Mobile Government: How to Improve Fairness in Public Administration Management

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Abstract
With the popularity of mobile technologies, mobile government (mGovernment) services have emerged. “Rule of man” in traditional government services can give rise to unfairness and corruption, and thereby lots of citizens did not trust government. If mGovernment systems with technology neutrality can reduce “rule of man” and improve fairness, more and more people will use it. How to improve the fairness of mGovernment services? It is critical to mGovernment success.

This study adopted theory of procedural fairness (TPF) to construct a theoretical model for investigating how seven mobile and wireless technological functions of mGovernment (i.e., real-time information dissemination) are conductive to three procedural rules (i.e., transparency), which in turn improve procedural fairness. A sample of 388 experienced users of mGovernment systems were used in this study. The results largely supported the hypotheses. Finally, theoretical and managerial implications are discussed.

Keywords
mGovernment, mobile and wireless technologies, procedural rules, procedural fairness

Introduction
With the ubiquity and rapid development of mobile and wireless technologies (MWTs), many governmental agencies have begun to provide mobile access to government information and services. Such mobile access is called mobile government (mGovernment) (Kushchu 2011). mGovernment services include mobile information and mobile transaction (Wu et al. 2009). This study focuses on the former, as it is the main service offered in the current early stage of mGovernment (Rannu et al. 2010).

In the last two decades, researchers have placed greater importance on eGovernment than mGovernment. However, around the world, users of mobile devices and 3G services far exceed those of computers and broadband (OECD 2008, Bertot and Jaeger 2010). Therefore, mGovernment should be more popular than eGovernment and will enables citizens to interact directly with the government anytime and anywhere(Tolbert and Mossberger 2006, Bertot and Jaeger 2010, Amailef and Lu 2013).

Why is procedural fairness important for mGovernment success? In lots of developing countries, such as China, “Rule of man” in traditional government services gave rise to corruption, unfair incidents and practices in public administration unfairness which gradually decreased citizen satisfaction with the government (Tolbert and Mossberger 2006). Although governments have invested a large amount of money and manpower to implement various mGovernment service, little citizens have positive attitudes
toward it, and therefore has low intention to use it. If mGovernment services ensure the fairness of government decisions, desirable outcomes are expected to increase. The instrumentality of procedural fairness increases user intention to use mGovernment services. This leads mGovernment success.

Public administration researchers and practitioners recognize the important role of perceived fairness in the relationship between public administration services and citizen attitudes (Thomas 1998, Tolbert and Mossberger 2006). They also proposed that information and communication technologies (ICTs) used in public administration may benefit citizens’ perceived fairness of government services (e.g., Bhatnagar 2003, Shim and Eom 2008, Anderson 2009, Bertot et al. 2010). However, no empirical study has adopted fairness theory to test how mobile ICTs affect user perceived fairness in the context of mGovernment.

Theory of procedural fairness (TPF) derives from the field of organizational behavior. According to TPF, several procedural characteristics (e.g., transparency, information accuracy, voice opportunity) make people perceive a procedure as fair (Leventhal 1980, Pops and Pavlak 1991). The critical advantage of using TPF to explain mGovernment services is that it provides a framework for understanding the characteristics of a fair procedure in public administration and for identifying which MWTs of mGovernment are useful in strengthening the characteristics of a fair procedure. Thus, the current study adopts TPF to explore how MWTs of mGovernment strengthen procedural characteristics, which in turn increases citizen perceived procedural fairness of mGovernment services. Our results will enlighten government agencies and system developers in designing mGovernment services to improve fairness.

Prior research (e.g., Hung et al. 2009, Deng et al. 2010) mainly identified how social or individual issues affect the success of eGovernment services. For instance, Hung et al. (2009) found that perceived usefulness, ease of use, training, trust, and personal innovativeness were predictive of user positive attitudes toward eGovernment services. Carter and Belanger (2005) found that relative advantage, image, and compatibility were antecedents of user attitudes toward eGovernment.

