The Mindsponge-based conceptualization for the technological acceptance mechanism

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Last several days, I discussed with my colleague (Mr Manh-Tung Ho) the topic of artificial intelligence (AI). One question emerged in my mind: “how can we, people, accept the use of AI in our daily life?”. It seems to me that the acceptance mechanism can be well-explained by the Mindsponge information processing framework (a.k.a Mindsponge mechanism) (Vuong and Napier 2015; Vuong 2016). In this research note, I conceptualize some models grounded on the Mindsponge framework to answer my question.

In previous literature, the acceptance of AI has been extensively studied using the Technology Acceptance Model (TAM) (Hong et al. 2006; King and He 2006; Velicia-Martin et al. 2021; Wu and Chen 2005). The model was originally proposed by Davis (1985) and later developed by Davis et al. (1989). For improving the individual’s acceptance towards technology or a technological

system, the model employed two primary notions: 1) perceived usefulness, and 2) perceived ease of use.

The model is reasonable and intuitive, but many inconsistencies exist among empirical studies. Thus, Sun and Zhang (2006) suggested that there might be some underlying factors moderating the effects of perceived usefulness and perceived ease of use on the acceptance level. The moderators might derive from three groups: 1) organizational factors, 2) technology factors, and 3) individual factors.

In my view, the acceptance level is subjectively driven, so I propose to look at how new technology is accepted from the viewpoint of the individual's information process. This process can be demonstrated by the Mindsponge framework, which implies that an individual's subjective thoughts (e.g. acceptance level, ideation, perceptions, etc.) are influenced by how they process information in their mind and the availability of the information in the surrounding environment (Nguyen et al. 2021; Vuong et al. 2021a; Vuong et al. 2021b).

Such relationships can be visualized in Figure 1. The perception and filtering process are parts of the mind, while the environment is where the information can be observed and absorbed. This Figure demonstrates how students can accept the use of AI for their job screening and performance measurement.

Figure 1: Conceptual diagram of technological acceptance based on the Mindsponge framework

To begin with, I assume that the information related to AI has to be perceived as available by the students so that they can absorb it into their thinking process. Across many kinds of AI-related technology, social media platforms are seemingly the most prevalent technology among students. The information related to AI could be absorbed through various ways, including experiencing AI functions on social media, reading news related to AI, etc. For that reason, it is plausible to say the

longer time spent on social media, the more AI-related information the students can receive and evaluate, and eventually affect how the student perceives the benefits of AI.

However, receiving AI-related information does not necessarily mean accepting the use of AI. The absorbed information has to go through the cost-benefit evaluation process of the mind. During the evaluation process, familiarity with AI and emotional AI (EAI) might have moderating effects on the perceived values of AI. In other words, an individual tends to weigh the value of reliable information heavier than the value of unreliable information. Like in common situations, we tend to assess information received from our acquaintances as more valuable than strangers. This assumption can be validated using model 1:

$$PerceivedBenefit \sim SMInformation + SMInformation * Familiarity$$

Where

- The *PerceivedBenefit* is an individual's degree of agreement towards a certain benefit of AI;
- *SMInformation* is the amount of information received from social media platforms, which can be proxied by the daily social media usage frequency of the individual.
- *Familiarity* is either the perceived familiarity of the individual towards AI or EAI.

When the level of perceived benefit changes, there are two possible outcomes. On the one hand, an individual's acceptance level towards AI is enhanced by the perceived benefits of AI. On the other hand, the acceptance level decreases if the students do not perceive AI to be beneficial. For testing this assumption, model 2 can be employed:

$$Attitude_AI \sim PerceivedBenefit_1 + PerceivedBenefit_2$$

Where

- The *Attitude_AI* is an individual's acceptance towards the use of AI in job screening and performance measurement.
- The *PerceivedBenefit_1* is an individual's degree of agreement towards a certain benefit of AI; for example, the perceived benefit on the students' mental health of AI on social media.
- The *PerceivedBenefit_2* is an individual's degree of agreement towards a certain benefit of AI; for example, the perceived benefit of AI applications.

Overall, the assumptions and models proposed in this research note are my initial thoughts about the acceptance mechanism towards new technology. In this case, I used AI in the workplace because it is related to my colleagues' research topics (Peter et al. 2021). Besides perceived benefits, the approach proposed above might be a potential model to integrate other aspects of the extended TAM, like trust, perceived risk, privacy concerns, etc. (Palos-Sanchez et al. 2017; Velicia-Martin et al. 2021; Wu and Chen 2005; Zhou 2011). The conceptualization is far from perfect and might contain flaws, so recommendations and comments are all welcomed. For implementing empirical validation for these models, I recommend researcher refer to the *Mindsponge*bayesvl* approach (Nguyen and Ho 2021) due to the high compatibility between the

complexity of the Mindsponge framework and the flexibility and visuality of the **bayesvl** R package (Nguyen 2021; Vuong et al. 2020a; Vuong et al. 2020b).

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