results of the hypothesis testing based on the path analysis are summarized in Table 5. Each hypothesized relationship was assessed to determine the relative importance of intrinsic, extrinsic, and technology-related factors in shaping behavioral intention.

Hypothesis 1 proposed a positive association between self-concern and behavioral intention. The analysis revealed that self-concern does not have a statistically significant effect on behavioral intention (β = .044, t = 0.756); therefore, Hypothesis 1 is rejected.

Hypothesis 2 examined the effect of social responsibility on behavioral intention. The results show a significant positive relationship between social responsibility and behavioral intention (β = .229, t = 3.046), providing support for Hypothesis 2 and indicating the relevance of civic-oriented motivations in this context.

Hypothesis 3 posited that revenge would positively influence behavioral intention. The path analysis indicates that revenge does not have a significant effect on behavioral intention (β = .096, t = 1.696), leading to the rejection of Hypothesis 3.

Hypothesis 4 predicted a positive association between output quality and behavioral intention. The findings confirm this relationship, as output quality exhibits a strong and statistically significant effect on behavioral intention (β = .416, t = 5.538), supporting Hypothesis 4 and underscoring the central role of perceived service effectiveness.

Hypothesis 5 proposed that rewards would positively influence behavioral intention. The results show that rewards do not have a statistically significant effect on behavioral intention (β = −.089, t = −1.829); consequently, Hypothesis 5 is rejected.

Finally, Hypothesis 6 examined the relationship between ease of use and behavioral intention. The analysis demonstrates a significant positive effect of ease of use on behavioral intention (β = .176, t = 3.382), supporting Hypothesis 6 and highlighting the importance of usability in digital reporting applications.

Table 6 presents a summary of each hypothesis and its final outcome based on the path analysis. Taken together, these findings provide the empirical basis for the discussion in the following section, where the results are interpreted in relation to prior research and the broader literature on digital co-production and citizen reporting.

Table 6. Summary of findings.

Hypotheses	Results
Hypothesis#1: Self-concern is positively associated with use and engagement.	Rejected

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Hypothesis#2: Social responsibility is positively associated with use and engagement.	Supported
Hypothesis#3: Revenge is positively associated with use and engagement.	Rejected
Hypothesis#4: Output quality is positively associated with use and engagement.	Supported
Hypothesis#5: Reward is positively associated with use and engagement.	Rejected
Hypothesis#6: Ease of use is positively associated with use and engagement.	Supported

DISCUSSION

The purpose of this study was to investigate the motivational factors that drive people in Saudi Arabia to use the security incedent reporting application. Building upon motivational theory, we classified the examined factors into intrinsic and extrinsic motivations and added ease of use as a technology-related construct. The analysis showed that three of our hypothesized factors have a significant effect on citizens' motivation and intention to use "Kollona Amn": output quality, social responsibility, and ease of use. Self-concern, revenge, and rewards did not show significant effects on behavioral intention.

Output quality. The strong effect of output quality indicates that citizens and residents are willing to use citizen reporting apps when they expect better services and quality of life. This aligns with technology acceptance research that emphasizes perceived usefulness and performance improvement as key drivers of adoption (Venkatesh & Davis, 2000; Venkatesh et al., 2012). It also resonates with recent studies of digital co-production and reporting systems, which show that expectations of improved service reliability and responsiveness are central motivations for reporting service-related issues (Alhammad et al., 2021; Rodriguez Müller et al., 2024). In the Saudi context, where public expectations of digital service quality have grown in line with Vision 2030, our findings confirm that perceived service improvement is a core driver for engaging with security-related reporting apps.

Social responsibility. Social responsibility emerged as a significant driver of intention to use "Kollona Amn". This supports prior work that identifies prosocial and community-oriented motives as important in citizen reporting and co-production (Abu-Tayeh et al., 2018; Wijnhoven et al., 2015; Neumann & Schott, 2023). It is also consistent with Hofstede's cultural classification, which describes Saudi society as collectivist, where individuals place considerable weight on obligations toward family and in-groups. Citizens in our sample appear motivated to use the app not only for personal benefit, but to fulfil a sense of civic duty and responsibility for community safety. Compared with the Balagh study, where self-concern and output quality were more prominent (Alhammad et al., 2021), our results suggest that social responsibility may be particularly salient when the subject of reporting is security and public safety rather than general municipal issues.

Ease of use. Ease of use also shows a significant positive effect on behavioral intention, which aligns with classic TAM findings and with evaluations of modern digital participation tools (Venkatesh et al., 2012; Shin et al., 2024). At the same time, most respondents in our sample reported that they had never used "Kollona Amn" before. This suggests that ease of use may influence intentions at the awareness and trial stage, whereas other factors, such as perceived responsiveness and feedback, could become more important for continued use, an issue that longitudinal studies could address.