However, few empirical studies have examined predictors of the success of mGovernment services. The technical design issues of mGovernment differ from those of eGovernment. Results of research on eGovernment may be related to mGovernment, but they cannot be transferred to mGovernment (Wu et al. 2009). In addition, no technical functions issues were presented in the above studies. Benbasat and Zmud (2003) criticized that many IT studies are based firmly on behavior discipline and not on IS discipline. Hence, they called for IS research to explore how IT artifacts (i.e., the use of IT to enable tasks) are constructed and how they affect context. Wu et al. (2009) also called for the development of a common framework to describe technical functions of mGovernment as it is an important issue for ensuring the success of mGovernment. In response to these calls, this study explores how MWT functions of mGovernment affect the procedural rules of mGovernment services, which in turn, improve users perception of procedural fairness of mGovernment services.

The remainder of this study is organized as follows: Section 2 is a comprehensive literature review of mGovernment applications and TPF. Section 3 presents the research model and hypotheses. Section 4 describes the research method and reports analytical results. The findings and implications are discussed in Section 5, and Section 6 concludes the study.

**Literature Review**

**The MWTs of mGovernment Services**

MWTs have dramatically developed in the past decade, and public sectors across the world have begun to use MWTs to deliver their services; this is called mGovernment (Ntaliani et al. 2008). mGovernment is an extension of eGovernment. Globally, mobile Internet usage has overtaken desktop Internet usage (Rannu et al. 2010). mGovernment should be more popular than eGovernment. Given its mobile Internet usage penetration rate of 69%, China is well placed to succeed in mGovernment (Zhou, 2013). China is an ideal site for our study, which examines factors associated with procedural fairness of mGovernment services.

Yuan et al. (2010) proposed that mobile technical functions could be categorized into three dimensions: the extent to which the function is time critical (time criticality), location sensitive (location sensitivity), and controlled by users (personal control). After a literature review of eGovernment and mobile service
research (e.g., Rannu et al. 2010, Vogel et al. 2010), this study adopted the following three dimensions to categorize seven mobile technical functions of mGovernment.

**Time-critical functions:** Mobile devices enable users real-time connect and fast access to mGovernment systems. This makes governmental real-time information dissemination and timely response come true. *Real-time information dissemination* denotes that an mGovernment system timely and voluntary disseminates current government information to related citizens with mobile devices (Ntaliani et al. 2008). *Response timeliness* refers to the degree to which mGovernment systems offer timely responses to inquiries by citizens with mobile devices (Wixom and Todd 2005).

**Location-sensitive functions:** *Location tracking* refers to the ability to exactly identify and locate targets (Yuan et al. 2010). With the use of object and location identification technology, mGovernment can provide information about the location of communal facilities and individuals, destinations, and traffic, among others. *Multimedia* message service (MMS) is a standard way to send messages with multimedia content to and from mobile phones. MMS enables mGovernment systems to convey location information that combines text, pictures, voice recordings (Hsu et al. 2007).

**Personal control functions:** *Portability* denotes that mGovernment service is ubiquitous and available anywhere because of using portable mobile devices and wireless LAN (Ntaliani et al. 2008). *Ease of use* refers to the degree to which users believe that using mGovernment systems would be easy (Ntaliani et al. 2008). *Active control* describes user ability to voluntarily participate in and instrumentally influence two-way communication between government agencies and themselves by means of mGovernment systems (Liu 2003).

The above definitions clearly demonstrate that five of the MWT functions are specific benefits of mGovernment. In addition, as mGovernment is an extension of eGovernment, two of the seven functions (ease of use, active control) are also relevant for eGovernment.

**Theory of Procedural Fairness (TPF)**

TPF derived from the field of organizational behavior (Lind and Tyler 1988, Chiu et al. 2007, Chiu et al. 2009), the concept of procedural fairness has been adapted to various IT settings, including online shopping, e-learning, management, and employee selection (Gilliland 1993, Chiu et al. 2007, Chiu et al. 2009). In the online shopping context, Chiu et al. (2009) defined procedural fairness as perceived fairness of online transaction procedures. In the mGovernment context, the current study defines procedural fairness as perceived fairness of procedures related to government services, actions, and decisions.

