



Government Services and Channel Choice: An Empirical Investigation of the Factors Influencing Channel Choice in the Southern Metropolitan Cities of India

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ABSTRACT

India is a diverse country with varying demographic characteristics, different people tend to choose different channels to avail government services. With the varying preferences among the public multi-channel management thus has become one of the critical aspects of public service delivery. The channels such as traditional, electronic, and mobile government (MG) services are mainly used in delivering the services. In this direction, the study analysed the critical determinants impacting channel use and channel satisfaction for which primary data has been collected using a questionnaire survey (391 responses). The results of ordinal logistic regression indicated the significance of demographic factors viz. gender, education and income on channel use and satisfaction. Further age was found to have a critical influence on MG use. Further, the attitudinal dimensions (ease of use, usefulness), transparency, internet access and new technology acceptance were having a significant influence on both indicators of channel choice (use and satisfaction) especially stronger towards MG services. The discussions and implications both from theoretical and managerial perspectives are laid down accordingly based on the results in the paper.

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INTRODUCTION

Government across the world is focusing on digitization, and India is no exception. India is going digital to bridge the growth gap, as evidenced by key initiatives such as the Digital India Program and MobileSeva (Kamal et al., 2016). These transformations began with web-based electronic government (EG) initiatives and have since been accelerated by technologies such as mobile, cloud, social media, and blockchain. Here, the government is collaborating with several digital initiatives to improve the transparency and reach of its public services. However, the issue of low adoption rates among citizens persists (PWC India, 2022). Further, due to India's vast and diverse geography, issues about economic and social factors like the digital divide, continue to limit digital adoption (Pal et al., 2020; Pick and Sarkar, 2015). Digital technologies are vital in improving reach and usability, especially in easing the operational processes of government services. However, for success, additional focus is required at the strategic governance and service delivery levels to enhance the widespread adoption of these services.

In the early stages of India's digital journey, the EG was playing a critical role, which is now transforming towards newer channels, such as MG (Imam et al., 2022; Sharma et al., 2021). Furthermore, with the penetration of these technologies and their potential, governments around the world are shifting to a 'digital by default service delivery strategy (Marien et al., 2016). However, some people continue to use traditional government (TG) channels, and few are comfortable with EG services, even though mobile government (MG) services are becoming more popular (Reddick, 2010; Reddick et al., 2020). Thus, with the availability of multiple channels for obtaining government services and the presence of dynamics in channel selection among users, there is a need to gain a better understanding of the factors that influence the public's channel selection. In this regard, research on multi-channel management has thus gained popularity. The insight on the same would assist the decision-makers to implement these channels effectively and improve services considering user characteristics and preferences (Madsen et al., 2019; Reddick and Turner, 2012).

Channels are the mechanisms, processes, or protocols through which citizens communicate with various government jurisdictions to obtain information or to avail the services (Reddick et al., 2020). A citizen's channel choice refers to the selection of a specific channel for contact to obtain services, address a specific service issue, or as an ongoing preference for government contact (Reddick et al., 2020; Pieterse and Ebbers, 2020). Traditional methods (offices, phones), EG (official websites, emails), and MG are the most common channels available to citizens (mobile apps) (Reddick et al., 2012; Reddick et al., 2020). According to Reddick and Turner (2012), Muller et al. (2021) understanding the influences of key determinants on channel choice behaviour is critical in developing service delivery strategies. Several determinants such as demographic factors, technological capacity in terms of access and skills, security and privacy, and service quality dimensions such as trust, transparency, and responsiveness were mainly considered in previous studies (Laenens et al., 2018; Reddick and Anthopoulos, 2014; Reddick et al., 2012; Reddick et al., 2020; Muller et al., 2021). Furthermore, the perceived value or attitudinal dimensions, and the nature of service were also proved critical in channel choices (Van den Boer et al., 2014; Fu and Lee, 2014; Reddick et al., 2012). The study thus builds on previous research by incorporating various theories and determinants relevant to channel selection to assess channel use and satisfaction which are the two key indicators of channel choices. An integrated model based on user demographics (gender, age, education, income), attitudinal dimensions (usefulness, ease of use), view of government (transparency, responsiveness), technological capacity (internet access, internet skills), trust, and new technology acceptance was developed for the purpose. The main objective of this study is to investigate the relationships between channel choice (i.e., use and satisfaction) on traditional and digital channels based on determinants considered through citizen perception surveys.

The study's scope is limited to Southern Indian metropolitan cities such as Bengaluru, Hyderabad, and Chennai. These Southern States dominate digital activities and have the highest adoption for these digital services (Kantar ICUBE, 2021). Furthermore, with metropolitan cities experiencing continuous growth and a large proportion of the population congregating there, service providers must prioritize improving digital services in these cities. It then helps in benchmarking and transferring these strategies to other cities. Only the most prominent government utility services, such as Aadhar, Passport, IRCTC, and so on, are commonly adopted in all three modes/channels and are referred to in the data collection process.

LITERATURE REVIEW

Overview

The penetration of information and communication technology (ICT) and digital drive initiatives are the key events occurring in enhancing the governance system. TG services have given way to digital channels such as EG and MG. In the present context, EG refers to the use of digital means by citizens to initiate contact with the government, like websites or email, or other digital methods (Emrah Kanat and Ozkan, 2009). Access to services at any time from home or office, cost savings, streamlined procedures, and increased service transparency are the primary benefits of EG (Ndou, 2004). However, the higher cost of required resources such as computers and internet connectivity, limits the adoption of these newer services (Ntaliani et al., 2008). Further, with the widespread adoption of mobile and mobile internet, a gradual shift towards MG services is taking place (Cardullo and Kitchin, 2019). MG refers to the use of wireless and mobile technology to access government information and services (Reddick et al., 2012). It provides mobility (anytime, from anywhere), enhancing the reach and timely delivery of information. It is easier to use because people are becoming accustomed to similar technologies (Ntaliani et al., 2008). It is thus thought to play an important role in expanding reach to most parts of the country, including the rural community (Mengistu et al., 2009).