Non-significant factors. The lack of significant effects for self-concern and revenge indicates that, in this context, citizens are not primarily driven by self-centred or retaliatory motives. Instead, they seem to prioritise community safety and service improvement. This contrasts with findings in some other digital co-production and customer behavior settings where self-benefit and revenge can play a stronger role (Grégoire, Laufer, & Tripp, 2010; Abu-Tayeh et al., 2018). One plausible explanation is the normative framing of security reporting in Saudi Arabia, where religious and cultural values stress forgiveness and collective responsibility, making revenge-based reporting less socially acceptable.

The absence of a significant effect for rewards also deserves attention. While financial or material incentives can in some contexts enhance participation, several experimental studies find that rewards do not always stimulate co-production and may even crowd out intrinsic motivations (Voorberg et al., 2018; Lee, 2024). Our results align with

this line of evidence. Respondents appear more motivated by expectations of improved security services and civic responsibility than by tangible rewards. This suggests that, for security reporting apps, policymakers should prioritize clear communication of impact, feedback on case handling, and community value over financial incentives.

Overall, the findings contribute to the growing literature on digital co-production and citizen reporting by showing that, in a security-oriented app in Saudi Arabia, social responsibility, perceived service quality, and ease of use are central drivers, while self-concern, revenge, and rewards play a limited role. This pattern adds nuance to recent international evidence, which finds both self-interested and community-oriented motives in issue reporting and co-production, and highlights the importance of contextual factors such as issue type and cultural norms (Rodriguez Müller et al., 2024; Matthews et al., 2022; Dorner et al., 2024)

CONCLUSION

This study contributes to the literature on digital co-production and citizen reporting by examining motivational drivers of participation in a security-focused reporting application in Saudi Arabia. By applying a self-determination perspective and engaging with recent empirical work on digital participation, the study extends existing knowledge to a context that remains underexplored, namely citizen reporting for public security in the Middle East.

The results highlight that citizens' engagement with reporting applications is shaped more by collective considerations and expectations of service effectiveness than by self-interested or incentive-driven motives. This finding reinforces recent evidence suggesting that, in public service domains associated with safety and collective welfare, citizen participation relies primarily on perceptions of institutional responsiveness and civic responsibility rather than material rewards. The study therefore advances current debates by showing that motivational patterns identified in infrastructure and municipal service reporting also apply, with important nuances, to security-related reporting.

Practically, the findings suggest that the effectiveness of citizen reporting platforms depends not only on technological availability but also on how public agencies frame participation and respond to citizen input. Clear communication of impact, visible follow-up, and reliable service responses are likely to be central to sustaining engagement over time. For public authorities, this implies that investment in feedback mechanisms and service transparency may be more productive than incentive-based strategies.

Future research should investigate how motivations evolve with repeated use, explore differences between first-time and experienced users, and assess the transferability of these findings across different cultural and institutional contexts. Overall, this study emphasizes the importance of aligning platform design and governance with citizens' civic motivations and expectations of public value in digital security reporting.

REFRENCES

[1] Abu-Tayeh, G., Neumann, O., & Stuermer, M. (2018). Exploring the motives of citizen reporting engagement: Self-concern and other-orientation. *Business & Information Systems Engineering*. https://doi.org/10.1007/s12599-018-0530-8

[2] Alhammad, M. M., Hajar, L., Alshathry, S., & Alqasabi, M. (2021). Motivational factors impacting the use of citizen reporting applications in Saudi Arabia: The case of Balagh application. *International Journal of Advanced Computer Science and Applications, 12*(6), 264–271. Retrieved from https://thesai.org/Downloads/Volume12No6/Paper_29-Motivational_Factors_Impacting_the_Use_of_Citizen_Reporting.pdf

[3] Alotaibi, R. M., Ramachandran, M., Kor, A., & Hosseinian-Far, A. (2016). Factors affecting citizens' use of social media to communicate with the government: A proposed model. *Electronic Journal of e-Government, 14*(1), 60–72. Retrieved from http://www.ejeg.com

[4] Bertot, J. C., & Jaeger, P. T. (2010). Engaging the public in open government: Social media technology and policy for government transparency. Retrieved from http://tmsp.umd.edu/TMSPreports_files/6.IEEE-Computer-TMSP-Government-Bertot-100817pdf.pdf