TPF claims that in the field of public administration, procedural fairness is affected by three procedural rules, namely, transparency, information accuracy, voice opportunity (Leventhal 1980, Pops and Pavlak 1991). In the mGovernment context, *transparency* refers to the amount and type of information that is delivered from mGovernment systems to interested parities (Nicolaou and McKnight 2006). *Information accuracy* refers to understandability, correctness, and reliability information used in decision making and delivered by mGovernment systems (Wixom and Todd 2005). *Voice opportunity* means that by using mGovernment systems, interested parties have more opportunities and channels to express their opinions to government agencies (Wailoo and Anand 2005).

Some researchers (e.g., Bhatnagar 2003) suggested that ICTs could promote transparency and fairness as it helps to disseminate government information through various online portals. We followed this logic and expected that MWTs of mGovernment could reshape the three procedural rules, which further improves procedural fairness of mGovernment services.
Research Model and Hypotheses

Transparency reflects that a government agency adopts an mGovernment system to synchronously deliver the most current information to related citizens. Disseminated information is related to citizen rights, governmental rules, governmental transactions and decisions, and assets of civil servants, among others (Bertot et al. 2010). Evidently, transparency should increase user perceived procedural fairness of a government agency’s services and actions.

When an mGovernment system provides a user with reliable, accurate, and understandable government information, the user will believe that based on the accurate information, government agency could make fair governmental decisions and take reasonable actions. Consistent with this argument, Magner and Johnson (2000) found that information accuracy was positively related to people’s perception of procedural fairness in local government budget and tax decision making.

Voice opportunity means that by using an mGovernment system, citizens have more efficient and convenient channels to express their opinions to a government agency and influence its decision making; this is a kind of mobile democracy. If mGovernment enables users to participate and influence governmental decision making, they will be more likely to believe that public management procedures are fair. This argument is consistent with the findings of Magner and Johnson (2000), which indicate that voice (i.e., process control) was positively related to perception of procedural fairness of governmental decision making. Thus, we hypothesized the following:

Hypothesis 1. Transparency (H1a), information accuracy (H1b), and voice opportunity (H1c) are positively related to perception of procedural fairness.

Balkin (1999) identified truthful and substantial information as an important element of transparency. Heise (1985, p.209) denotes “transparent organizations make available publicly all legally releasable information—whether positive or negative in nature – in a manner which is accurate, timely, balanced, and unequivocal”. Thus, we expected that timely information delivery is a pivotal predictor of transparency. In line with this argument, Rawlins (2008) found that substantial and timely information has a significant and positive relationship with transparency.
In this study, transparency of mGovernment was defined as a government agency adopts an mGovernment system to synchronously deliver the most current and timely information to related citizens (Nicolaou and McKnight 2006). In the context of mGovernment, information delivery includes information dissemination and feedback. The former reflects that mGovernment volunteers information to the interested parties in a timely manner (e.g., information push), and the latter denotes that mGovernment promptly responds to citizens’ inquiries about special problems. If MWTs enable governments to distribute information or respond to key public audiences in a more timely fashion, it will allow the public to synchronously monitor the government, thereby increasing government transparency (Pina et al. 2007). Thus, we hypothesized the following:

**Hypothesis 2.** Real-time information dissemination (H2a) and response timeliness (H2b) are positively related to transparency.

Information accuracy refers to understandability, correctness, and reliability of information delivered by mGovernment. With location and identification technology, location tracking function enables mGovernment to provide reliable and accurate information about traffic routes, destinations, and locations of communal facilities or individuals (Ntaliani 2008). In addition, it can target a cell phone user so that governments can directly provide their services to each person (Ntaliani 2008). For instance, the 110 Alarm and Command system can locate an emergency cell phone caller so police can be dispatched quickly to aid the caller directly.