However, evidence suggests that some people continue to prefer traditional channels of interaction such as counter visits, physical letters, and phone calls over digital modes (Van Dijk, 2020). In this direction, several studies are being conducted to better understand the behavioural attributes that lead to a particular channel choice and their role in the formation of satisfaction and channel use decisions (Reddick and Anthopoulos, 2014; Madsen et al., 2019). For example, Pieterse (2010) conducted a study on channel selection and primarily focused on analyzing citizens' channel behaviour, discussing channel usage, and exploring citizens' channel preferences. Similar studies were later conducted in countries such as the United States, Canada, China, and Egypt (Reddick, 2010; Reddick et al., 2012; Reddick et al., 2020).

Review on Channel Choice and Government Services

Channel choice studies attempt to explain why people prefer and use certain channels over others when interacting with government service channels (Reddick et al., 2020). The provision of public services, information acquisition, and citizen engagement with the government are the primary activities which these services focus on. Here, the government is continuously implementing newer digital channels which are believed to be efficient and cost-effective, however, the adoption of these is still not at the desired extent (Pieterse and Ebbers, 2020). The research in the area has gained prominence which adopted various theories such as the digital divide theory, gratification theory, self-determination theory, technology acceptance model, Media richness theory, and status quos bias theory in identifying the factors and understanding the channel choice behaviour (Muller et al., 2021; Reddick et al., 2012).

Here, users' personal factors are one of the prominent determinants considered, which can be categorized into user-based and channel-based factors. In user-based factors the user characteristics like gender, age, education, experience, socioeconomic factors like income, etc. are mainly considered (Schmidhuber et al., 2017; Reddick et al., 2012). It is usually examined through the lens of the digital divide (Ebbers et al., 2016). Studies indicated mixed results for all demographic factors with few variables being significant and few not. However, age and income, and education were proved the most critical ones (Fu and Lee, 2014; Muller et al., 2021; Pieterse and Ebbers, 2020; Reddick et al., 2020; Reddick et al., 2012). Further, channel choice proved that disadvantaged users are less likely to use new digital channels, such as MG (Reddick and Turner, 2012). For instance, a study among Egyptian residents revealed the presence of a digital divide not only in the use of EG services but also in the use of telephones and was more resilient to using service centres (Pieterse and Ebbers, 2020; Reddick et al., 2012; Reddick and Turner, 2012). Hence, managing individual user characteristics and task attributes is critical in effective multi-channel operations. Emphasis should be on a detailed operationalization of problem complexity and problem ambiguity, and the role these determinants play in service channel preferences and use (Madsen et al., 2019; Madsen et al., 2020; Pieterse and Ebbers, 2020; Pieterse and Ebbers, 2008). The key to the government's advancement is to better understand how EG can supplement, rather than replace, the available public service channels (Madsen et al., 2019; Pieterse and Ebbers, 2020).

In channel-based factors the studies have primarily focused on channel use and channel satisfaction in the assessment of channel choice behaviour (Muller et al., 2021; Reddick et al., 2020). The individual's satisfaction level on a particular channel has a positive influence on that channel, and may negatively influence others (Madsen and Kraemmergaard, 2015; Reddick and Turner, 2012). Satisfaction was also proved critical in enhancing channel use (Fu and Lee, 2014). Accordingly, many studies attempted to explain users' choice of traditional, e/m governments using user satisfaction (Reddick et al., 2020; Muller et al., 2021; Ebbers et al., 2016). Furthermore, individuals at times choose channels rationally based on the best available and most accessible option, and sometimes unreasonably based on habit (Ebbers et al., 2016; Pieterse, 2010).

The individual's ability to connect and their abilities and comfort with the internet is another vital aspect that also influences channel choices (Laenens et al., 2018; Reddick et al., 2020). The task characteristics such as task complexity and ambiguity (Ebbers et al., 2016), channel characteristics such as ease of use and usefulness (Laenens et al., 2018; Pieterse and Ebbers, 2020), and situational constraints like time availability can also explain users' channel preferences (Van den Boer et al., 2014; Laenens et al., 2018; Pieterse and Ebbers, 2020). Similarly, Fu and Lee (2014) indicated the criticality of trust at a detailed level of insight into political trust, internet trust, and perceived risk on channel choices. However, though the level of fulfilment with channel choice is important for users, the question for the government is whether this prompts more notable citizen support and realization (Pieterse and Ebbers, 2020; Serrano-Cinca et al., 2018). Therefore, Madsen et al. (2020) recommended some good multi-channel strategies after studying conditions unique to each country for the effective implementation of government services.

Development of Conceptual Model

A review of the literature revealed several critical dimensions that are relevant in this context. The study thus extended and integrated the conceptual framework developed by Reddick et al. (2020) and Muller et al. (2021). The determinants considered are described below.

Channel use and Channel Satisfaction

The channel choice studies primarily consider channel use and channel satisfaction as the two key dependent variables which are influenced by several independent factors such as user personal characteristics, trust, transparency and quality of channels etc. (Fu and Lee, 2014; Laenens et al., 2018; Muller et al., 2021; Reddick et al., 2020).

Channel use indicates the use of a particular channel for availing of any type of government service. It can generally be recorded in terms of number of times (i.e. frequency), duration, etc. (Muller et al., 2021; Reddick et al., 2020). Recent studies on government services consider TG, EG and MGas the three main channels. Here, digital channels are considered to be more cost-efficient than traditional channels thus impacting the use of digital channels (Ebbers et al., 2008; Pieterse and Ebbers, 2020; Reddick and Anthopoulos, 2014; Reddick and Turner, 2012). Moreover, the presence of internet connectivity among many, and the mobility offered in mobile-based services makes this mode a convenient one and thus people tend to use MGservices over others (Reddick et al., 2020). However, most previous literature has mainly indicated the criticality of user personal characteristics in channel selection or use (Muller et al., 2021; Reddick et al., 2020).

