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Keeping up with generative AI: effects of engagement characteristics, cognitive appraisals, and affective reactions on user adaptation

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ABSTRACT

Generative artificial intelligence (GenAI) is expected to substantially change users' established routines of accomplishing tasks, such as information search and content creation. Despite such promising potential, many users are still not incorporating GenAI into their routine internet use. This study draws on the adaptation to information technology (AIT) model to examine how users adapt to GenAI and the influencing factors, including cognitive appraisals, affective reactions, and engagement characteristics. An online survey was conducted with GenAI users recruited on Prolific. The results showed that cognitive appraisals (perceived opportunity, threat, and control) and affective reactions (enjoyment, trust, and anxiety) influence users' various adaptations to varying degrees. Furthermore, engagement characteristics, including the frequency and breadth of using GenAI tools and user involvement, are significant predictors of cognitive appraisals. The study contributes to the nascent literature on GenAI tools by uncovering the impact of cognitive appraisals and affective reactions on users' adaptation to GenAI tools, meanwhile revealing the influence of engagement characteristics on users' appraisals. The findings provide a basis for encouraging certain adaptation behaviours and help understand factors that hinder users' active adaptation to GenAI.

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GenAI; adaptation; appraisals; artificial intelligence; engagement

Recent technological advancements in computing and artificial intelligence (AI) have developed the powerful tool of Generative AI (GenAI), which uses machine learning algorithms to generate new content, including text, audio, code, images, and video. Since the public launch of OpenAI's ChatGPT in November 2022, various advanced GenAI tools have been developed that have sparked immense public interest. Given its advanced capabilities in completing tasks such as content generation and information search, McKinsey (2023) predicted GenAI will have crucial impacts across all industry sectors, and individuals would use GenAI to automate some of their work. Despite the hype around GenAI, a recent survey of nationally representative samples in six countries by the Reuters Institute at the University of Oxford showed that GenAI tools are yet to be incorporated into users' routine internet use, with many users having used them just once or twice (Fletcher and Nielsen 2024).

This raises the question of what factors drive individual users' diverse usage and adaptation to GenAI after initial adoption, which is among the major factors shaping the development and evolvement of genAI platforms over time (Nielsen 2024) and would likely result in emerging digital disparities in the long run. Extant research on GenAI has focused on examining factors influencing users' adoption (e.g. Abdaljaleel et al. 2024; Baek and Kim 2023), yet little is known regarding factors that motivate diverse adaptation to GenAI tools.

This study has the following objectives: (1) to delineate different types of adaptation behaviours, ranging from innovative usage to avoidance; (2) to examine the influences of cognitive appraisals and affective factors on such adaptation behaviours based on the Adaptation to Information Technology (AIT) model (Bala and Venkatesh 2016) and relevant prior research that explains users' adaptation behaviours to cutting-edge technologies and influencing factors; (3) and to examine the impact of behavioural and psychological engagement factors on downstream adaptation. Specifically, it addresses the following research questions: How do people vary in their adaptation to GenAI tools? How are cognitive appraisals (perceived opportunity, perceived threat, and perceived control) and affective

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reactions (enjoyment, trust, and anxiety) related to different adaptation behaviours? How are individuals' experiences (breadth and frequency of usage) and involvement with GenAI related to different adaptation behaviours?

This study empirically examines the proposed hypotheses and research questions by analyzing data collected from U.S.-based GenAI users recruited through Prolific. The paper contributes to the existing literature on technology adaptation and GenAI usage behaviours by identifying the cognitive and affective antecedents that shape users' adaptation to GenAI tools. Additionally, it offers practical insights for GenAI developers, individual users, and society as a whole. Specifically, the nuanced understanding of users' adaptation patterns and their underlying influencing factors provides valuable implications for GenAI developers seeking to attract new users and foster long-term user loyalty.

1. Literature review

1.1. Users' adoption of AI tools and influencing factors

With the emergence and popularity of AI products, most studies examining how users adopt AI tools and their influencing factors have been based on the Technology Adoption Model (TAM) (e.g. Cheng et al. 2022; Lim and Zhang 2022; Ma et al. 2024). These studies have shown that perceived usefulness and ease of use directly or indirectly influence the behavioural intention to adopt AI tools in different sectors (Lim and Zhang 2022). For example, Lim and Zhang (2022) revealed that perceived usefulness and ease of use positively affected attitudes toward AI-powered news, which led users to adopt personalised AI tools on digital news platforms. Scholars have also focused on other antecedent factors, such as attitudes toward AI technology and trust in AI, affecting users' perception and adoption of AI technologies (e.g. Choung, David, and Ross 2023; Lim and Zhang 2022). For instance, Choung, David, and Ross (2023) showed that trust, perceived ease of use, and perceived usefulness positively influenced attitudes toward using AI voice assistants, and perceived usefulness and perceived ease of use were directly related to users' intentions to use such tools.