MMS reshaped mobile information communication by making it more versatile and more expressive than before (Hsu et al. 2007). Multimedia message service enables mGovernment to send complete government information with colorful pictures, voice, video, and animated characters. Compared with text-based information, colorful pictures, voice or video convey more vivid and graphic information, which is more understandable than words. Second, text-based information is a textual description of a thing. The correctness and reliability of a text-based information might be deteriorated when the writer recorded it with subjective perception bias. However, colorful pictures, voice, video present a thing in an objective and real manner, which should be more reliable and correct (Hsu et al. 2007). Thus, we expected that MMS increases information accuracy. The above arguments are captured into the following hypothesis:

**Hypothesis 3.** MMS (H3a) and location tracking (H3b) are positively related to information accuracy.

Voice opportunity means that by using online communication channels of mGovernment systems, citizens have more opportunities to express their opinions and for their opinions to be given more consideration by government agencies (Wailoo and Anand 2005). Online communication channels of mGovernment systems can provide citizens more channels for expressing themselves. However, if citizens do not use these platforms, their voice opportunities are not increased. Furthermore, theory of planned behavior (TPB) clarified that personal control is an important antecedent of intention to use IS system (Ajzen, 1991). Based on TPB, lots of empirical studies found that personal controls significantly affect individual intention to use new IS, such as eGovernment (Taylor and Todd 1995, Hung et al. 2006, Hung et al. 2009). Thus, personal control (e.g., text editing, information sending) of online voice platforms could increase citizen opportunities to communicate with government agencies.

Personal control implies how easy these online voice platforms are to use (Hung et al. 2009). We identified three MWT artifacts (portability, ease of use, and active control) to reflect personal control of mGovernment systems. First, portability is important to voice opportunity, as it increases ubiquity, decreases time limitation, and allows citizens to log easily on to voice platforms anytime and anywhere. Second, previous research confirmed that ease of use significantly influences individual intention to use new IS services, such as eGovernment (Carter and Bélanger 2005, Hung et al. 2009). Thus, ease of use of these online voice platforms should increase citizen opportunities to express their opinions on mGovernments. Finally, only users have the ability to instrumentally control the online platforms and
influence two-way communication between a government agency and themselves. Thus, they can express
themselves clearly, and their suggestions could be given proper consideration by the government agency.
In this light, active control substantially increases citizen voice opportunities on mGovernment systems.
The above arguments are captured in the following hypothesis:

**Hypothesis 4.** Portability (H4a), ease of use (H4b), and active control (H4c) are positively related to
voice opportunity.

**Research Method**

**Data Collection Procedure**

Respondents were 388 MPA alumni or alumnae in Beijing, China. They were selected as they had taken
eGovernment courses and were experienced users of mGovernment services. To increase the
generalizability of the results, the respondents spread across two big cities of China. The instruction of
this survey claimed the definition of mGovernment services and offered several popular mGovernment
services as examples. The questionnaire requested the respondents to answer whether they had used
mGovernment services. If no, they were excluded to participate into our survey. If yes, let them write
down the name of the mGovernment service they had used last time and fill in the questionnaire by
assessing this service. 502 individuals were invited to participate in this survey. Finally, 388 valid
cases were obtained, representing a final response rate of 77%. Table 1 presents the demographic information of
the respondents.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>209</td>
<td>53.9%</td>
</tr>
<tr>
<td>Female</td>
<td>179</td>
<td>46.1%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>188</td>
<td>48.5%</td>
</tr>
<tr>
<td>30-39</td>
<td>200</td>
<td>43.0%</td>
</tr>
<tr>
<td>40-49</td>
<td>31</td>
<td>8.0%</td>
</tr>
<tr>
<td>≥50</td>
<td>2</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Years of Using Mobile Device</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>19</td>
<td>4.9%</td>
</tr>
<tr>
<td>2-6</td>
<td>87</td>
<td>22.4%</td>
</tr>
<tr>
<td>6-10</td>
<td>170</td>
<td>43.8%</td>
</tr>
<tr>
<td>&gt;10</td>
<td>112</td>
<td>28.9%</td>
</tr>
<tr>
<td><strong>Frequency of Using Mobile Devices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>154</td>
<td>39.7%</td>
</tr>
<tr>
<td>Often</td>
<td>232</td>
<td>59.8%</td>
</tr>
</tbody>
</table>

Table 1. Characteristics of the respondents

**Measures**
The items for most studied variables were adapted from the English literature, while three measures were self-developed. Given the survey was executed in China, the questionnaire was translated into Chinese by means of a back-translation procedure. The measures of the studied variable included 41 questions. All items were measured by 7-point Likert scale, ranging from 1=strongly agree to 7= strongly disagree.