The presence of a digital divide has been proven to hinder the adoption of newer technologies like EG and MG (Madsen et al., 2019; Reddick et al., 2012). For instance, Pietersens and Ebbers (2008), Muller et al. (2021) found that lower-education and higher-aged people tend to have lower acceptance of EG/MG services and prefer traditional channels. The capabilities of the users towards internet use (Madsen and Kraemmergaard, 2015; Muller et al., 2021; Reddick et al., 2020), task characteristics, e.g., task complexity and ambiguity (Van den Boer et al., 2014; Ebbers et al., 2016; Reddick et al., 2020) are other key determinants that impact the channel use. Trust in technology is another element which has been proven critical in Channel use or selection (Fu and Lee, 2014; Muller et al., 2021). For instance, citizens prefer to avoid going to physical offices due to the process complexity and time required, poor service quality, and lower trust in the service personnel (Reddick and Anthopoulos, 2014; Reddick and Turner, 2012). However, situational factors like availability, practical constraints like availability of time or disabilities, and service effectiveness impact channel usage and preferences (Laenens et al., 2018; Reddick and Turner, 2012).

Channel Satisfaction is defined as an individual's reactions or feelings regarding their usage experiences with a specific service channel (Muller et al., 2021; Wang and Teo, 2020). The quality of service, where elements such as transparency, responsiveness, and so on have been shown to have a significant impact on satisfaction (Laenens et al., 2018; Muller et al., 2021; Reddick et al., 2020). Meeting users' expectations create a positive experience by increasing satisfaction (Fu and Lee, 2014; Laenens et al., 2018). According to studies on channel choice for government services, the benefits of newer technologies and poor service delivery in traditional modes are driving greater adoption of digital technologies (Laenens et al., 2018; Muller et al., 2021). Furthermore, users' previous experiences and satisfaction with the service provider and the channel are thought to have a positive impact on future use. Thus, increased satisfaction will influence channel use, and channel use also leads to increased satisfaction (Reddick and Turner, 2012).

User Demographics

The literature on channel choice has revealed that an individual's demographic characteristics have a significant impact on channel preference and use for government services (Pieterse and Ebbers, 2020; Reddick et al., 2012). Here, most studies looked at variables like gender, age, education, and income, with a few others also considering occupation and experience (Muller et al., 2021; Reddick et al., 2012, 2020; Reddick and Anthopoulos, 2014; Schmidhuber et al., 2017). The socioeconomic status of users is typically examined as a determinant of channel choice through the lens of the digital divide (Ebbers et al., 2016). The digital divide is the gap in access to and use of technology between different groups of people.

The differences in users' personal characteristics influence their channel choice. Studies have found that well-educated and younger generations have more competencies to engage in newer digital technologies such as EG and MG (Pieterse and Ebbers, 2020; Reddick et al., 2020). However, lower-income and elderly people tend to have lesser knowledge and access to digital resources digital thereby preferring traditional channels (Pieterse and Ebbers, 2008; Reddick and Anthopoulos, 2014). Further, people tend to prefer traditional modes for complex tasks such as obtaining government services and are more likely to use new technologies for information gathering, and entertainment (Ertio et al., 2016; Reddick and Turner, 2012). Besides, males are more quick to adopt newer technology like EG and MG (Muller et al., 2021; Pieterse and Ebbers, 2020; Reddick et al., 2020). Overall, the findings are inconsistent and are influenced by context, location, situation, and other factors (Laenens et al., 2018).

Technology Capacity

Technology capacity is essentially an indication of a people's capacity to use a specific technology. Studies on channel selection have primarily focused on two key elements: the availability of resources (access) and the user's ability to use the channel (skills) (Laenens et al., 2018; Reddick et al., 2020; Reddick and Anthopoulos, 2014). The availability of resources is also referred to as facilitating condition, influencing the access to these services and is proven significant (Laenens et al., 2018). Inadequate resources, such as poor or no internet, and a lack of computers or mobile phones, have been major impediments to people adopting newer digital technologies (Pieterse and Ebbers, 2020; Reddick et al., 2012; Reddick et al., 2020). Similarly, even if someone is predisposed to use the internet due to their trust and acceptance of technology, their ability to utilize it efficiently is determined by their skills (Fu and Lee, 2014; Van Deursen et al., 2016). A lack of ability among users in terms of skills, knowledge, ease of use, and so on leads to an individual avoiding digital channels and thus relying on traditional modes (Pieterse and Ebbers, 2020; Reddick et al., 2020). Along similar lines, Laenens et al. (2018), Madsen et al. (2019) have indicated that the lack of information and knowledge about EG and MG is a major barrier to adoption. Furthermore, while m-applications improve mobility, smaller screen sizes for complex tasks make them more difficult to use, so people prefer EG over MG (Madsen et al., 2019). Thus, ease of use relates to the access aspect and was proved significant in an individual's channel selection (Reddick et al., 2020).

Technology Acceptance and Trust

Technology acceptance seeks to explain why some people accept technology more quickly than others. To assess this aspect, studies on channel choice consider two elements: new technology acceptance and trust. Behavioural studies indicate that personality traits influence the acceptance of new technology (Laenens et al.,

2018). Some people are more inclined to newer technologies and readily accept them. While others, tend to wait and follow others after seeking their thoughts and opinions (Van den Boer et al., 2014; Laenens et al., 2018; Reddick et al., 2020). In the study, the factor 'new technology acceptance' refers to the degree to which a person accepts and uses a new technology (Reddick et al., 2020).

Trust is another notable factor impacting technology acceptance. Here, two critical components are trust in the service provider and trust in the internet and other relevant technologies (such as computers and mobile phones). Normally, people's trust in newer technologies, such as internet-based EG and MG, is typically undermined by perceived risk (Fu and Lee, 2014; Laenens et al., 2018; Reddick et al., 2020; Reddick and Anthopoulos, 2014). Hence, if internet users believe that government channels are safe and credible, they will be more likely to use and be satisfied with them (Fu and Lee, 2014). Further, trust in government refers to trustworthiness and expectation that gradually develops during citizens' continuous interactions with governments, and it has been viewed as a crucial indicator to assess the relationship between the government and the general public (Sharma et al., 2021; Wang and Teo, 2020). A higher level of trust in government/service providers tends to increase people's acceptance of any newer technology and is critical in developing a favourable attitude towards these new technologies or services (Fu and Lee, 2014; Laenens et al., 2018). Similarly, increased satisfaction and trust in traditional channels and their service personnel induces resistance among some people to adopt newer technologies (Madsen et al., 2019; Pieterse and Ebbers, 2020).

