



Online, offline, or word-of-mouth? Complementary media usage patterns and credibility perceptions of nuclear energy information in Southeast Asia



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ABSTRACT

Many Southeast Asian countries are considering the adoption of nuclear energy to meet the rising energy demands and achieve energy efficiency. Considering the emerging regional salience of nuclear energy, this study seeks to understand the public's media consumption patterns regarding nuclear-related information, and credibility perceptions of nuclear-related information sources in countries that are at a nascent stage of nuclear development. Focus groups were conducted with citizens aged between 18 and 69 from five Southeast Asian countries – Indonesia, Malaysia, Singapore, Thailand, and Vietnam. Overall, the findings suggest that the participants utilize communication channels in a complementary manner to receive and seek nuclear-related information. Participants also evaluated the credibility of individuals and organizations that convey nuclear-related information based on their trustworthiness and nuclear expertise. The findings provide practical implications in terms of policy implementation, as well as public communication of nuclear-related information. Directions for future research were also discussed.

1. Introduction

Nuclear energy is a controversial technology that has attracted much public discourse over the years [1]. Proponents of nuclear energy advocate it as a clean and affordable solution to address rising energy demands by providing a stable and secure electricity supply [2]. Conversely, detractors oppose nuclear energy based on the magnitude and irreversibility of the potential destruction posed by nuclear accidents. Other often-cited drawbacks include nuclear-related hazards resulting from the improper disposal of radioactive waste and the substantial costs of nuclear power plant construction [3]. Over the past two decades, a sizable number of studies have been conducted in the United States (U.S.) as well as countries from East Asia, and Europe to understand public perceptions of nuclear energy (e.g., see [4–7]). These studies typically examined public perceptions of nuclear energy in countries with existing nuclear power plants [8–10].

A recent meta-analysis examining public perceptions of nuclear energy showed that while numerous studies have been conducted in European countries and the U.S., there is a lack of studies conducted in Southeast Asia (SEA) [11]. While SEA countries do not currently possess any nuclear power plants, regional interest in nuclear energy has surged in recent years. Various countries have drawn up ambitious plans for nuclear energy development [12–15]. As extant studies are typically premised in countries that are fairly developed in nuclear

energy, current research does not comprehensively account for countries that do not possess nuclear energy facilities, or countries that plan to adopt them in future.

SEA also makes for an interesting study context due to its unique socio-cultural background, which differs substantially from countries that have been examined thus far (i.e., the U.S., East Asia, and Europe). The countries in SEA possess rich cultural, language, and religious diversity [16]. They also possess unique geographical features, with some nations being surrounded by seas, and others being vulnerable to earthquakes [17]. Furthermore, SEA nations have undergone rapid economic progress over the past two decades [16]. These factors could influence regional development of nuclear energy differently, therefore calling for more in-depth examination of the issue in SEA.

Given that there is currently no nuclear power plant in SEA, the SEA public is largely unfamiliar with this novel technology [18]. There also exist wide disparities regarding perceptions of nuclear energy between the public and the experts [18]. For instance, while the general public tend to overestimate the risks of nuclear energy, frequently associating it with nuclear weaponry [19], experts often underestimate the risks of nuclear energy [20–23]. To bridge this gap, policymakers have utilized various communication channels (e.g., word-of-mouth, print, broadcast, online and social media) to share nuclear-related information with the public [24]. Thus, it is imperative to garner a holistic understanding of the public's media consumption patterns to effectively disseminate

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nuclear-related facts.

Moreover, as SEA countries solidify their plans and progress towards a nuclear future, the public may also actively seek and consult various communication channels (e.g., word-of-mouth, print, broadcast, online and social media) for nuclear-related information. Using a series of focus group discussions, this exploratory study seeks to understand the public's media consumption patterns regarding nuclear energy and their credibility perceptions of the communication channels and sources of nuclear-related information in SEA.

Findings from this study provide both conceptual and practical implications. Conceptually, this study advances research on source credibility and media credibility by applying it to an understudied and unique cultural context. Practically, the findings obtained can inform policymakers and communication practitioners about the appropriate communication channels and information sources through which to disseminate nuclear-related information to the public.

1.1. Study context: nuclear development in SEA

This study focuses on five SEA nations—Indonesia, Malaysia, Singapore, Thailand, and Vietnam. Since they are among the most economically developed or developing nations in SEA [25], these countries are well-equipped with the financial capabilities to pursue nuclear development plans. The high energy demands in these nations have also prompted considerations of nuclear energy adoption. The adoption of nuclear energy may therefore enhance and sustain the economic competitiveness of these countries, as increased energy use and output may spur industrialization [26].

