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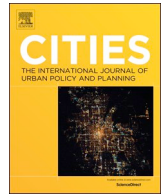
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# Analysis of citizens' motivation and participation intention in urban planning

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## ABSTRACT

Public participation has attracted considerable interest in urban planning theory and practice. A large body of growing literature has attempted to figure out the importance of public participation in urban planning and management. However, there are very few theory-driven empirical studies in the participation literature that examine citizen's motivation and intention to participate in urban planning processes. The aim of this paper therefore is to fill this gap in the literature by investigating the relationship between motivation and the intention of public participation in the field of urban planning and management. On the basis of a survey conducted in Wuhan, China, a structural equation model is developed and estimated to identify the causal relationships between four motivational factors and three intentions to participate in urban planning. We find positive impacts of "Civil Society" "Personal Interest" "Social Influence" and a negative impact of "Constraints" on the intention to participate in urban planning. The conclusions of this study provide valuable insights for exploring the intrinsic and extrinsic factors affecting citizens' participation intentions in urban planning activities.

## 1. Introduction

Increasingly, local governments and planning professionals have become interested in public participation in urban planning and management. It reflects that they gradually become aware various benefits of public participation in planning activities. These benefits are ranging from acquiring instant up-to-date local knowledge for problem-solving that is not easily accessible by conventional methods. Many public administration scholars and practitioners have drawn attention to the wide diversity in citizen participation in urban planning practice (Batty et al., 2012; Fung, 2015; Koch, 2013). Some studies have elaborated the meaning of participation, and described various experiences that can be viewed as showcases of successful or failed participation processes (e.g. Arnstein 1969; Forester 1982; Healey 1992; Barndt 1998; Booher and Innes 2002; Creighton 2005; Wang et al., 2007; Lauwaert, 2009; Williamson and Parolin, 2012; Cheng, 2013; Minner et al., 2015; Hemmersam et al., 2016). As witnessed in this vast literature, public participation practice developed at various levels and in different forms across countries, cities, themes and time periods.

The most basic form of public participation, focusing on information

provision, has been widespread since the appearance of the notion of public participation. Starting in the 1970s, public hearings, discussion groups and other forms of participation which act as a more general democratization process have been tried with mixed levels of success in European countries. Pilots of small-scale plans with the decision authority shifting to the local population were also developed and executed. World-wide, a diffusion of this practice can be observed, but with differentiating speed and intensity.

Over the past three decades, Chinese society has undergone unprecedented urbanization (Bank and Group, 2014). Massive urban construction needs more advanced planning methods. Public participation in urban planning activities emerged in response to the proper time and conditions. The Urban-Rural Planning Law in China from 2008 indicates that local government and planning professionals have attempted to take substantial action in facilitating public participation for plan-development and implementation. The law emphasizes the necessity of public participation in the planning process, which therefore requires that Chinese planners should develop their communication skills with the public. For instance, before filing an urban plan for examination and approval, the organization shall announce the draft of

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the planning at least 30 days and collect opinions from experts and the general public. Furthermore, it reflects that Chinese government is trying to convert its planning mode from a top-down approach towards an open-minded planning approach, and citizen opinions are regarded as important for urban development (Zhou, 2018).

The achievement of effective public participation is not an easy task. Various planning agencies have tried to integrate this concept into practice and invested a great amount of money and effort but gained little. One of the key causes may be that the way the public should be involved in urban planning has been poorly understood, and that planning practice is highly deficient. Therefore, Chinese citizens, especially those well-educated, gradually begin to claim their rights and indispensable responsibility to be included into urban planning (Zhou and Wang, 2014). However, due to such reasons, they have not yet found the proper ways to get access to urban planning.

It follows that understanding the common interests and relevant motivations of the public to engage in urban planning is an important topic. Which factors trigger people to participate? Some researchers have attempted to examine the influence of motivation on citizen engagement in governance (Brabham, 2012; Leao and Izadpahani, 2016), while, few studies have directly investigated the motivation and intention of citizens participation in urban planning. To fill this research gap, a conceptual framework is constructed for analysing motivations and intentions underlying citizen participation in urban planning.

The aim of this paper is, therefore, to investigate the relationship between citizens' motivation and participation intention in the city of Wuhan, China, which serves as the case study area. The paper contributes to the investigation of why and how citizen engage in urban planning activities through a multifaceted study on citizen's motivation and its influences on the intention to participate in urban planning. To the best of our knowledge, this has not been addressed in previous studies on citizen's participation. This study thus is able to provide deeper insights on the relationship between citizen's motivation and their participation intention in urban planning.

In addition, researchers have highlighted different aspects of public participation with regards to urban planning, but there is lack of quantitative analysis of citizens' motivation and willingness to participate in urban planning with different levels of involvement (Hague and McCourt, 1974; Batty et al., 2012; Russ and Takahashi, 2013; Koch, 2013; Hong and Jeon, 2015;). Prior studies tend to be concern with qualitative analysis of special small-scale projects. To complement these relevant and interesting studies, this study concerns a quantitative analysis of the relationship of citizen participation motivation and intention. In particular, Structural Equation Model which has been widely used in psychology, behaviour and urban study is adopted in this study. It provides incremental knowledge not only about why citizens engage in participation activities, but also about the extent of the participation of different citizen's motivation dimensions.