Specifically, three items were developed to measure real-time information dissemination. Three items for response timeliness construct were adapted from Wixom and Todd (2005) timeliness scale. MMS was measured by a self-developed three-item scale. Three items adapted from Yuan and colleague’s (2010) study to measure location tracking. Three items used to assess portability were also self-developed. Ease of use was measured by three items adapted from Wixom and Todd’s (2005) scale. Active control was measured by a four-item scale adapted from Liu (2003).

Transparency was measured using three items adapted from Rawlins’ (2008) study. Information accuracy was measured by a three-item scale adapted from Wixom and Todd’s (2005) scale. Voice opportunity was measured by four-item scale adapted from the voice measure used in Conlon and Fasolo’s (1990) study. Five items used to measure procedural fairness were adapted from Blader and Tyler (2003) scale.

**Data Analysis and Findings**

LISREL (version 8.70) (Jöreskog and Sörbom 1996) was used to conduct the data analysis.

**Common Method Bias**

To assess the severity of common method bias, CFA (confirmatory factor analysis) was conducted on competing models that increased in complexity (Podsakoff et al. 2003). The result showed that the hypothesized eleven-factor model fit the data ($\chi^2=1186; df=574; p<0.005; \text{RMSEA}=0.053$) significantly better than any of the simpler models. The results showed that common method bias was unlikely to be a major threat in this study (McFarland and Sweeney 1992).

**Measurement Model**

The Cronbach’s alpha of all studied variables ranges from 0.80 to 0.93. CFA was conducted to assess the validity of all measures by examining whether each observed indicator loaded highly on its intended construct. The factor loadings were showed in Table 2. The factor loadings for each scale ranges from 0.56 to 0.94. All loadings were significant ($p<0.05$). Loadings of .50 to .55 were considered fair, .63 to .70 very good, and above .71 excellent (Comrey, 1973). The results showed that the reliability and validity of the measures were satisfactory.

CFA was conducted to assess the overall goodness of fit of the measurement model. As shown in Table 3, the results demonstrated that the measurement fit the data very well.

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor loadings</th>
<th>Cronbach Alpha</th>
<th>A sample item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time information dissemination</td>
<td>RTID1 0.80</td>
<td>0.85</td>
<td>The mGovernment system synchronously delivers the most current information to related citizens.</td>
</tr>
<tr>
<td></td>
<td>RTID2 0.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RTID3 0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response timeliness</td>
<td>RT1 0.81</td>
<td>0.87</td>
<td>The mGovernment system responds to my request quickly.</td>
</tr>
<tr>
<td></td>
<td>RT2 0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RT3 0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMS</td>
<td>MMS 1 0.86</td>
<td>0.90</td>
<td>Through the mGovernment system, I am able to receive multimedia information that incorporates videos.</td>
</tr>
<tr>
<td></td>
<td>MMS 2 0.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MMS 3 0.82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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The mGovernment system can help me identify geographic positions of some communal facilities (such as national library, etc.).

The mobile device used to log on the mGovernment system is so small that I can take it anywhere.

The mGovernment system is easy to use.

While I was on the mGovernment system, I could choose freely what I wanted to do.

Through the mGovernment system service, the local government agency provides reliable information about its decision making.

The mGovernment system provides correct information.

Through using the mGovernment system, I felt that I have more opportunities to express my views.

Through using the mGovernment system I feel that decisions and processes are fair in the local government authority.