Attitudinal Beliefs

An individual's perceived belief or value in a particular channel influences its use and can be classified as an attitudinal belief towards channels (Reddick and Turner, 2012). People with a favourable, positive attitude toward digital technologies are more likely to use EG or MG services (Laenens et al., 2018; Reddick and Anthopoulos, 2014; Wang et al., 2020). Under this aspect, studies on channel choices primarily considered elements such as usefulness, and ease of use (Fu and Lee, 2014; Laenens et al., 2018; Reddick and Anthopoulos, 2014). Reddick and Turner (2012) highlighted the importance of public service value in people's channel selection. Laenens et al. (2018), on the other hand, demonstrated the importance of perceived usefulness, and perceived ease of use, as determinants influencing channel choices.

Ease of use or task complexity refers to how easily an individual can perform a service-related task. It is primarily concerned with the number of interconnected steps required to avail the services (Venkatesh et al., 2016). Most people believe that newer technologies, such as MG and EG, are more convenient, time-saving, and efficient in delivering digital services, and they prefer to use them over traditional methods (Van den Boer et al., 2014; Laenens et al., 2018). Though online channels are better at reducing complexity, studies show that people find it complicated and thus prefer traditional channels (Ebbers, 2016; Sharma et al., 2021). Further, less educated and older people are uneasy and perceive these digital modes to be complex.

Similarly, another main reason for people's aversion is a lack of understanding about the benefits and utility of these digital technologies. Perceived usefulness is thus an important factor that refers to how much a person believes that using a particular system will improve their job performance (Laenens et al., 2018; Reddick and Turner, 2012; Reddick and Anthopoulos, 2014). For instance, the benefits and relative advantages of MG over EG make MG more appealing than EG (Muller et al., 2021; Reddick et al., 2020). Similarly, studies have shown that people tend to avoid traditional modes as they prefer less interaction with service personnel and also because of the prevalence of negative attitudes towards traditional channels (Laenens et al., 2018; Reddick et al., 2020). Thus, the perception of usefulness and ease of use of any channel has a direct impact on people's satisfaction and channel selection (Laenens et al., 2018; Reddick and Turner, 2012).

View of the Government

The view of service providers like the government and its units delivering these services is critical for developing citizen compliance towards the use of these channels (Wang et al., 2020). Here, the perceived quality of any service or channel has a direct impact on satisfaction and subsequent use (Reddick et al., 2020). Most studies of channel selection and channel management thus proved the criticality of quality dimensions in enhancing channel use and satisfaction (Fu and Lee, 2014; Madsen et al., 2019; Reddick et al., 2020). Here, transparency and responsiveness are considered two critical elements. Transparency and the right to access government information are now widely acknowledged as essential for building trust in government and

increasing public participation (Fu and Lee, 2014; Reddick et al., 2020). Increased transparency in government services makes people more comfortable in using newer channels like MG and EG (Laenens et al., 2018; Madsen et al., 2020; Wang et al., 2020). Clarity on tasks and how to perform them in digital services enhances usage rates, whereas lower transparency increases uncertainty, reducing trust and usage of digital services (Fu and Lee, 2014; Madsen et al., 2019).

Furthermore, government responsiveness refers to the extent to which citizens believe the government responds to their concerns in a timely and appropriate manner (Reddick et al., 2020). With less interaction with service personnel in digital channels, an immediate response to their queries is required. Otherwise, people avoid digital channels and would go with traditional channels (Madsen et al., 2019; Van Deursen et al., 2016). A less responsive system reduces trust and satisfaction in the system, influencing channel selection among users (Fu and Lee, 2014; Reddick and Turner, 2012). In a similar vein, Reddick and Anthopoulos (2014) emphasized the importance of service perception, which focuses on quality elements of user satisfaction toward a channel.

The conceptual model of the study is shown in Figure 1.

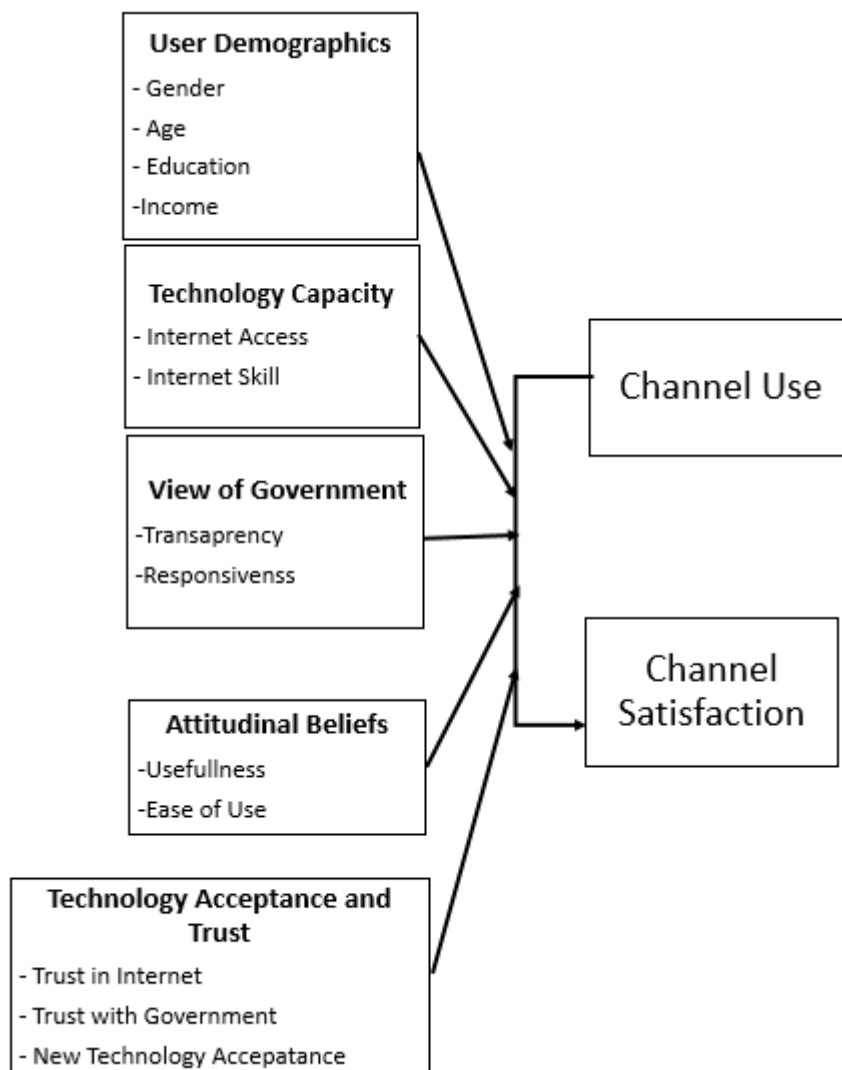


Figure 1 The conceptual model of the study

METHODOLOGY

The study takes an empirical approach, employing a questionnaire survey method to examine people's channel preferences. Due to their digital and economic developments, the three major metropolitan cities of Southern India, Bengaluru, Chennai, and Hyderabad, are being considered for the survey. Hence, channel choice studies for government services in these locations are critical, and the insights gained are critical in effective channel implementation.