The remainder of this paper is organized as follows. Section 2 documents the strategic decisions underlying the design of the study in general and the survey in particular. In Section 3, the sampling and data collection process are described, and the results of a descriptive analysis of sample characteristics are documented. Section 4 reports the results of the main analyses. We complete the paper by discussing the implications of the findings.

## 2. Design of the research

### 2.1. Conceptual framework

Investigating the determinants of public participation has been a popular topic in urban planning and management research since many decades (e.g. Farinosi et al., 2018; Lee et al., 2017; Li et al., 2018; Oni et al., 2017; Wijnhoven et al., 2015). Many public administration scholars and practitioners have drawn attention to the wide diversity in citizen participation in urban planning practice (Fung, 2015; Koch,

2013). They pointed out that public participation as a means of empowering citizens in political decision-making should consider the full menu of design choices including different ways of exchanging information and different levels of empowerment. Understanding the interest of different segments of the population in participation as a function of contents and communication mode is thus of interest to organize effective and efficient participation. To understand why citizens engage in urban planning activities, an examination of their motivation to participate in political processes is required.

Citizen participation in political processes differs from consumptive choices. Consequently, widely applied theories to explain human choice and decision making, such as random utility theory and the theory of planned behaviour (TPB) do not seem valid to understand participation decisions. On the basis of Self-Determination Theory (Deci and Ryan, 1985) we assume that individuals may be intrinsically or extrinsically motivated to participate in urban planning processes. Intrinsic motivation means that participation choice is caused by endogenous satisfaction, such as fun or challenge, while extrinsic motivation indicates that the participation decision is caused by the attained outcomes, such as financial reward or reputation (Ryan and Deci, 2000). These two motivators tend to interconnect with each other in a way that extrinsic rewards influence intrinsic motivation, and most of the time, individual behaviour is motivated both intrinsically and extrinsically (Brabham, 2008). For urban planning participation intention, the type of planning projects they require or the problems that need to be solved, including the aims, the content, the scale, and the stage of the plans (Afzalan et al., 2017).

Based on these considerations, and with a supporting review of the literature, four factors affecting the motivation of participation are identified as relevant in this study: 'Civil Society', 'Personal Interest', 'Social Influence' and 'Constraints'. Also, to understand the extent of citizens' willingness to engage if they have an opportunity to participate in urban planning in the future, the intention to participate in urban planning project is measured with respect to 'Urban Planning Scale', 'Urban Planning Content', and 'Urban Planning Process' (Fig. 1). These constructs are discussed in more detail as follows.

### 2.2. Citizens' motivation to participate in urban planning

#### 2.2.1. Civil society

The essential role of civil society in urban governance and public participation concerns the positive correlation between political culture and power in urban affairs. (Swapan, 2014; Verdini, 2015). Political culture in civil society indicates the rights and responsibilities of citizens, and the rules and regulations for participating in the political process (Oni et al., 2017). Concerns of citizens are one of motivational factors, which influence the "Intention to Participate" (Leao and Izadpahani, 2016). A society with a well-developed political culture is reflected in citizens being involved in political process and taking their responsibilities of citizens contributing to society. In the current study, this construct is defined as the individuals' concern about and overall appraisal of urban planning participation: to what extent do they believe that urban planning is a matter of government and citizens; citizens not only have the right to discuss urban public issues but also can act on these rights and participate in planning processes.

#### 2.2.2. Personal interest

The concept of personal interest reflects an intrinsic motivation to initiate an activity for its own sake, which is interesting and satisfying in itself. Brabham (2012) explored the motivations underlying participation in a crowdsourcing project in terms of improving public engagement. Results show that expressing oneself and having fun are important intrinsic motivators. Learning is another important motivator found in the free/libre open source software (FLOSS) project (Wijnhoven et al., 2015). In this paper, personal interest is viewed as the intrinsic motivation underlying participation, such as to learn new

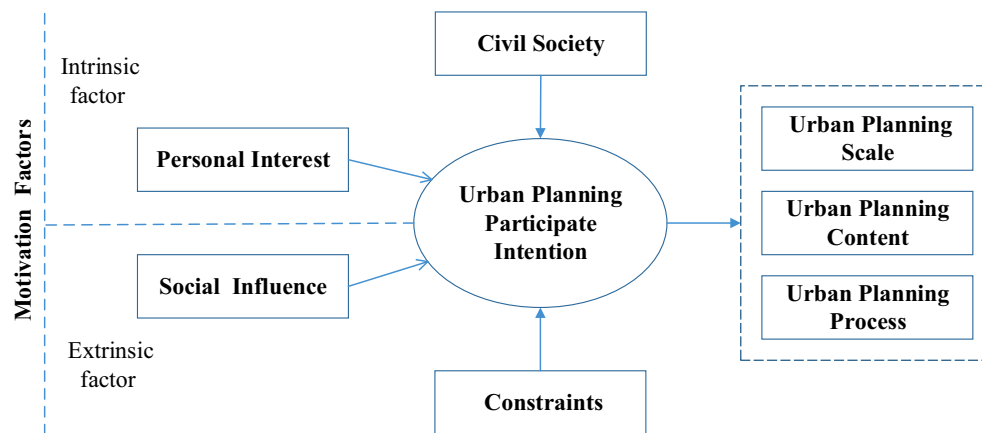


Fig. 1. Research framework.

skills or acquire new knowledge, to have fun or to achieve self-expression and interpersonal communication.