In addition to TAM, a few scholars have developed and tested other models to explain individuals' intention to use AI tools (e.g. Chi et al. 2023). For example, Sohn and Kwon (2020) compared different models predicting behavioural intention to use AI-based products and found that the value-based adoption model (VAM) that considers enjoyment and perceived fee, along with the usefulness and technicality of the technology, was the best. Chi et al. (2023) also proposed an AI acceptance framework (i.e. AIDUA) and examined how factors such as perceived social influences, hedonic motivation, and anthropomorphism affect users' emotions and trust in interacting with AI robots, which in turn affect users' willingness to use AI robots. They found enjoyment and trust in technology played crucial roles in AI acceptance.

With the advent of GenAI tools, researchers have turned to explore factors that affect the use of GenAI tools (e.g. Abdaljaleel et al. 2024; Baek and Kim 2023; Choudhury and Shamszare 2023; Ma et al. 2024). For example, Ma et al. (2024) demonstrated the influences of TAM factors, the perceived usefulness and perceived ease of use, on ChatGPT adoption. They also identified educational background as a crucial moderator, indicating a stronger relationship between the perceived ease of use and behavioural intention to adopt ChatGPT among those with higher educational backgrounds. Abdaljaleel et al. (2024) collected survey data from Arab countries and discovered that perceived ease of use, perceived usefulness, positive attitudes, and social influences were crucial factors driving the adoption of ChatGPT. Based on a survey of adults in the United States, Choudhury and Shamszare (2023) found that trust was a crucial factor influencing the adoption of ChatGPT. Baek and Kim (2023) found that task efficiency and personalisation affected users' continuous use of ChatGPT, mediated by perceived discomfort and trust in ChatGPT.

In sum, previous studies on genAI tools have discovered that TAM-related factors, such as the perceived ease of use and perceived usefulness, have influences on users' intention to use the tools (e.g. Abdaljaleel et al. 2024; Ma et al. 2024). At the same time, users' hedonic motivation and trust have also affected users' adoption of GenAI tools. While this nascent research on GenAI adoption offers important insights, it is equally important to understand what factors contribute to users' post-adoption adaptation behaviours utilising these tools. To this end, this study draws upon the AIT model in the information systems field as the overarching theoretical lens for understanding users' adaptation to GenAI tools.

1.2. Adaptation to information technology (AIT) explaining GenAI adaptation

After adopting the technology, based on their perceptions and individual characteristics, users may appraise and cope with these changes in different ways, resulting in differing behavioural reactions toward the new technologies (Beaudry and Pinsonneault 2005). Scholars in the information system and organisational behaviour fields have focused on examining users' post-adoption technology adaptation behaviours (e.g. Bala and Venkatesh 2016; Beaudry and Pinsonneault 2005; Chen, Hsieh, and Rai 2022). One pioneering adaptation model is the Coping Model of User Adaptation (CMUA), which explains users' cognitive appraisals and adaptation behaviours in response to the changes brought about by new technology (Beaudry and Pinsonneault 2005). Extending CMUA, Bala and Venkatesh (2016) proposed and tested the AIT model, a holistic nomological network of technology adaptation that incorporates technology implementation characteristics as antecedents and job performance and satisfaction as outcomes.

Specifically, the AIT model posits that people would employ two processes to cope with a change in their environment: cognitive appraisal and adaptation. Cognitive appraisals comprise primary and secondary appraisals. A primary appraisal includes users' evaluations of the potential for personal benefit or harm, including perceived opportunity and threat. A secondary appraisal relates to users' judgment of the level of control over the technology, given their abilities and resources (Bala and Venkatesh 2016). The AIT model further proposes two groups of situational characteristics and coping resources as antecedents of users' cognitive appraisal, helping users appraise the technology: experiential engagements (i.e. user participation and training effectiveness) and psychological engagements (user involvement and management support) (Bala and Venkatesh 2016).