A total of 391 final responses were obtained, far exceeding the desired sample size of 270. The desired sample size is calculated using the standard rule of 10 times the number of items, which in this study is 27. (Hair et al., 2017). The sampling method used here is convenience sampling, which is commonly used in citizen-based adoption studies (Andrade, 2021; Zeng and Li, 2022). Furthermore, the survey's goal was to collect proportionately equal data from each of the three cities. The data was gathered using both a field survey and online forms, with the latter receiving the vast majority of responses. The data is then quantitatively analyzed using ordinal logistic regression analysis to demonstrate the significance of the relationships between the determinants and the outcome variables. It is a widely used method because the data were based on both nominal and ordinal scales, and the dependent variables were categorical, with three options (Reddick et al., 2020).

Questionnaire Development

The questionnaire developed had 27 questions on the variables, including demographics. The items are drawn from previous literature to assess factors such as user characteristics, technology capacity, new technology acceptance, satisfaction, trust, and attitude beliefs as observed in the conceptual framework on channel choice (Figure 1). The items included both ordinal and nominal responses, with the ordinal responses using a five-point Likert scale. The questionnaire was initially subjected to face validity, in which 4 experts and 5 respondents provided feedback on the questionnaire's quality in terms of relevance, clarity, and ease, and was then subjected to minor changes. To collect data for the study, both a print and an online questionnaire (i.e. Google forms) were created. The item specifics and sources of reference are listed below (Table 1).

Table 1 Details of items used in the questionnaire along with the sources

| Factors | Items | Sources |
|---------------------------------------|---|---|
| User characteristics | Gender, Age, Education, Monthly income | Muller et al. (2021) |
| Technological Capacity | I often use the Internet. I am skilled at using the Internet. For an easy task (eg. electricity bill payment), I would choose this channel. For a complex task (submitting your taxes), I would choose this channel. | Reddick et al. (2020) |
| Technology Acceptance and Trust | In general, I am able to accept new technology. In general, I trust the information on the internet. I believe that my Government is very transparent. I believe that my Government is quite responsive. | Reddick et al. (2020) |
| Technology Acceptance and Trust | In general, I am able to accept new technology. In general, I trust the information on the internet. I believe that my Government is very transparent. | Muller et al. (2021); Reddick et al. (2020) |
| Attitudinal Beliefs | I feel that this channel is more useful over others for providing government services. (1-traditional government; 2-electronic government; 3- mobile government) I find it very convenient to avail Government services in this channel over others. (1-traditional government; 2-electronic government; 3- mobile government) I feel of the three channels this channel is very easy to use. (1-traditional government; 2-electronic government; 3- mobile government) I believe that my personal and financial data are well protected when using: (1- traditional government; 2-electronic government; 3- mobile government). | Ortlinghaus et al (2019); Pieterse et al. (2008) |
| Channel Choice & Channel Satisfaction | I often use Government mobile applications. I am very satisfied by the services provided by Government mobile applications. I often use the Government websites. I am very satisfied by the services provided by the Government websites. I often use the traditional modes of the Government. I am very satisfied by the services provided by the traditional modes of the Government. | Muller et al. (2021); Reddick et al. (2020) |
| Channel Use | This is my preferred channel for making reservations (eg. train tickets). This is my preferred channel for making payments (eg. taxes, bills etc). This is my preferred channel to process license and qualification authentications (eg. Aadhar). | Wang et al. (2020) |

RESULTS AND ANALYSIS

Descriptive Analysis

Table 2 reports the scores of the respondents towards the service channel use and satisfaction for comparison. It can be observed that the channel use score for EG is the highest (3.50) followed by MG at 3.30. Also, the satisfaction score for both EG (3.14) and MG (3.15) are almost equal. It indicates the dominance of EG at present and the penetration of MG among the people currently. The TG had the least score on both dimensions i.e. use (2.55) and satisfaction (2.53) indicating that it is the people's least preferred channel at present for availing government services.

Table 2 Comparison of respondent use of and satisfaction with service channels

| Channels | Average Use Score | Average Satisfaction Score |
|-----------------------------|-------------------|----------------------------|
| Mobile Government (MG) | 3.30 | 3.15 |
| Electronic Government (EG) | 3.50 | 3.14 |
| Traditional Government (TG) | 2.55 | 2.53 |

Further, the correlations among the different channels for level of channel use and channel satisfaction are presented in Table 3 and Table 4 respectively. The results of correlation analysis on channels and the level of channel use score (Table 3) indicated the significance of TG use with EG use and MG use with EG use. However, TG use was having no significant relationship with MG use. Further, the strength of correlation was stronger between the EG use to MG use indicating the potential of stronger shifts from EG to MG among people. Moreover, the people's shift from TG to MG directly is having no strength which means the potential shifts will be in the direction of TG to EG and then people may shift from EG to MG.

