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Risk perception, trust and public engagement in nuclear decision-making in Hong Kong

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HIGHLIGHTS

- Risk perception, trust and public engagement matter to nuclear decision-making.
- Our logistic regression analysis found that demographics, trust and perception of public engagement are the factors that explain risk perception and nuclear choice in Hong Kong.
- Our conceptual model specifics aspects of trust that are influential.

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ABSTRACT

The extent to which nuclear energy can be a feasible energy option has re-emerged as a subject of widespread debate following the Fukushima accident in Japan. However, relatively little is known about how public inputs can improve nuclear decision-making. This paper aims to provide a better understanding of public opinions regarding nuclear energy by examining its risk perception, trust and public engagement dimensions. Based on a survey of Hong Kong residents (n=509), we make some observations. Firstly, we offer empirical evidence that affirms the theoretical connections between risk perception, trust, and public engagement in the context of nuclear energy. Secondly, our logistic regression analysis indicates that demographics, trust, and perceptions of the efficacy of public engagement are factors explaining perceptions of greater risks and nuclear opposition. Thirdly, our conceptual model sheds light on the complexity of the trust concept, and specifies aspects of trust that are influential in the contexts of risk perception and nuclear choices. Our findings suggest that the Hong Kong government must ensure trust building receives prominent attention in nuclear decision-making, and that it should avoid excessive reliance on the business sector and should assume a key role for itself in enhancing trust in nuclear decision-making.

1. Introduction

1.1. Background and study approach

The threats of global climate change and increasingly expensive fossil fuels have prompted many nations to reconsider the development of nuclear energy as an energy option. However, the extent to which and just how nuclear energy can be an energy option is a central but contentious energy policy issue worldwide. As early as the 1970s, public opposition to nuclear energy halted nuclear expansion plans in Germany and the US (Glaser, 2012; Surrey and Huggett, 1976). Public opposition to nuclear energy, however, seemed to wane from the early 2000s as the "nuclear renaissance" that emerged across Europe co-existed with nuclear expansion plans in major emerging economies including China and India (Goodfellow et al., 2011; Yang and Xu, 2013). However, these pro-nuclear energy strategies came under urgent review in 2011 following the Fukushima nuclear accident in Japan. While some countries, including Germany, Belgium, and Austria, decided to phase out nuclear, some countries such as France and China remained committed to continuing their nuclear expansion plans but with a commitment to developing more stringent safety standards and regulatory systems (Renewables International, 2013; Yang and Xu, 2013).

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Public acceptability of nuclear energy matters to policy-makers because the choice of nuclear energy and related siting decisions often trigger a public outcry resulting in the deflection of policies as well as project delays (Glaser, 2012). Building public support for nuclear-related energy decisions however poses particular challenges for policy-makers for a number of reasons. Nuclear decision-making involves not only technical issues but also a complex mix of economic, social, environmental and governance concerns such as risk management and public distrust (OECD, 2010). These concerns also involve a wide range of stakeholders within and outside government including the general public, nuclear plant operators, the media, NGOs as well as academics and epistemic communities (OECD, 2010). It is therefore important to understand public perceptions of this energy option and how to engage the public effectively to improve the efficacy of nuclear decision-making.

This paper explores Hong Kong's nuclear decision-making from the perspectives of effective governance, with particular reference to two key processes – facilitating trust-building and improving public engagement. We aim to contribute to our empirical understanding of public perceptions of nuclear risks, the opportunities for, and barriers to, improving trust and public engagement, and how nuclear decision-making processes should respond and address these governance issues in the context of Hong Kong. This paper presents the results of a public opinion survey of approximately 500 local residents in Hong Kong conducted in 2013.

Hong Kong merits study for a number of reasons. The use and development of nuclear energy has provoked considerable local public opposition over recent decades (Hsiao et al., 1999). While Hong Kong is atypical and differs from other cities in important ways in terms of its socio-economic and political context as well as the characteristics of its power sector, it nonetheless shares with many developed and developing economies the challenges of managing public distrust and promoting public engagement in various policy areas ranging from nuclear energy, to public health, transport, and GM food (Gilson, 2003; Poortinga and Pidgeon, 2003; Zhang et al., 2005). Hong Kong's experience in nuclear decision-making therefore has a relevance that extends beyond its own boundaries, and may contribute to our understanding of how cities and countries respond to public policy issues that include, but are not limited to, energy challenges.