### 2.2.3. Social influence

Social influence is another important motivational factor for participation. It mainly refers to the external influence of social relations on individual value judgment and behaviour choice. A number of psychological models used this factor to measure how much a person feels social pressure in starting an activity (Fishbein and Ajzen, 1975; Yap and Gaur, 2016; Chheng and Liu, 2017). Self-determination theory postulates that social pressure and social influence are extrinsic motivators, interacting with intrinsic motivation (Ryan and Deci, 2000). The hypothesis is that individual behaviour is affected by their circle of influence (Al-Debei et al., 2013). Some previous research has shown that participants in public participation are highly exposed to other persons' influences, which affect their motivation and decisions (Cheung and Lee, 2010). In the current study, social influence is defined as an extrinsic motivation factor that stems from the social circle of individuals.

### 2.2.4. Constraints

In our study, not only the motivation for participation is examined, but also the set of factors that lead to non-engagement. Past experiences and anticipated obstacles are closely related to individual's behaviour (Al-Debei et al., 2013). Also, individual's behaviour is closely related to the difficulty of conducting the behaviour of interest, which to some extent may reflect some past bad experiences and other anticipated obstacles (Ajzen, 1985). Even though the intrinsic intention is strong, external constraints may affect the intention to participate. In our study, "constraints" are defined as factors which prevent an individual to participate in urban planning, e.g. lack of information, effective communication or convenient tools.

## 2.3. Citizens' intention to participate in urban planning

### 2.3.1. Urban planning scale

The urban planning scale relates to the geographical scale of the city to which the plan or actions apply. Previous studies have discussed public participation practices for different urban planning scales. Although most of the theory and empirical studies are based on the smaller i.e. neighbourhood scale, public participation is also important at the regional scale (Graves, 1972). For instance, Pickering and Minnerly (2012) conducted research on metropolitan regional participation in is investigated through two case studies in South East Queensland and Metro Vancouver. The interrelation between neighbourhood planning participation, and intention to stay in communities has been analysed in Wu's (2012) study. These studies concluded that

the relationship between participation in community activities and neighbourhood stability is not straightforward. We recognize that it's necessary to have a change from direct participation to other forms of participation for different scales (Rockloff and Moore, 2006). In order to explore the scale-based of participation, we classified spatial scale at four levels: regional scale, city scale, zoning and community in our study. Regional planning concerns land use practices on a broader scale, not just the urban construction area of a single city. City planning includes overall planning and detailed planning (zoning), which are the different process of guiding the efficient planning and management. Community is the smallest social unit in relation to people's housing and daily lives.

### 2.3.2. Urban planning content

Urban planning content involves various aspects of the urban environment, such as land use and development, planning permission, protection and use of the environment, and design of the urban areas such as transportation, green space and infrastructure. According to the diversity in planning content, studies on public participation also focus on various aspects. Foss (2016) carried out research on environmental planning, pointing out that public participation made a contribution to urban sustainability. Other research examined how community involvement improved public service and infrastructure (Russ and Takahashi, 2013). The intention to participate in urban planning depends on the topic of concern.

### 2.3.3. Urban planning process

The urban planning process contains the policy cycle of urban planning and implementation. Researchers state that those whose living environment is influenced by the urban planning activities should claim their right to be involved in the whole urban planning process, particularly at the decision-making stage (Lasker and Guidry, 2009). Researchers also pointed out that public participation as a means of empowering citizens in political decision-making should consider the full menu of designed choices (Batty et al., 2012; Fung, 2015; Koch, 2013). In China, involving public participation in urban planning regulation has been mentioned in the Urban Rural Planning Law of 2008. In this law, the public consultations are prescribed as one kind of public announcement that all plans and development proposals should be displayed on an official government website at least 30 days. In this study, we focus on the influence of public participation motivation and interest on different process of urban planning activities. The impetus of the public to be involved in planning activities is enhanced with the promotion of the stage and concreteness of planning processes.