The above-mentioned countries present a worthwhile study context due to their multitude of commonalities, as well as unique cultural, language, and religious contexts. On one hand, they are tied together by multiple threads of history and shared culture, geographical proximity, economic dependency, and shared resources. However, there exists wide disparities in terms of cultural practices. For instance, the Vietnamese have a unique practice of engaging in conversations while drinking tea in a communal setting [27], which allows them to connect with strangers from all walks of life, sharing stories and the latest news [28]. This practice offers a unique cultural perspective as to how people from different cultures may have distinct ways of receiving and seeking information about nuclear energy.

These SEA countries also differ in terms of their current stages of nuclear development [29], readiness to adopt nuclear energy, and concrete plans to establish nuclear facilities. With the exception of Singapore, the aforementioned SEA countries currently possess nuclear research reactors [30]. Of them, Vietnam possesses the most concrete nuclear development plans to construct nuclear power plants [31]. Although these plans have been scrapped indefinitely [32,31], Vietnam remains the most well-equipped for nuclear energy development, with established nuclear-related institutions responsible for policy formulation, strategic planning, as well as research and development [33].

Indonesia, Malaysia, and Thailand have also spent the last few decades planning to incorporate nuclear into their national energy mix. These countries have established nuclear-specific governmental institutions to strategize, deliberate, and pass policies regarding the construction of nuclear power plants [34]. These countries also have experience in operating nuclear research reactors [35,36]. Additionally, these countries have implemented initiatives to educate and engage citizens on nuclear energy [3]. This approach reflects the respective governments' intentions to ease their citizens into a potential nuclear future.

In comparison, the Singapore government does not have any immediate plans for nuclear energy development. While Singapore has the capabilities to adopt nuclear energy due to its affluent economy and technological advancements, it will be challenging to site nuclear power plants and prepare socio-politically acceptable contingency measures due to Singapore's limited land mass [37]. Despite this, it is worthwhile to include Singapore in this study due to its close

geographical proximity to the countries with plans for nuclear energy development [37]. Considering the symbiotic relationships among the Southeast Asian countries, the regional nuclear energy development plans would have implications on its neighboring countries. Moreover, Singapore is open to developing nuclear-related expertise in light of the regional plans for nuclear energy development [38]. Singapore could also explore other nuclear adoption options such as an offshore floating nuclear power plant [39], or a joint venture with other Southeast Asian countries [40].

Based on the above-mentioned considerations, it is important for Singaporeans to be informed about nuclear energy even if Singapore does not have any immediate plans for nuclear energy development [41]. As such, it would be beneficial to identify the communication channels and information sources that can be utilized to inform the Singaporean public about nuclear energy. The dissemination of facts about nuclear energy will also increase Singaporeans' awareness of regional nuclear developments, and be more prepared to tackle any nuclear-related issues.

Considering the prospects of nuclear development in SEA, it is important to understand how the public receives, seeks, and perceives nuclear-related information. Given the varying degrees of nuclear readiness in each country, it is also worthwhile to compare the observations obtained across these five SEA countries. It would be interesting to understand whether the distinct political, economic, and cultural background in SEA play a role in the public's media consumption patterns, as well as their credibility perceptions of different media platforms and information sources.

2. Literature review

2.1. Media consumption patterns

People typically strive to reduce uncertainty when faced with obscure science topics such as nuclear energy. Traditionally, mass media platforms (e.g., television, radio, newspapers) serve as key information sources that disseminate information in a top-down manner from media corporations to the public [42,43]. However, the advent of online and social media has drastically altered the media landscape. The novel affordances of new media platforms encourage users to actively participate in content creation, distribution, and information exchange [42,43]. This evolution has expanded the variety of media sources through which the public can receive and seek out information.

Media displacement theorists argue that individuals possess limited time and resources to expend on different types of media [44,45]. The addition of online and social media into the media landscape is perceived to reduce the amount of time that individuals can avail for traditional media. Media consumption is therefore regarded as a zero-sum game in which different types of media platforms compete for audience attention [46].

However, other scholars argue that media consumers utilize various communication channels in a complementary manner [47]. The use of communication channels to gratify users' needs are suggested to prevail over the number of channels available, or affordances of the platforms [48]. As such, competition among communication channels will only occur when different media platforms perform the same function. The different modalities of platforms such as traditional media, online and social media, and interpersonal interactions could function complementarily and supplement individuals' information acquisition [47,49,50]. Thus, we propose:

RQ1: What kinds of communication channels do the general public in SEA use to receive and gather nuclear-related information?

2.2. Credibility

The diverse media environment provides the public with a

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