**Table 2. Results of the Validity and Reliability Analysis**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Item</th>
<th>Validity/Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location tracking</td>
<td>LT1</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>LT2</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>LT3</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>PORT1</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>PORT2</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>PORT3</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>EOU1</td>
<td>0.78</td>
</tr>
<tr>
<td>Portability</td>
<td>EOU2</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>EOU3</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>AC1</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>AC2</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>AC3</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>AC4</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>TRA1</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>TRA2</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>TRA3</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>IA1</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>IA2</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>IA3</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>VO1</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>VO2</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>VO3</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>VO4</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>PF1</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>PF2</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>PF3</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>PF4</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>PF5</td>
<td>0.67</td>
</tr>
</tbody>
</table>

**Note.** aRTRD= Real-time information dissemination, RT= Response timeliness, MMS = Multimedia message service, LT=location tracking, PORT= Portability, EOU= Ease of use, AC= Active control, TRA= Transparency, IA= Information accuracy, VO= Voice opportunity, PF= Procedural fairness. b A sample item of each measure.

**Structural Model**

The hypothesized structural model (see Table 3), including eleven-factors, yield a good fit: \( \chi^2/df \) is 2.27, \( p<0.005 \). CFI is 0.97, NFI is 0.94, NNFI is 0.96, IFI is 0.97, RMSEA is 0.057. Hence, the fit indices of the structural model were within the acceptable threshold. As expected, transparency (\( \beta=0.37, p<0.001 \)), information accuracy (\( \beta=0.27, p<0.001 \)) were found to have stronger positive effect on procedural fairness than voice opportunity (\( \beta=0.14, p<0.01 \)). Thus, H1a, H1b and H1c were supported. Real-time
information dissemination (β=0.43, p<0.001) and response timeliness (β=0.33, p<0.001) have positive effects on transparency. Thus, H2a and H2b were supported. MMS (β=0.37, p<0.001) and location tracking (β=0.21, p<0.001) were found to significantly increase information accuracy. Thus, H3a and H3b were supported. Finally, results also show that ease of use (β=0.29, p<0.001) has stronger positive effect on voice opportunity than portability (β=0.11, p<0.05), and active control (β=0.19, p<0.01). The results supported H4a, H4b and H4c.

<table>
<thead>
<tr>
<th>Fit indices</th>
<th>Recommended value</th>
<th>Measurement model</th>
<th>Structural model</th>
</tr>
</thead>
<tbody>
<tr>
<td>χ²/df</td>
<td>≤3.00</td>
<td>2.06</td>
<td>2.27</td>
</tr>
<tr>
<td>CFI</td>
<td>≥0.90</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>NFI</td>
<td>≥0.90</td>
<td>0.95</td>
<td>0.94</td>
</tr>
<tr>
<td>NNFI</td>
<td>≥0.90</td>
<td>0.97</td>
<td>0.96</td>
</tr>
<tr>
<td>IFI</td>
<td>≥0.90</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>RMSEA</td>
<td>≤0.08</td>
<td>0.053</td>
<td>0.057</td>
</tr>
</tbody>
</table>

**Table 3. Fit Indices for Measurement and Structural Models**

Altogether, 41% of the variance in transparency was explained by real-time information dissemination and response timeliness. 25% of the variance in information accuracy was explained by MMS and localization. 21% variance in voice opportunity was account by portability, ease of use and active control. Transparency, information accuracy and voice opportunity accounted for 28% of the variance in procedural fairness.

**Figure 2. Hypotheses Testing Results**

Note. χ²/df =2.27, p < .001; CFI = 0.97; NNFI =0.96; IFI =0.97; RMSEA =0.057. *p <0.05 (two-tailed). **p <0.01 (two-tailed). ***p <0.001 (two-tailed).
Discussion

This study adapted TPF to examine how seven mobile technological functionalities influence three procedural rules, which in turn increases user perception of procedural fairness in the context of mGovernment. This study is pioneering with respect to applying TPF and confirms theoretical notions in the newly emerging context of mGovernment services. All the hypothesized relationships are supported.