In the rest of this introductory section we discuss some key theoretical concepts relating to nuclear risks, trust and public engagement. We will then provide an overview of the major developments associated with nuclear energy in Hong Kong. This is followed by a detailed discussion of our survey results. The final section discusses the conclusions and policy implications derived from our findings.

1.2. Theoretical perspectives

1.2.1. Nuclear choices and risk perception

The energy literature provides clear evidence that public perceptions are crucial to energy policies, from energy planning to project implementation (Boehmer-Christiansen, 1990; Venables et al., 2008), and across all major energy areas ranging from coal and other fossil fuels (Wittneben, 2012), to renewable energy (Swofford and Slattery, 2010), and to energy efficiency (Reynolds et al., 2012). Within this work there is also a body of nuclear-related literature. Public perceptions of nuclear energy have attracted attention from academics and policy-makers in part because public support or opposition to this energy option is found to be critical in nuclear choices. Public concerns relating to nuclear risks, radioactive waste disposal and distrust in the nuclear sector have affected the pathways, scale, and pace of nuclear deployment around the world (Ipsos MORI, 2010; Macilwain, 2011; OECD, 2010).

An emerging body of the risk literature has shed light on the nature and challenges relating to nuclear choices. Risk is defined by the probability of an event and magnitude of its consequences (Jacobs and Worthley, 1999). Risk perception is found to be a crucial factor affecting nuclear choices (Goodfellow et al., 2011; Venables et al., 2008; Venables et al., 2012). Managing risk perception has however posed particular challenges to policy-makers for a number of reasons.

Firstly, the public tends to differentiate nuclear risks from other technological risks as a special kind of risk. When compared with other risks such as those associated with cancer, nuclear risks are often perceived as having a profile characterised by a low probability of occurrence but catastrophic and long-term health impacts (NERC, 2010; Scholz and Siegrist, 2010). People tend to express only a "reluctant acceptance" of nuclear energy as a "solution" to climate change, indicating that difficult trade-offs have to be made by the public when considering choices relating to nuclear energy (Pidgeon et al., 2008).

Secondly, the public is concerned with a broad range of issues associated with this energy option. These include non-technical issues relating to costs, environmental and health impacts, ethics of the disposal of radioactive waste, as well as information disclosure (Ipsos-Reid, 2003; Ipsos MORI, 2010).

Thirdly, the notion of risk is highly dynamic as it is socially, culturally and historically constructed, and changes over time and space (Irwin et al., 2000). Studies have also found that perceptions of nuclear risks can be affected by demographics and experience (Corner et al., 2011; Hadjilambrinos, 2000; Sjoberg, 2000). These socio-political dimensions of nuclear risks imply that managing risk perception requires more than technical expertise. However, traditional, technocratic policy-making systems have only a limited ability to deal with nuclear decision-making which is often value-laden (Valentine and Sovacool, 2010) and involves incomplete knowledge (Power, 2004). It is in this risk management context that trust and public engagement are perceived as two different but complementary concepts that can provide a firmer platform for effective nuclear decision-making (Aegerter and Bucher, 1993; Bradbury et al., 1999).

1.2.2. Trust matters to managing risk perceptions

Trust is a "psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another" (Rousseau et al., 1998, p. 395). Trust is regarded as a prerequisite for effective risk management (Brecher and Flynn, 2002; Cvetkovich and Lofstedt, 1999; Poortinga and Pidgeon, 2003), and is crucial to enhance policy legitimacy and improve policy efficacy (Braithwaite, 1998; Kim, 2005). The concept of trust has been studied in the context of various major risk issues that range from climate change, to radiation from mobile phones, radioactive waste, genetically modified food, and to human genetic testing (Poortinga and Pidgeon, 2003). In the nuclear literature, trust has been found to be critical in influencing the acceptability of the nuclear option (Hunt et al., 1999; Poortinga and Pidgeon, 2003; Teräväinen et al., 2011).

Trust is a complex concept because of its multiple actor and multi-faceted nature. Some studies have found that scientists and environmental NGOs are seen as more trustworthy while energy companies, nuclear safety authorities, journalists, and political parties are less trusted (European Commission, 2007; OECD, 2010). Some studies (see for example Poortinga and Pidgeon, 2003; Walker et al., 2008), on the other hand, have developed different, but complementary ways to distinguish and assess different dimensions of trust. Some studies have underscored