**Table 1**  
Constructs with respective items.

Constructs	Questions	Items	Measures
Part I: The motivation to participate in urban planning			
Civil society	Based on your own knowledge, to what extent do you agree with these general statements related to urban planning?	CS1 CS2 CS3	Urban planning is a matter of government and mine. Citizens not only have the right to use urban public service facilities, but also can make requests or suggestions. It is necessary that a government or community organizes activities for public affairs, e.g. public hearings.
Personal interest	To what extent do you agree with these statements related to the motivation to participate in urban planning activities?	PI1 PI2 PI3	I participate because I can learn new skills or knowledge. I participate because it's fun. I participate because of the need of self-expression and interpersonal communication.
Social influence	To what extent do you agree with these statements related to the motivation to participate in urban planning activities?	EI1 EI2 EI3	My participation is influenced by how my friends/relatives behave. I participate by listening to suggestions from others. I participate by just following what others do.
Constraints	To what extent do you agree with these statements related to the motivation to not participate in urban planning activities?	C1 C2 C3	Lack of information release popularly prevents me from participating in urban planning. Lack of effective communication between the organizers and participants prevents me from participating in urban planning. Lack of convenient ways or tools prevents me from participating in urban planning.
Part II: The intention to participate in urban planning			
Urban planning scale	If you have an opportunity to participate in urban planning related to different scales, to what extent do you want to participate?	UPS1 UPS2 UPS3	I would like to participate in regional planning. I would like to participate in city planning. I would like to participate in zone planning.
Urban planning content	If you have an opportunity to participate in urban planning related to the contents, to what extent do you want to participate?	UPC1 UPC2 UPC3	I would like to participate in the planning of green space. I would like to participate in the planning of ecological environment protection. I would like to participate in the planning of disaster prevention and public safety.
Urban planning process	If you have an opportunity to participate in urban planning related to different stages, to what extent do you want to participate?	UPP1 UPP2 UPP3	I would like to participate in the stage of planning decision. I would like to participate in the stage of planning implementation I would like to participate in the stage of supervision and inspection.

#### 2.4. Research hypotheses

The effect of citizens' motivation on various kinds of participation behaviour has been studied in previous studies, e.g., citizen engagement in governance (Brabham, 2012; Leao and Izadpahani, 2016). But few researches investigated the effect of citizens' motivation on urban planning participation.

Based on the conceptual framework presented above, four factors affecting the motivation of participation are identified as relevant in this study: 'Civil Society', 'Personal Interest', 'Social Influence' and 'Constrains'. Moreover, the intention to participate in urban planning is measured with respect to 'Urban Planning Scale', 'Urban Planning Content', and 'Urban Planning Process'. The present study hypothesizes that citizens' motivation factors (with 'Civil Society', 'Personal Interest', 'Social Influence' and 'Constrains') positively or negatively influence citizens' intention to participate in 'Urban Planning Scale', 'Urban Planning Content', and 'Urban Planning Process'. These hypotheses are discussed in more details as follows.

**Hypothesis A.** A favourable civil society of people has a significant positive impact on the intention to participate in urban planning scale/content/process.

**Hypothesis B.** Personal interest has a significant positive impact on the intention to participate in urban planning scale/content/process.

**Hypothesis C.** Social influence has a significant positive impact on the intention to participate in urban planning scale/content/process.

**Hypothesis D.** Constrains has a significant negative impact on the intention to participate in urban planning scale/content/process.

### 3. Data and methodology

#### 3.1. Study area

This survey was conducted in Wuhan city, China. Wuhan is the capital of Hubei province, and is recognized as a center of politics, economics, finance, culture, education and transportation in central China. With fast economic growth and rapid urban development, Wuhan has become one of the most competitive cities for domestic trade in China. The economy prosperity of Wuhan puts high demand on urban land for large infrastructure and housing construction. The issue of urban regeneration and community redevelopment inevitably requires listening to the opinions of residents (Zhou, 2018), and demands substantial public participation. Another reason for choosing Wuhan as the study area is because it has outstanding platforms for citizen participation at the forefront of public participation development in China. There are all kinds of media and platforms of urban planning and management in Wuhan city, ranging from traditional tools (e.g. face-to-face survey, hearing) to digital tools (e.g. website, software, and social media).

#### 3.2. Measures

The implementation of the research framework requires data on citizen's motivation and intention to participate in urban planning, and on their socio-demographic characteristics. The survey was divided into three sections, corresponding to each of these concepts. The first section of the questionnaire included several questions about possible factors influencing the motivation to become involved in public participation. Previous research has relied on different scales to measure motivation. In this study, the constructs of interests were Civil Society (CS), Personal Interest (PI), Social Influence (SI) and Constraints(C). In the second section, questions about the intention to participate were asked in terms of three categories: Urban Planning Scale (UPS), Urban



**Table 2**  
Sample characteristics.

Measure	Item	Percentage (%)
Gender	Male	49.5
	Female	50.5
Age	18–29	23.2
	30–39	18.4
	40–49	18.5
	50–59	18.2
	≥ 60	21.7
Education	Undergraduate degree or lower	69.7
	Higher than bachelor's degree	30.3
Occupation	Administrators and technical staff	26.0
	Clerks or service workers	38.0
	Student or retired	26.9
	Unemployed	9.1

Planning Content (UPC) and Urban Planning Process (UPP). Each construct consisted of three items, which were reference to previous relevant researches and used in this study. All constructs with detailed items are presented in Table 1. A 7-point scale was used in the first two parts to measure the intention to participate, where the two anchors of the scale –3 and 3 mean strongly disagree and strongly agree, respectively. The last part of the questionnaire collected data on the social demographic characteristics of respondents, including gender, age, education, and occupation.