Theoretical Implications

First, the traditional typology of MWT functions has only three dimensions: time criticality, location dependency, and personal control. Our work adapted the three dimensions to develop a comprehensive framework, which includes seven factors, to describe technological functionalities of mGovernment services. Our results further show that in the context of mGovernment, time-critical functions are beneficial to government transparency. Location-sensitive functions increase government information accuracy, and personal control functions facilitate citizen voice through mGovernment. With this framework, we addressed Benbasat and Zmud’s (2003) concern and established a solid theoretical background to examine how MWT artifacts of mGovernments affect context.

Second, previous studies proposed that eGovernment/mGovernment can improve fairness of public administration (Tolbert and Mossberger 2006, Bertot et al. 2010). However, they neglected the underlying processes through which eGovernment facilitates fairness. The present study examined three mediators that link the relationships between seven MWT functions of mGovernment services and procedural fairness. Therefore, this study enriches eGovernment literature by opening the “black box” between the functionalities of mGovernment and fairness.

Third, our research findings confirm the rationale of TPF and demonstrate that this theory can be adopted to explain mGovernment phenomenon. The positive relationship between procedural fairness and user satisfaction is a new finding in eGovernment literature. The present study introduced the new concept of procedural fairness into eGovernment literature.

Practical Implications

This research provides several important implications for government agencies and system developers. To improve procedural fairness with mGovernment services, we suggest that government agencies should improve transparency, information accuracy, and voice opportunity. Among them, transparency and information accuracy are more critical. In addition, previous studies have suggested that procedural fairness of mGovernment services can be enhanced by promoting the opportunity to perform, reconsideration opportunity, and interpersonal effectiveness of officials (Gilliland 1993). Second, government agencies can select a suitable portfolio of mobile applications to fit their specific needs. For example, if government agencies hope to increase transparency by using mGovernment systems, they should optimize time-critical functions of the systems, such as real-time information dissemination and response timeliness.

Our study provides system developers with a service evaluation framework for assessing mGovernment systems. The seven important antecedent factors (i.e., real-time information dissemination, response timeliness, MMS, location-tracking, portability, ease of use, and active control) of procedural fairness with mGovernment services have been identified. Accordingly, to effectively evaluate mGovernment systems, we suggest that system developers monitor these seven mobile technological functions as indicators. Second, our study can help system developers create suitable products to meet the different needs of government agencies. For instance, important determinants of transparency of mGovernment services are real-time information dissemination and response timeliness. Accordingly, to improve transparency, we suggest that system developers can adopt various instant messaging software, such as short message service, multimedia message service, micro-message, e-mail, and information notification technology (Hsu et al. 2007) to design the mGovernment systems. To improve information accuracy of mGovernment services, we suggest that system developers embed various multimedia elements (e.g., video, audio,
animation software) (Hsu et al. 2007) or location and identification technologies (e.g., radio frequency identification and global positioning system technology) (Yuan et al. 2010).

**Limitation**

First, this study is cross-sectional, and data are self-reported. CFA of competing models show that common method bias was unlikely to be a threat to our results. Future research should design longitudinal studies to replicate our research findings. Second, only a Chinese sample was used, and threats to external validity of this investigation cannot be avoided. However, this study contributes to literature by demonstrating that some MWT functions of mGovernment services increase social fairness and citizen satisfaction. However, future researchers should conduct a cross-cultural study to re-examine the universality of our research model. Third, we focused on M-Information of mGovernment services. However, the mobile transaction aspect of mGovernment services is becoming increasingly mature. Future research should also examine which mobile functionalities can improve procedural fairness of mobile transaction services.

**Conclusion**

We successfully identified seven important MWTs functions of mGovernment services and provided constructs to measure them. We also adopted TPF to explore how the seven MWT functions improve three procedural rules, which in turn, increase procedural fairness. Through a survey of experienced mGovernment service users in China, our study proved that: time-critical functions (real-time information dissemination, response timeliness) improve procedural fairness through transparency; location-sensitive functions and MMS improve procedural fairness through information accuracy; and personal control functions (portability, ease of use, active control) improve procedural fairness through voice opportunity. Our study presents theoretical contributions to eGovernment literature, provides insights into government agencies, and provides recommendations for system developers about how to select and design mGovernment services to ensure procedural fairness.

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