Additionally, this model delineates how the two levels of appraisals, in turn, affect users' adaptation behaviours differently. It conceptualises and operationalises four adaptation behaviours: (a) exploration-to-innovate (i.e. searching for novel or innovative ways of using the technology), (b) exploitation (i.e. using the features of the technology according to tutorials or suggestions from others), (c) exploration-to-revert (i.e. using the technology in ways that fit with their prior habits), and (d) avoidance (i.e. trying not to use the technology when accomplishing their tasks). One thing worth noting is that these adaptation behaviours are not mutually exclusive since users may perform various adaptation behaviours when faced with a new technology.

Previous literature applying this model has confirmed the significant role of two levels of cognitive appraisals on users' adaptation behaviours within organisational settings (e.g. Bala and Venkatesh 2016; Chen, Hsieh, and Rai 2022) and users' post-adoption adaptation to cutting-edge technologies such as social media (Muhammad et al. 2021), implementation of big data analytics and artificial intelligence on ridesharing platforms (Cheng et al. 2022), mobile payment services (e.g. Gong et al. 2020), and one-stop smart governance apps (Zhang et al. 2022). While extant research yields consistent findings regarding the influence of the primary appraisals on the four adaptation behaviours, a consensus has not been reached regarding the influence of perceived control on some adaptation behaviours, with some literature suggesting conflicting findings. Since GenAI tools are cutting-edge technologies that are likely to bring changes to people's daily routines and task performances, this study employs this theory as the main theoretical framework.

Applying the logic of AIT to the context of GenAI tools, this study predicts that since users can use the technology to accomplish various tasks, they may perceive GenAI-induced change as opportunities or threats (or both) and respond in different ways to accomplish their tasks. While the adaptation model presents a powerful theoretical lens for explaining users' adaptation to cutting-edge technology, it mainly focuses on the impact of users' cognitive appraisals, neglecting the role of affective reactions that might also significantly affect users' adaptation decisions. Thus, this study also examines affective reactions as another factor affecting user adaptation behaviours. The following section discusses how each factor would affect user adaptation behaviours to GenAI tools and proposes hypotheses and research questions.

1.3. Factors influencing user adaptation to GenAI tools

1.3.1. The influence of cognitive appraisals

Previous literature has identified the significant role of two levels of cognitive appraisals on users' varied adaptation behaviours (e.g. Bala and Venkatesh 2016; Beaudry and Pinsonneault 2005; Chen, Hsieh, and Rai 2022), despite some conflicting findings regarding the influence of perceived control on some adaptation behaviours. First, regarding exploration-to-innovate behaviours, research has consistently shown that perceived opportunity and control would likely exert a positive influence (Bala and Venkatesh 2016; Muhammad et al. 2021). In the GenAI context, when users perceive the opportunities enabled by these tools to accomplish their tasks in new ways and feel control over the technology, they might be motivated to maximise the benefits by engaging in extra effort to use the technology to its fullest potential and innovate the use, thereby exhibiting exploration-to-innovate behaviours. Thus, we propose that:

> **H1**: (a) Perceived opportunity and (b) perceived control of GenAI tools positively relate to exploration-to-innovate.

Second, regarding exploitation behaviours, prior literature identified the significant positive impact of perceived opportunity. However, consistent findings have yet to be shown regarding the impact of perceived control. Bala and Venkatesh's (2016) original paper did not find the hypothesised negative relationship between perceived control and exploitation. However, results showed a moderating role of perceived control on the relationship between perceived opportunity and exploitation, such that the relationship was stronger for employees with low perceived controllability. On the contrary, in a study of users' adaptation to social media, Muhammad et al. (2021) found a positive influence of perceived control on users' exploitation behaviours. Hence, we propose that:

> **H2**: Perceived opportunity of GenAI tools is positively related to exploitation.

> **RQ1**: How does perceived control of GenAI tools relate to exploitation?

Third, regarding exploration-to-revert behaviours and avoidance, prior research demonstrates a significant favourable influence of perceived threat on these types of adaptation. In the context of GenAI, when users perceive the threats these tools bring, such as disrupting existing established routines and generating harmful (or bad) consequences, they may be motivated to minimise the disturbances caused by the new technology. This perception would encourage them to engage in exploration-to-revert behaviours to leverage the tool in ways that fit with their old ways of performing tasks or avoid using the tool. However, in terms of perceived control, while Bala and Venkatesh's (2016) model hypothesises a positive influence on exploration-to-revert behaviours, it did not reach statistical significance. In contrast, Muhammad et al.'s (2021) study showed the opposite negative influence of perceived control on users' exploitation behaviours, indicating that when users perceive a lack of control on social media platforms, they would more likely engage in exploration-to-revert behaviours.