### 3.3. Data collection

Due to the possible influences of professionalism of individuals in urban and rural planning, the selected samples are the respondents who have participated in urban planning at least once. The sample was randomly selected covering all districts in Wuhan city, including city centre and suburbs. Based on the research framework and previous literature, a self-completion questionnaire was designed and implemented. The actual survey took around 15–30 min to complete. First, the online draft questionnaire was distributed among 185 respondents during November 11–15, 2016. About 58% ( $n = 107$ ) of the respondents filled out the questionnaire. According to the feedbacks and suggestions from the respondents, the structure and contents of the questionnaire were improved and optimized. Then, between January 20, 2017 and February 10, 2017, the questionnaire was randomly distributed among 560 respondents across all districts in Wuhan city. 78% ( $n = 437$ ) of the respondents completed the questionnaire properly, and 22% ( $n = 123$ ) had missing or invalid data which was discarded. Considering that the online survey is not friendly enough particularly for the elderly, we supplemented a paper-based questionnaire for the elderly ( $n = 65$ ). In the end, a total of 502 ( $n = 502$ ) valid questionnaires were used for following analyses.

### 3.4. Analysis methods and processes

The data of social demographic characteristics was analysed using descriptive statistics. Because these sample characteristics show evidence of self-selection, data were weighted using the statistics from the “Statistical communiqué on the 2015 national economic and social development of Wuhan”. This weighted sampling enhances representativeness of the selected sample.

To measure the relationship between citizens' motivation and participation intention in urban planning, a Structural Equation Model (SEM) was adopted with SPSS and Amos software. SEM is a statistical method which can examine the relationships between multiple independent variables and a dependent variable. Besides, direct and indirect relationships between latent constructs can be estimated by this model. The latent constructs are normally approximated through multiple observable factors (items). Structural Equation Model has been

increasingly used to analyse perception, motivation, influence, and intention in urban research, such as place attachment, residential satisfaction, activity needs, and settlement intention (Chan et al., 2017; Hong and Jeon, 2015; Liu et al., 2017; Sharmeen et al., 2014; Shaykh-Baygloo, 2020). To detect the multiple relationships between the intention of participation and the selected influential factors, SEM analysis method was adopted.

At first, we implement an exploratory factor analysis and a reliability analysis. Exploratory factor analysis is used to find out the essential structure of multivariate observation variables and process dimensionality reduction. In this study, it was used to extract the major motivational factors and intention factor of urban planning participation. Then we proceed to validate the factor structure of the relationship of motivation and intention of urban planning participation elements by confirmatory factor analysis, which is used to test the hypotheses on observed variables and latent variables. Some goodness-of-fit indices including Degrees of freedom (CMIN/DF), Goodness of Fit Index (GFI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) are presented to expose how good the model fits the sample data.

### 3.5. Sample characteristics

The sample characteristics are summarized in Table 2. It indicates that 49.5% of the respondents is male and 50.5% is female. Most respondents are between 30 and 59 years old (55.1%). Respondents aged between 18 and 29, and older than 60 represent 23.2% and 21.7% of the sample, respectively. Most respondents (69.7%) possess an undergraduate or lower degree, while 30.3% of the respondents have a postgraduate or higher degree. 26% of the respondents belong to the category administrators and technical staff, 38% to clerk or service employees, while 26.9% are students and retired people. The remained 9.1% is unemployed.

## 4. Results

### 4.1. Exploratory factor analysis and reliability

In this study, exploratory factor analysis is used to find out the major motivational factors and intention factor of urban planning participation and to extract the essential structure of multivariate observation variables and process dimensionality reduction. Exploratory factor analysis and Kaiser–Meyer–Olkin (KMO) analysis were conducted. The result of KMO is 0.918, which indicates that the sample is suitable for factor analysis. Exploratory factor analysis with Kaiser varimax rotation was conducted to validate the scales for the constructs. Our study framework consisted of seven latent variables with twenty-one items (observed variables), including Civil Society (with CS1, CS2, CS3), Personal Interest (with PI1, PI2, PI3), Social Influence (with SI1, SI2, SI3), Constraints (with C1, C2, C3), Urban Planning Scale (with UPS1, UPS2, UPS3), Urban Planning Content (with UPC1, UPC2, UPC3) and Urban Planning Process (with UPP1, UPP2, UPP3). As listed in Table 3, rotation converged in 7 latent variables group, and each group shows that the loading of its corresponding factor is higher than the cross-loadings on other factors. By calculating Cronbach's alpha coefficient, the internal consistency of each construct is evaluated; Coefficients equal to 0.70 or greater are considered acceptable. As shown in Table 4, the variables explain 72.9% of the total variance and indicate good reliability of the scales, in which Cronbach's alpha of all scales ranged between 0.852 and 0.912. Factor loading values show the correlation between factors (latent variables) and items (observed variables). The results of exploratory factor analysis are satisfactory. Table 4 shows that all items load on independent factors between 0.691 and 0.837, indicating a strong correspondence and representativeness. For example, the factor loading coefficient between latent variable ‘Civil Society (CS)’ and observed variables ‘CS1’, ‘CS2’ and ‘CS3’ is