Table 3 Correlations among respondent use of service channels

| | MG Use | EG Use | TG Use |
|--------|---------|---------|--------|
| MG Use | 1 | | |
| EG Use | 0.202** | 1 | |
| TG Use | 0.086 | 0.190** | 1 |

Table 4 Correlations among respondent satisfaction with service channels

| | MG Satisfaction | EG Satisfaction | TG Satisfaction |
|-----------------|-----------------|-----------------|-----------------|
| MG Satisfaction | 1 | | |
| EG Satisfaction | 0.182** | 1 | |
| TG Satisfaction | -0.198** | 0.365** | 1 |

Further, the correlation of the channel's satisfaction scores all had a significant relationship. However, the stronger correlation satisfaction score was between TG and EG (0.365) indicating the transformation and usefulness of EG over TG. Also, the strength of EG to MG satisfaction though significant not as stronger compared to TG to EG indicating probably the mixed preferences among people towards EG and MG. It is also key to note that the results indicated a negative significant correlation between TG satisfaction and MG satisfaction which indicates the people who will be more satisfied with MG are less likely to be satisfied and preferring with TG and vice versa. These results clearly show how EG has transformed and taken over TG in availing government services and how EG and MG together are balancing the benefits of each other and being used by people.

Table 5 provides the descriptive statistics of the scores of the variables that are considered in the study. Of the variables as discussed previously on mean score and correlations among channels EG and MG have almost equal scores on channel use and satisfaction while TG had the lowest. Of the variables, Internet access (4.75), Internet skill (4.40) and New technology acceptance (4.58) were found to have the highest mean scores. It indicates the criticality and readiness of these dimensions for digital transformations. The trust, transparency and responsiveness too had a mean score above average score of 3 which too is critical to note with the highest being for the trust of 3.46. Further, the mean score for Usefulness (2.39), and Ease of Use (2.45), being in the range of 2 to 3 indicates that people perceive EG and MG to be more useful and easier to use for availing government services.

Table 5 Descriptive Statistics for the Variables

| | Descriptive Statistics | | | |
|---------------------|------------------------|----------------|---------|---------|
| | Mean | Std. Deviation | Minimum | Maximum |
| Internet Access | 4.75 | 0.571 | 1 | 5 |
| Internet Skill | 4.40 | 0.653 | 2 | 5 |
| New Tech Acceptance | 4.58 | 0.607 | 2 | 5 |
| Trust | 3.46 | 0.849 | 1 | 5 |
| Transparency | 3.08 | 1.010 | 1 | 5 |
| Responsiveness | 3.04 | 0.971 | 1 | 5 |
| Usefulness | 2.39 | 0.570 | 1 | 3 |
| Ease of Use | 2.45 | 0.605 | 1 | 3 |
| MG Use | 3.30 | 0.931 | 1 | 5 |
| MG Satisfaction | 3.15 | 1.005 | 1 | 5 |
| EG Use | 3.50 | 0.928 | 1 | 5 |
| EG Satisfaction | 3.14 | 1.021 | 1 | 5 |
| TG Use | 2.55 | 1.058 | 1 | 5 |
| TG Satisfaction | 2.53 | 1.012 | 1 | 5 |
| Gender | 0.35 | 0.476 | 0 | 1 |
| Age | 1.21 | 0.555 | 1 | 4 |
| Education | 2.13 | 0.519 | 1 | 3 |
| Income | 3.56 | 1.477 | 1 | 5 |

Note: a total of 391 complete responses were obtained

Results of Ordinal Logistic Regression Analysis

Table 6 presents the results of logistic regression analysis for the service channel use and its relationship with the determinants or independent variables. The results indicated a significant association between the demographic variables such as gender and education on all three channels of government services. Here, the males tend to have a positive orientation and females have a negative influence on the use of MG services in any of the channels. Further educated individuals tend to have a stronger inclination towards the use of MG services over the less educated individuals and this is stronger for the MG services than the other two channels. Age was found to have an inverse relation towards the use of MG services and a strong influence on the other two channels. Here, the youths in the age group of 18-30 years are more positive towards the MG services and this decreases gradually with the increase in age. Income had a significant association with the use of TG and MG services. Here the lower income category was observed to prefer the traditional channels and vice versa.

Moreover, the dimensions such as internet access, new technology acceptance and transparency were proved to be significant determinants for MG use. Moreover, trust, responsiveness and internet skills were found to be a non-significant determinant of the use of any channels. From the attitudinal belief perspective, both the dimensions' usefulness and ease of use were having significant influences towards the use of MG services. Here, the results indicated that people perceive the MG services to be more beneficial and convenient to use than the traditional service. Further, ease of use was also proved critical towards the use of EG and TG services. Here, if the people perceive MG to be easier to use then it would negatively influence the use of both the EG and TG services.

The results of the logistic regression analysis for the Channel's satisfaction with the determinants are presented in Table 7. The results showed the criticality of gender and education towards the satisfaction of MG services and not on other channels. Here, the male tends to be more satisfied with MG services positively than the females who had a negative influence. Similarly, the MG satisfaction level was found to decrease as the educational level decreased from PG and above to UG level qualification. Income too showed some significant relationship on all the channel's satisfaction. Here as the individual's household income decreases the MG satisfaction level tends to decrease. Similarly, EG satisfaction would be higher among people with a monthly income level of below 60,000, whereas for 60000 and above EG satisfaction would be decreasing. Similarly, lower-income people are having higher satisfaction with TG services and this decreases with the rise in income level. However, age was indicating no significant impact on Channel's satisfaction.

Table 6 Determinants of Service Channel Use

| | MG Use | EG Use | TG Use |
|---|-----------|-----------|-----------|
| Demographics | | | |
| Gender (Females) | -0.464** | -0.564** | -0.629*** |
| Age | | | |
| 1 (18-30yrs) | 3.789** | -0.13 | 1.421 |
| 2 (31-45) | 3.282** | -0.426 | 0.233 |
| 3 (46-60) | 3.216** | 2.697* | -0.435 |
| 4 (Above 60) | 0 | 0 | 0 |
| Education | | | |
| 1(12th pass and below) | -2.275*** | -1.027** | -1.394*** |
| 2 (UG) | -1.814*** | -1.513*** | -2.067*** |
| 3 (PG and Above) | 0 | 0 | 0 |
| Income | | | |
| 1 (less than INR 20000) | -0.702** | -0.256 | 0.117 |
| 2 (20000 – 40000) | -0.181 | 0.024 | 0.965*** |
| 3 (40000 – 60000) | 0.105 | 0.963*** | 0.924*** |
| 4 (60000 – 80000) | -0.901*** | 0.072 | 0.603* |
| 5 (Above 80000) | 0 | | 0 |
| Technological Capacity | | | |
| Internet Access | 0.564*** | 0.133 | -0.205 |
| Internet Skills | 0.041 | -0.13 | 0.249 |
| Technological Acceptance and Trust | | | |
| New Technology Acceptance | 0.352** | 0.246 | 0.298 |
| Trust | -0.052 | -0.115 | -0.193 |
| View of Government | | | |
| Transparency | 0.23** | -0.062 | -0.137 |
| Responsiveness | -0.019 | -0.034 | -0.09 |
| Attitudinal Beliefs | | | |
| Usefulness | | | |
| 1 (TG) | -1.232** | 0.58 | -0.746 |
| 2 (EG) | -1.002*** | 0.377 | -0.113 |
| 3 (MG) | 0 | 0 | 0 |
| Ease of Use | | | |
| 1 (TG) | -2.273*** | -0.96* | 2.882*** |
| 2 (EG) | 0.178 | -1.034*** | 0.271 |
| 3 (MG) | 0 | 0 | 0 |