[5] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

[6] Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology, 22*(14), 1111–1132. https://doi.org/10.1111/j.1559-1816.1992.tb00945.x
[7] Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Springer.
[8] de Reuver, M., Stein, S., & Hampe, J. F. (2013). From eParticipation to mobile participation: Designing a service platform and business model for mobile participation. *Information Polity, 18*(1), 57–73. https://doi.org/10.3233/IP-2012-0276
[9] Dorner, V., et al. (2024). Encouraging citizen reporting of sustainability and infrastructure problems in smart cities. In *Proceedings of the 57th Hawaii International Conference on System Sciences*. Retrieved from https://scholarspace.manoa.hawaii.edu/items/19eb8367-cada-453e-a990-da7bc61b9cf5
[10] Grégoire, Y., Laufer, D., & Tripp, T. M. (2010). A comprehensive model of customer direct and indirect revenge: Understanding the effects of perceived greed and customer power. *Journal of the Academy of Marketing Science, 38*(6), 738–758. https://doi.org/10.1007/s11747-009-0186-5
[11] Hofstede, G. (1983). National cultures in four dimensions: A research-based theory of cultural differences among nations. *International Studies of Management & Organization, 13*(1–2), 46–74. https://doi.org/10.1080/00208825.1983.11656358
[12] Ichiguchi, T. (2011). *Robust and usable media for communication in a disaster*. NISTEP Science & Technology Foresight Center. Retrieved from http://data.nistep.go.jp/dspace/bitstream/11035/2871/1/NISTEP-STT041E-44.pdf
[13] Kamel Boulos, M. N., Resch, B., Crowley, D. N., Breslin, J. G., Sohn, G., Burtner, R., & Chuang, K.-Y. (2011). Crowdsourcing, citizen sensing and sensor web technologies for public and environmental health surveillance and crisis management. *International Journal of Health Geographics, 10*, 67. https://doi.org/10.1186/1476-072X-10-67
[14] Kaschesky, M., & Bouchard, G. (2011). Opinion mining in social media: Modeling, simulating, and visualizing political opinion formation in the web. In *Proceedings of the 12th Annual International Digital Government Research Conference* (pp. 317–326). https://doi.org/10.1145/2037556.2037607
[15] Lee, D., Kim, Y., & Lee, J. (2024). Do monetary or nonmonetary incentives promote citizens' use of a government crowdsourcing platform? *Public Administration, 102*(4), 1492–1512. Retrieved from https://onlinelibrary.wiley.com/doi/10.1111/padm.12985
[16] Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly, 29*(4), 446–454. https://doi.org/10.1016/j.giq.2012.06.003
[17] Liu, H. K. (2021). Crowdsourcing: Citizens as coproducers of public services. *Policy & Internet, 13*(2), 315–331. Retrieved from https://onlinelibrary.wiley.com/doi/10.1002/poi3.249
[18] Matthews, P., Parsons, A., et al. (2022). Dog fouling and potholes: Understanding the role of everyday complaints for public policy. *Local Government Studies*. Retrieved from https://dspace.stir.ac.uk/handle/1893/34316
[19] Mergel, I. (2013). Social media adoption and resulting tactics in the U.S. federal government. *Government Information Quarterly, 30*(2), 123–130. https://doi.org/10.1016/j.giq.2012.12.004
[20] Neumann, O., & Schott, C. (2023). Behavioral effects of public service motivation among citizens: Testing the case of digital co-production. *International Public Management Journal, 26*(2), 175–198. https://doi.org/10.1080/10967494.2021.1937413
[21] Oreg, S., & Nov, O. (2007). Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values. *Computers in Human Behavior, 23*(1), 205–223. https://doi.org/10.1016/j.chb.2007.09.007
[22] Romano, M., Onorati, T., Aedo, I., & Diaz, P. (2016). Designing mobile applications for emergency response: Citizens acting as human sensors. *Sensors, 16*(3), 406. https://doi.org/10.3390/s16030406
[23] Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020
[24] Schmidthuber, L., Hilgers, D., Gegenhuber, T., & Etzelstorfer, S. (2017). The emergence of local open government: Determinants of citizen participation in online service reporting. *Government Information Quarterly, 34*(3), 457–469. https://doi.org/10.1016/j.giq.2017.07.001
[25] Shin, B., Floch, J., Rask, M., Bæck, P., Edgar, C., Berditchevskaia, A., Mesure, P., & Branlat, M. (2024). A systematic analysis of digital tools for citizen participation. *Government Information Quarterly, 41*(3), 101954. https://doi.org/10.1016/j.giq.2024.101954
[26] Susanto, T. D., Diani, M. M., & Hafidz, I. (2017). User acceptance of e-government citizen report system: A case study of City113 app. *Procedia Computer Science, 124*, 560–568. https://doi.org/10.1016/j.procs.2017.12.190

[27] Taeihagh, A. (2017). Crowdsourcing, sharing economies, and development. *Journal of Developing Societies*. https://doi.org/10.1177/0169796X17710072
[28] Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 36*(1), 157–178. Retrieved from https://pdfs.semanticscholar.org/512d/d3c7e1b55786e6f918bd0411ff744bb4cf62.pdf
[29] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*. https://doi.org/10.2307/2634758
[30] Voorberg, W. H., Jilke, S., Tummers, L., & Bekkers, V. (2018). Financial rewards do not stimulate coproduction: Evidence from two experiments. *Public Administration Review, 78*(6), 864–873. https://doi.org/10.1111/puar.12896
[31] Wijnhoven, F., Ehrenhard, M., & Kuhn, J. (2015). Open government objectives and participation motivations. *Government Information Quarterly, 32*(1), 30–42. https://doi.org/10.1016/j.giq.2014.10.002
[32] Wu, C.-G., Gerlach, J. H., & Young, C. E. (2007). An empirical analysis of open source software developers' motivations and continuance intentions. *Information & Management, 44*(3), 253–262. https://doi.org/10.1016/j.im.2006.12.006