**Table 3**  
Results of exploratory factor analysis.

Rotated component matrix							
Item	1	2	3	4	5	6	7
CS1	0.222	-0.002	0.202	<b>0.777</b>	0.164	0.142	-0.023
CS2	0.121	-0.043	0.236	<b>0.765</b>	0.091	0.243	0.138
CS3	0.199	-0.086	0.151	<b>0.829</b>	0.187	0.101	0.046
PI1	0.250	0.151	0.068	0.260	<b>0.715</b>	0.033	-0.069
PI2	0.269	0.230	0.117	0.205	<b>0.749</b>	0.051	-0.121
PI3	0.157	0.441	0.115	0.109	<b>0.691</b>	0.156	-0.099
SI1	0.042	<b>0.856</b>	0.092	0.017	0.150	-0.049	0.106
SI2	0.035	<b>0.848</b>	0.053	0.017	0.170	0.037	0.072
SI3	0.042	<b>0.836</b>	0.009	-0.125	0.073	0.030	0.191
C1	0.084	-0.046	0.008	0.118	-0.169	0.023	<b>0.832</b>
C2	0.208	0.037	0.064	0.227	-0.181	-0.026	<b>0.802</b>
C3	0.178	0.070	0.097	0.243	-0.126	-0.092	<b>0.781</b>
UPS1	0.261	0.114	0.214	0.158	0.098	<b>0.813</b>	-0.026
UPS2	0.359	0.086	0.251	0.240	0.104	<b>0.720</b>	-0.090
UPS3	0.218	0.083	0.326	0.176	0.078	<b>0.706</b>	-0.035
UPC1	0.283	0.079	<b>0.760</b>	0.231	0.098	0.317	0.033
UPC2	0.250	0.047	<b>0.791</b>	0.191	0.115	0.247	0.061
UPC3	0.341	0.155	<b>0.722</b>	0.229	0.179	0.089	-0.036
UPP1	<b>0.777</b>	-0.032	0.285	0.200	0.110	0.261	0.158
UPP2	<b>0.783</b>	0.110	0.304	0.192	0.229	0.142	0.052
UPP3	<b>0.774</b>	0.063	0.235	0.271	0.131	0.090	0.059

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.  
a. Rotation converged in 7 iterations.

**Table 4**  
Result of reliability analysis.

Construct	Item	Factor loading	Explained variance%	Cronbach's alpha
Civil society	CS1	0.777	36.909	0.865
	CS2	0.765		
	CS3	0.829		
Personal interest	PI1	0.715	13.580	0.852
	PI2	0.749		
	PI3	0.691		
Social influence	SI1	0.856	8.680	0.876
	SI2	0.848		
	SI3	0.836		
Constraints	C1	0.832	5.092	0.901
	C2	0.802		
	C3	0.781		
Urban planning scale	UPS1	0.813	3.402	0.896
	UPS2	0.720		
	UPS3	0.706		
Urban planning content	UPC1	0.760	2.756	0.888
	UPC2	0.791		
	UPC3	0.722		
Urban planning process	UPP1	0.777	2.470	0.912
	UPP2	0.783		
	UPP3	0.774		

Notes: Total explained variance: 72.9%.  
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.918.

between 0.777 and 0.829, indicating observed variables are sufficient to represent and interpret latent variable. In total, 21 items were retained for further analyses.

**4.2. Structural equation model analysis**

The specified measurement model for the citizen's motivation and participation intention in urban planning was assessed using confirmatory factor analysis and SEM method. The structural equation model is conducted using AMOS 21.0 on the basis of our conceptual framework and the results of the exploratory factor analysis. The estimated structural equation model and the standardized coefficients of

the estimated relationships are shown in Fig. 2.

To determine how well hypothesized model fits the sample data, some goodness-of-fit indicators are presented. Table 5 shows the goodness-of-fit measures of the model, including Degrees of freedom (CMIN/DF = 2.585), Goodness of Fit Index (GFI = 0.915), Comparative Fit Index (CFI = 0.914) and Root Mean Square Error of Approximation (RMSEA = 0.086). All indices surpassed the recommended threshold for SEM, indicating a satisfactory level of goodness-of-fit. Detailed results of the estimates between observed and latent variables are presented in Table 6.

After confirming the reliability of overall measurement model and structural model, the hypotheses between constructs are tested. The results of hypothesis and standardized path loadings are shown in Table 7. The results confirm our hypotheses that the latent variables of "Civil Society", "Personal Interest", "Social Influence" and "Constraints" have different effects on people's intention to participate in 'Urban Planning Content/Scale/Process'.

'Civil Society' is tested to have a significant and a positive correlation with all aspects of 'Urban Planning Content/Scale/Process' (0.991 for 'Urban Planning Scale', 0.973 for 'Urban Planning Content' and 0.734 for 'Urban Planning Process'). This implies that people who have a high consciousness level in 'Civil Society' are more likely to participate. In addition, effects of 'Civil Society' on 'Urban Planning Content/Scale/Process' are in general larger than the effects of other aspects of the individuals, indicating that, relative to 'Personal Interest', 'Social Influence' and 'Constraints', the latent variable 'Civil society' has a stronger effect on 'Urban Planning Content/Scale/Process'. This result is consistent with the previous results that 'Civil society' is one of most motivational factors influencing participation intention (Leao and Izadpahani, 2016; Verdini, 2015).