Note: * is $p < 0.1$; ** is $p < 0.05$, *** is $p < 0.01$ representing statistical significance; Pseudo R-square for MG use is 0.12; EG use is 0.123, and for TG use is 0.136.

Moreover, the dimensions such as internet access, new technology acceptance and transparency were proved to be significant determinants for MG use. Moreover, trust, responsiveness and internet skills were found to be a non-significant determinant of the use of any channels. From the attitudinal belief perspective, both the dimensions' usefulness and ease of use were having significant influences towards the use of MG services. Here, the results indicated that people perceive the MG services to be more beneficial and convenient to use than the traditional service. Further, ease of use was also proved critical towards the use of EG and TG services. Here, if the people perceive MG to be easier to use then it would negatively influence the use of both the EG and TG services.

The results of the logistic regression analysis for the Channel's satisfaction with the determinants are presented in Table 7. The results showed the criticality of gender and education towards the satisfaction of MG services and not on other channels. Here, the male tends to be more satisfied with MG services positively than the females who had a negative influence. Similarly, the MG satisfaction level was found to decrease as the educational level decreased from PG and above to UG level qualification. Income too showed some significant relationship on all the channel's satisfaction. Here as the individual's household income decreases the MG satisfaction level tends to decrease. Similarly, EG satisfaction would be higher among people with a monthly income level of below 60,000, whereas for 60000 and above EG satisfaction would be decreasing. Similarly, lower-income people are having higher satisfaction with TG services and this decreases with the rise in income level. However, age was indicating no significant impact on Channel's satisfaction.

Table 7 Determinants of Service Channel Satisfaction

| | MG Satisfaction | EG Satisfaction | TG Satisfaction |
|--|-----------------|-----------------|-----------------|
| Demographics | | | |
| Gender (Female) | -0.567*** | 0.2 | -0.159 |
| Age | | | |
| 1 (18-30yrs) | 0.889 | -0.074 | -0.319 |
| 2 (31-45) | 1.534 | 0.524 | 0.629 |
| 3 (46-60) | -2.274 | -0.001 | 0.303 |
| 4 (Above 60) | 0 | 0 | 0 |
| Education | | | |
| 1(12th pass and below) | -0.625 | -0.219 | 0.166 |
| 2 (UG) | -692** | -0.483 | 0.279 |
| 3 (PG and Above) | 0 | 0 | 0 |
| Income | | | |
| 1 (less than INR 20000) | -1.162*** | 1.002*** | 1.578*** |
| 2 (20000 – 40000) | -0.218 | 0.602** | 0.138 |
| 3 (40000 – 60000) | -0.086 | 1.259*** | 0.093 |
| 4 (60000 – 80000) | -0.662* | -1.378*** | 0.341 |
| 5 (Above 80000) | 0 | 0 | 0 |
| Technological Capacity | | | |
| Internet Access | 0.383** | 0.047 | 0.135 |
| Internet Skills | -0.3* | -0.048 | -0.119 |
| Technology Acceptance and Trust | | | |
| New Technology Acceptance | 0.352** | 0.019 | -0.184 |
| Trust | -0.072 | 0.002 | 0.158 |
| View of Government | | | |
| Transparency | 0.28** | -0.277*** | -0.025 |
| Responsiveness | 0.007 | 0.164 | -0.117 |
| Attitudinal Beliefs | | | |
| Usefulness | | | |
| 1 (TG) | -0.165 | -0.441 | 1.143** |
| 2 (EG) | -1.197*** | 0.21 | 0.427* |
| 3 (MG) | 0 | 0 | 0 |
| Ease of Use | | | |
| 1 (TG) | -3.188*** | 0.518 | 2.786*** |
| 2 (EG) | 0.669*** | 0.004 | 0.152 |
| 3 (MG) | 0 | 0 | 0 |

Note: * is $p < 0.1$; ** is $p < 0.05$, *** is $p < 0.01$; Pseudo R-square for MG Sat. is 0.156; EG Sat. is 0.078, and for TG Sat. is 0.104.

The technological determinants such as internet access, internet skills, and new technology acceptance all were having significant influence on MG satisfaction. Here individuals with higher levels of internet access and a stronger inclination towards the use of new technology would be having higher satisfaction with MG services. Transparency was proved to have a significant influence on MG satisfaction, whereas for EG satisfaction it had a significant negative influence, probably indicating a lesser preference for EG services and more for MG services with an increased level of transparency. However, trust and responsiveness were found to be insignificant determinants impacting satisfaction on any of the channels.

Further, the attitudinal belief dimensions' usefulness and ease of use were proved to play a significant role in MG satisfaction and TG satisfaction and not in EG satisfaction. Here, the individuals who perceive MG services to be more useful and easy to use are having a higher level of satisfaction with the MG channel and this decreases with the people who perceive these two dimensions are stronger for EG and TG channels. Similarly, individuals who perceive TG to be useful and easy to use are having higher satisfaction with TG channels.

