



## Exploratory analysis of public perceptions of innovative financing for infrastructure systems in the U.S.



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### ABSTRACT

While traditional financing approaches such as federal and state grants funded by taxation are insufficient to address the existing need, innovative financing such as novel public private partnership models, credit enhancement tools, and new bonding instruments has emerged to expand the fiscal space of public agencies for infrastructure development. Formulating innovative financing approaches is one of the challenges faced by policymakers to address the ever growing need for restoring the failing civil infrastructure in the U.S. Public support/opposition is one of the major drivers/disruptors of innovative financing. Assessment of public perceptions is a major component towards gaining public support and developing sustainable infrastructure financing policies. The objective of this study is to investigate the determinants of public perceptions of innovative financing. Data obtained from public survey of 616 individuals from 50 states in the U.S. is analyzed to investigate the effects of: (a) economic factors, (b) infrastructure conditions, and (c) personal characteristics of the public on the knowledge, awareness, perceptions, and attitudes of the public towards innovative financing. The findings reveal that the likelihood of public support of innovative financing is insensitive to economic conditions and is affected by the factors related to infrastructure condition such as the level of need for infrastructure renewal, the ability to protect the public against natural disasters, and the history of using innovative financing for infrastructure renewal. The findings also show that 57% of the sample population in the U.S. were not knowledgeable about different methods for financing infrastructure projects and 77% of the sample population in the U.S. were not aware of the activities of public organizations for finding innovative financing solutions for infrastructure projects. Based on the findings, two main strategies have been proposed for infrastructure agencies to enhance their efforts towards gaining public acceptance of innovative financing: (i) enhance strategies to facilitate learning for the public about innovative financing in infrastructure projects and (ii) improve marketing and citizen involvement strategies to get the public to buy-in to innovative financing methods. The findings can enhance the current efforts of public agencies related to educating the public and citizen involvement strategies by incorporating public preferences in policy development to enhance the likelihood of public support of innovative financing methods. Potential improvements can be made in changing the key messages in educating the public, using more effective

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strategies for communicating complicated financing concepts, and highlighting the success stories and benefits of innovative financing in other states and countries.

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## 1. Introduction

In 2013, the American Society of Civil Engineers (ASCE) gave U.S. infrastructure a grade of “D+” (deficient). An investment of \$3.6 trillion was estimated to be required between 2013 and 2020 to improve the current condition of the infrastructure to a functionally good condition (ASCE, 2013). The fiscal space for infrastructure development made available by traditional financing approaches is not sufficient to meet the needs (the fiscal space refers to “as the room in a government’s budget that allows it to provide resources for a desired purpose” (Heller, 2005)). The National Academy of Science (NAS) has also emphasized the significance of the need for infrastructure renewal in the U.S. to enhance the quality of life of Americans in the 21st century. For instance, (i) transportation systems require about \$20 billion more annually to keep services at current levels (CBO, 2008), (ii) the electric utilities industry will need to make a total investment of at least \$1.5 trillion between 2010 and 2030 to keep pace with demand (Chupka et al., 2008), and (iii) drinking water and wastewater systems need an average annual investment of \$24.6 billion to \$41 billion for the years 2000 through 2019 (CBO, 2002). According to National Academy of Sciences, 2009, to enhance infrastructure systems, there will a need for substantial public- and private sector investments. On a similar note, ASCE, 2013 states that, the available fiscal space is only sufficient to meet 50% of the need for restoring infrastructure.

In the context of the U.S. infrastructure, transportation infrastructure has been traditionally financed using state and federal grants, funded by taxation, and delivered by public agencies. According to Egger and Dovery (2007), traditional financing includes two main methods used by government agencies for their infrastructure needs: pay-as-you-go financing and debt financing (also known as public bonding). Three categories of financial innovation could exist: (a) different use of traditional financing and funding tools (e.g., earmarking property taxes for capital investments); (b) creation of new tools (e.g., new public-private-partnership (PPP or P3) models); and (c) use of familiar financing and funding tools employed in other sectors (Walton and Euritt, 1990; Ploeg, 2006; Chapman, 2008; Pagano and Perry, 2008; Mostafavi and Abraham, 2010; Mostafavi et al., 2014). According to American Association of State Highway and Transportation Officials (2014), “innovative finance is a broadly defined term that encompasses a combination of techniques and specially designed mechanisms to supplement traditional financing sources and methods. Innovative finance for surface transportation includes such measures as:

- New or non-traditional sources of revenue
- New financing mechanisms designed to leverage resources
- New fund management techniques
- New institutional arrangements

Innovative financing techniques are intended to maximize the ability of states to leverage Federal capital, attract new sources of funds to transportation investment, accelerate project completion dates, and more effectively utilize existing funds” (American Association of State Highway and Transportation Officials, 2014). While traditional infrastructure financing has been mainly based on federal grants and fuel taxes, innovative financing provides tools and institutional arrangements as alternatives or augmentations to traditional, grant-based funding strategies (American Association of State Highway and Transportation Officials, 2014). Examples of innovative financing techniques includes private finance and delivery. Two characteristic of innovative financing could lead to the increased likelihood of public oppositions to innovative financing methods: (i) innovative financing could entail more fees (either user-fees or additional taxation), to be paid by the public (Agrawal and Nixon, 2013); and (ii) public may object to private involvement in project delivery. The latter could lead to public opposition due to the sensitivity of the public to private entities making profit from taxpayers’ money (Savas, 2000). In this study, the focus is on these two aspects in which the public could be affected, and not on any particular innovative financial structure.

There are many potential obstacles to innovative financing approaches from a public acceptance perspective. For example, studies such as Mostafavi et al. (2011a) have shown that many financial innovations are barely understandable to the public – possibly triggering public opposition and increasing the probability of unsuccessful implementation. Vonk Noordegraaf et al. (2014) identified public support as a prominent factor in road pricing cases. Public pressure driven by attitudes and perceptions has been found to greatly influence the priorities and actions of policymakers (Polsby and Wildavsky, 1988). However, proactive measures can help reduce potential public opposition. Such measures include public information campaigns and developing policies that give careful consideration to public perceptions (Vives, 1997; Garvin, 2010; Mostafavi et al., 2012a,b). The key to take effective proactive steps to enhance the public perception of innovative financing is exploring the underlying determinants. The objective of this paper is to systemically investigate the underlying determinants of the dimensions of public perceptions regarding infrastructure development and financing in the U.S. This study is geared to answer the following questions: (i) what is public’s level of knowledge about financing and agency efforts related

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