Similar to the effects of 'Civil Society', 'Personal Interest' also has a positive effect on the intention to participate in 'Urban Planning Content/Scale/Process'. This is understandable because people who are highly interested in urban planning are more inclined to participate. This also supports the previous results that 'Personal Interest' is more closely associated with the participation intention of 'Urban Planning Process' (Brabham, 2012; Wijnhoven et al., 2015).

With regards to the effects of 'Social Influence' on the intention to participate in 'Urban Planning Content/Scale/Process', positive influences are found on the 'Urban Planning Scale' and 'Urban Planning Content'. This is interesting finding in the sense that the intention to participate of individuals is positively affected by the behaviour of their groups.

In case of the latent variable that limits people to participate, a negative relationship was found between the 'Constraints' and the intention to participate in 'Urban Planning Content/Scale/Process'. The more lack of effective information to communicate, the lower willingness to participate. This is consistent with some previous studies (Ajzen, 1985; Al-Debei et al., 2013).

**5. Conclusions and discussion**

The study aims to examine the relationship of motivation factors of citizens and their participation intention in urban planning. To the best of our knowledge this is the first attempt to investigate why and how citizen engage in urban planning activities, linking between citizens' motivation and participation intention in urban planning. Some psychological theories e.g. Theory of Planned Behaviour, Self-Determination Theory are adopted and extended in this research through the construct of motivation factors, including variables of 'Civil society', 'Personal Interest', 'Social Influence', 'Constraints'. Considering that existing studies discussed the importance of public participation in urban planning, as far as our concern, this paper presents the first study to extend the participation in 'Urban Planning Contents, Scales and Processes'. Results indicate that the intention to participate in urban planning indeed varies according to different scales, contents and

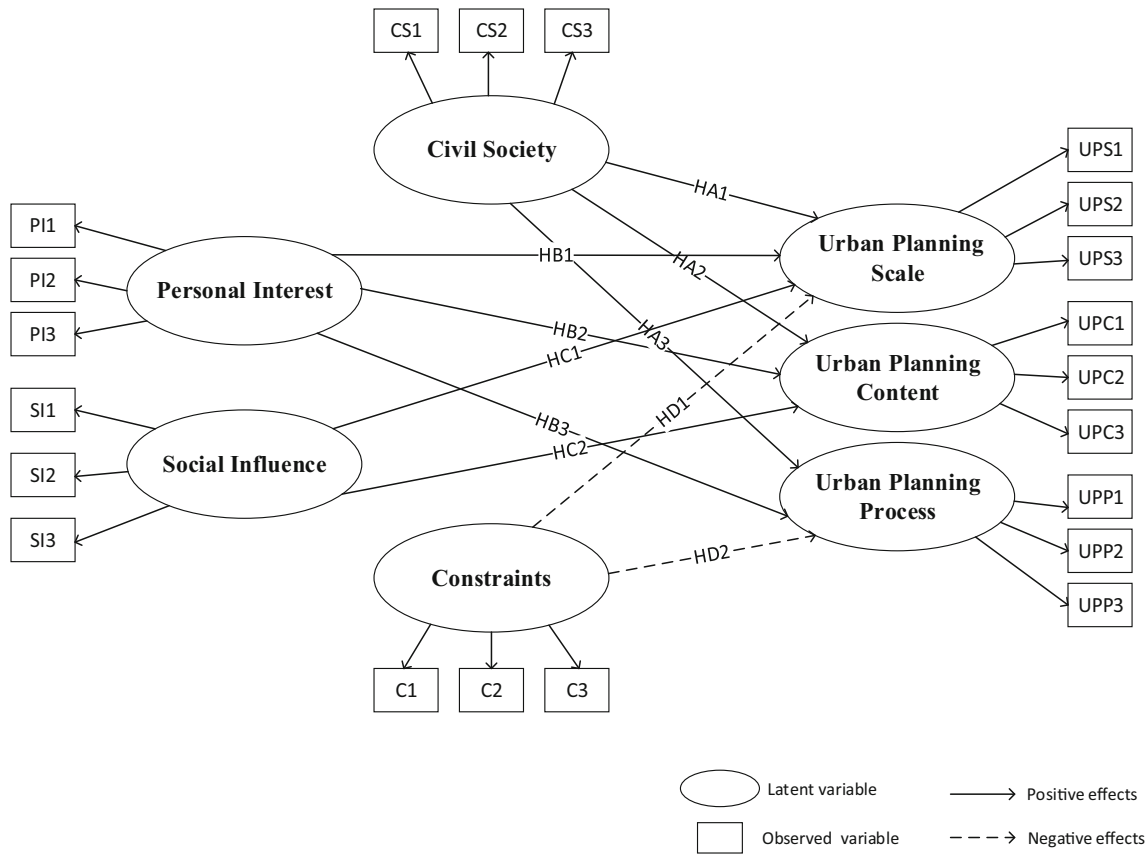


Fig. 2. Structural equation model of motivation and intention to participate.