Discussions

Government services are transitioning from traditional to digital technologies (EG and MG). The correlation analysis between the channels demonstrated the phases of transformation from TG to EG and then to MG. However, the strength of the relationship between the TG and EG is stronger than the others, indicating significant differences between traditional and electronic services. Furthermore, EG had a higher mean score for channel use, indicating its current market dominance. It is now being taken over by MG Services, which has the highest satisfaction rating, followed by EG Services. To summarize, digital technologies are replacing traditional channels in the Indian market. Previous research indicated similar results especially the dominance of digital technologies, particularly MG channels (Muller et al., 2021; Pieterse and Ebberts, 2020; Reddick et al., 2020). Technological dimensions such as internet skills, access, and new technology acceptance were

higher among respondents, reflecting the dominance and people's capabilities in digital technologies, as reported by Laenens et al. (2018), Muller et al. (2021), and Reddick et al. (2020).

For demographic variables that influence channel use and satisfaction, the results were mixed. Males have a higher preference for MG services than females, and vice versa. Furthermore, there were clear differences in the use and satisfaction levels for MG services between the younger generation and the elderly. Similar differences were found in the majority of government service channel choice studies (Muller et al., 2021; Pieterse and Ebbers, 2020; Reddick and Anthopoulos, 2014; Reddick et al., 2012; Reddick and Turner, 2012).

Internet access, new technology acceptance, and transparency were found to be significant. These aspects are well supported in the literature, which indicates that for developing countries (such as India), internet access, reflecting the ability to afford and availability of resources, is a key factor impeding the acceptance of digital services such as MG. Furthermore, the lack of information on the services and support (i.e. who will take responsibility and sort users' issues if required reflecting on transparency in service) plays an important role in the use of MG services (Fu and Lee, 2014; Madsen et al., 2019; Madsen et al., 2020; Reddick and Turner, 2012; Reddick et al., 2020). However, it is encouraging to see that people perceive digital services to be useful and simple to use, which is a strong predictor of any technology adoption that benefits the country's digital transformation goals. These findings are consistent with those of Muller et al. (2021) and Reddick et al. (2020).

Similarly, the relationship between internet access, skills, and new technology acceptance all proved significant in increasing MG satisfaction levels. Furthermore, respondents showed a stronger preference for MG services in terms of usefulness and ease of use, which proved to positively influence its satisfaction level and is consistent with previous findings by Laenens et al. (2018), Reddick and Turner (2012), and Reddick et al. (2020). An inverse relationship was also discovered for the other types of people who prefer traditional channels and will be satisfied with them. For example, elderly people are very slow to adopt new technology, have poor internet skills, and prefer traditional services over MG services. Previous research by Pieterse and Ebbers (2020), and Reddick and Anthopoulos (2014) has also indicated this. Furthermore, for the use and satisfaction of these channels, trust and responsiveness are not critical determinants, indicating that people have adequate trust and confidence in the current government and its processes. As a common factor across all channels, it is unlikely to play a significant role in channel preferences. The findings are somewhat similar to those of previous studies by Reddick et al. (2020).

Implications

From a theoretical standpoint, the findings validated some of the key findings on channel preferences among people in developing countries like India. The study validated key observations such as the differences in attitudes towards MG services between men and women, as well as the greater preference for MG services among younger generations and those with higher incomes and education. Furthermore, the elderly are slower to adopt new technology and still prefer traditional services over digital ones. It thus validated and further supported by the study. The importance of internet access and transparency in improving channel use and satisfaction was emphasized. While statistically insignificant, trust and responsiveness cannot be ignored completely.

From a managerial standpoint, decision-makers must recognize that people have a stronger orientation towards digital technologies, particularly MG. However, due to access and skill factors, a few groups of people remain reliant on TG and, to a lesser extent, EG. However, study findings revealed that the determinants considered were primarily important for the use and satisfaction of MG services and less so for the other two channels. The need for these systems to be more transparent is critical in channel acceptance across other dimensions. Even attitudinal dimensions such as usefulness and ease of use are important in the adoption of these channels. Considering these factors, it is reasonable to conclude that decision-makers should prioritize transforming their services to digital modes such as MG, which have greater potential and acceptance among the public. However, the transparency of the service, the complexity of usage, and the extent to which digital technology outperforms other channels all play important roles that should be carefully considered and implemented accordingly. According to the study's findings, a mixed or Omni channel strategy with the presence of services in more than one channel appears to be a better strategy in the current circumstances.

CONCLUSIONS

The government's emphasis on transforming India into a digital economy, combined with people's changing demographics towards digital technologies, has resulted in the widespread use of electronic and mobile government services. However, because of a lack of adoption and the persistence of certain challenges for these digital channels, people continue to rely on traditional channels of service, such as government offices or centres, to obtain government services. Because of these dynamics and the presence of multiple channels, it was necessary to understand the people's attitudes and preferences towards the three major channels of government services, namely traditional, electronic, and mobile-based services. The study was conducted in important cities in Southern India due to the higher adoption of digital services such as e-commerce in this region of the country. For this purpose, a questionnaire survey approach was used to collect primary data (391 responses), which was then analyzed using logistic regression analysis.

The investigation of the determinants of channel use and satisfaction yielded few critical insights. Lower-aged younger generations, higher-income, and more educated individuals tend to be more positive towards digital channels and faster in adopting these latest technologies, giving MG channel use higher priority and satisfaction. The benefits of MG, its ease of use, and the level of transparency provided by service providers in MG are all critical for service enhancement impacting satisfaction and use. Internet access and positivity towards new technology acceptance are also important factors in the use of digital technologies such as MG. The implications for decision-makers were derived from these discussions on the key findings. The demographic characteristics of the target users, the need to be transparent, and the provision of adequate resources to improve access to a consistent and stable network in all locations, and compatible applications are critical factors for the government to improve the public's digital adoption, particularly in Southern India. The persistence of certain challenges on these in specific locations, as well as some people's preference for traditional services, suggests the need for Omni-channel (multiple channels) presence for a specific service to improve the delivery of government services. Overall, the study revealed a few key insights on determinants and their influence on government service channels, with the MG channel preferred. These important determinants, however, should be carefully considered.

However, there are a few limitations to the study's sampling strategy. A larger sample representation across all cities in Southern India and the country would have made the results more reliable, even though the current sampling method is adequate. Cross-sectional studies always have limitations when it comes to people's changing behaviour over time. The data was collected primarily through digital online channels, which may have resulted in a biased response and thus information should be carefully considered. A similar study focusing on a specific government service could provide useful information for decision-makers in the future.

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