**Table 5**  
Performance indices of the proposed model and their recommended values.

Model fit index	CMIN/DF	GFI	CFI	RMSEA
Obtained values	2.585	0.915	0.914	0.086
Recommended values	< 3	> 0.9	> 0.9	< 0.1

**Table 6**  
Measure model of the observed indicators to the latent variables.

Latent variables	Observed indicators	Estimate	S.E.	C.R.	Level of significance
Civil society	CS1	0.799			
	CS2	0.814	0.089	12.658	***
	CS3	0.817	0.082	12.991	***
Personal interest	PI1	0.645			
	PI2	0.807	0.116	9.456	***
	PI3	0.817	0.090	12.494	***
Social influence	SI1	0.874			
	SI2	0.864	0.069	14.854	***
	SI3	0.780	0.075	13.132	***
Constrains	C1	0.828			
	C2	.934	0.057	16.183	***
	C3	0.843	0.059	16.664	***
Urban planning scale	UPS1	0.922			
	UPS2	0.798	0.053	15.194	***
	UPS3	0.874	0.055	17.615	***
Urban planning content	UPC1	0.901			
	UPC2	0.914	0.052	18.581	***
	UPC3	0.766	0.066	14.065	***
Urban planning process	UPP1	0.884			
	UPP2	0.899	0.061	18.209	***
	UPP3	0.865	0.064	17.084	***

\*\*\* p < 0.01.

processes.

Furthermore, this research contributes to fill the research gap regarding the lack of quantitative analysis of citizens' willingness to participate in urban planning. This point is regarded as that it should have been more concerned with quantitative analysis while actually never given sufficient attention. The findings of the proposed structural equation model successfully support the validity of our study theoretical framework, which shows significant effects of motivation factors on participation intention in urban planning scale, content and process. The positive motivators encompass the concern of civil society, personal interest and social influence. In terms of negative factors, the 'Constraints' hinder citizens' willingness to participate. Moreover, the findings of our study indicate that compared with citizen's 'Personal Interest', 'Social Influence', 'Constrains', the variable of 'Civil society' has the strongest influence to participate in 'Urban Planning Contents, Scales and Processes'. In this sense, we infer that citizens pay more attention to the topic and civic culture that participation in urban planning. These findings are consistent with some previous studies (Al-Debei et al., 2013; Brabham, 2012; Leao and Izadpahani, 2016; Verdini, 2015; Wijnhoven et al., 2015).

From a practical perspective, although there are some successful cases of citizen participation programs in China, citizen participation is still in its infancy. This study provides discussion suggestion for the design and organization of citizen participation. Nonetheless, our findings have some limitations. One important aspect that is not considered in this study relates to the impact of actual decision making. If the urban planning process is designed in the way that participation is rather an alibi process or placatory, the citizenry will soon get frustrated. In addition, we need to pay attention to the way of participation (such as online, face-to-face, micro-task, excessive long-term engagement and so on). In future studies, motivation factors need to be considered more comprehensively.



**Table 7**  
Results of hypothesis testing and standardized path loadings.

	Research hypothesis	Estimate	S.E.	C.R.	Level of significance
HA1	Civil Society→Urban Planning Scale	0.991	0.169	5.867	***
HA2	Civil Society → Urban Planning Content	0.973	0.127	7.664	***
HA3	Civil Society → Urban Planning Process	0.734	0.118	6.231	***
HB1	Personal Interest → Urban Planning Scale	0.117	0.123	0.957	0.338
HB2	Personal Interest → Urban Planning Content	0.099	0.090	1.100	0.271
HB3	Personal Interest → Urban Planning Process	0.322	0.073	4.406	***
HC1	Social Influence → Urban Planning Scale	0.118	0.073	1.611	*
HC2	Social Influence → Urban Planning Content	0.114	0.055	2.063	**
HD1	Constraints→ Urban Planning Scale	-0.088	0.071	-1.248	0.212
HD2	Constraints→ Urban Planning Process	-0.134	0.051	2.621	***

\*\*\* p < 0.01.

\*\* p < 0.05.

\* p < 0.1.

To improve engagement environment and motivate citizens, decision and policy makers should on the one hand, enhance encouraging the civil society to participate in urban planning and strengthen its publicity and education on urban planning issues; on the other hand, regulate potential negative effects and debase the constraints, which prevent citizens from participating; also optimize methods and tools of participation.

For future research, we notice the importance of digital society whereas public participation has received a new meaning. ICT technology and platforms provide a more convenient, open, transparent platform for the public and become important tools that enable citizens to participate in urban planning. Meanwhile, one of the key aspects of smart cities is the development and the use of digital tools to support the involvement of the public in urban governance. Developing new online technologies and platforms for communication is essential to promote effective engagement in planning processes. How to use ICT-based technology in urban planning participation strategies needs to be further studied. In addition, we also need to pay attention to the general interest and willingness of the public to have access and use such technology in our follow-up study, particularly the intensity of willingness to participate in different urban planning scales, content and process.

### CRedit authorship contribution statement

Wenshu Li, Tao Feng and Harry J.P. Timmermans conceived and designed the study framework and experiment design; Wushu Li performed the experiments; Wenshu Li and Tao Feng analysed the data; Wenshu Li and Bowen Li drafted the manuscript; all authors contributed to revising the manuscript. Zhigang Li and Ming Zhang provide financial support.

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### Declaration of competing interest

The authors declare no conflict of interest.

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