Fourth, extant research identified perceived threat's positive impact on avoidance and perceived control's negative impact on avoidance. For instance, users would avoid using social media when they perceive a lack of resources and ability to use it (Muhammad et al. 2021). Appropriating the theoretical lens to the GenAI, users will likely avoid using GenAI tools when they perceive GenAI as potentially causing negative consequences to completing their tasks. Similarly, when users feel that they do not possess adequate ability and resources to leverage the tool, they are more inclined to avoid using it to accomplish tasks. Taken together, this study proposes the following hypotheses and research questions:

> **H3**: Perceived threat of GenAI tools is positively related to exploration-to-revert.

> **RQ2**: How does perceived control of GenAI tools relate to exploration-to-revert?

> **H4**: (a) Perceived threat is positively related to avoidance, while (b) perceived control of GenAI tools is negatively related to avoidance.

1.3.2. The impact of affective reactions

In addition to the cognitive appraisals proposed in the AIT model, affective reactions can also function as feedback mechanisms that influence individuals' approach or avoidance responses to evaluated technologies, as suggested by the 'affect-as-information' theory (e.g. Clore and Huntsinger 2009). Previous research has shown the joint effects of cognitive and affective reactions on technology adoption and adaptation (e.g. Dwivedi et al. 2019; Muhammad et al. 2021).

Enjoyment, referred to as hedonic value derived from the experience of using technology (Van der Heijden 2004), can motivate users to further explore or exploit the technology features (e.g. Lin, Gregor, and Ewing 2008; Muhammad et al. 2021). Another positive affective factor that is likely to foster sustained usage of IT is users' trust in the technology (Mcknight et al. 2011) since a sense of trustworthiness in a new IT can motivate users to explore further and exploit its features. Previous research on technology adaptation has provided some empirical support for the influence of trust on users' adaptation behaviours, particularly in the context of social media platforms (e.g. Muhammad et al. 2021).

On the other hand, negative affect, such as anxiety, can function as inhibitory feedback that inhibits the intention to adopt IT (e.g. Carver 2004). Anxiety is characterised as a self-focused emotional response to threatening stimuli (Gross and Hen 2004). It is likely to activate self-regulatory goals, which often result in avoidance behaviours toward the object of concern. Unlike anger, which can be categorised as an appetitive or approach-oriented response to an object (Carver 2004), anxiety has been identified as a significant negative antecedent of users' intentions to adopt IT (e.g. Blut, Wang, and Schoefer 2016; Hohenberger, Lee, and Coughlin 2019). Although distinguishing anxiety from fear remains a contentious issue (Daniel-Watanabe and Fletcher 2022), anxiety is more commonly employed in technology-related research, as evidenced by studies on technology anxiety (e.g. Meuter et al. 2003) and IT adoption literature (e.g. Blut, Wang, and Schoefer 2016; Hohenberger, Lee, and Coughlin 2019). Therefore, consistent with prior research on technology adoption, we examined anxiety as a potential factor that relates to reverting or avoiding adaptation behaviours.

Therefore, this study examines enjoyment, trust, and anxiety as affective reactions potentially influencing users' adaptation behaviours. In the GenAI context, this study expects that positive affective reactions of enjoyment and trust will motivate users to further innovatively explore and leverage the features of the technology and exploit the features according to tutorials or suggestions from others. On the contrary, feelings of anxiety can motivate users to mitigate the potential risks associated with the technology and to restore their emotional stability by either using the tool in the traditional ways or avoiding it altogether. As such, this study hypothesises the following:

> **H5**: Enjoyment is positively related to (a) exploration-to-innovate and (b) exploitation.

> **H6**: Trust is positively related to (a) exploration-to-innovate and (b) exploitation.

> **H7**: Anxiety is positively related to (a) exploration-to-revert and (b) avoidance.

1.4. Antecedents of cognitive appraisals: engagement characteristics

As antecedents of users' cognitive appraisal in the AIT model (Bala and Venkatesh 2016), experiential engagements with the technology implementation can help users appraise its perceived opportunity and threat and determine whether they have the ability and resources to leverage it. These factors are hypothesised to positively influence perceived opportunity and control and negatively influence perceived threat.

Users' psychological engagement with the technology implementation is another antecedent affecting their cognitive appraisals. Specifically, users who feel involved with the new technology and perceive support from the organisation are likely to see opportunities in the technology, feel less harmful, and proactively seek resources that can, in turn, increase their sense of control. Accordingly, these factors are believed to positively influence perceived opportunity and control and negatively influence perceived threat.

This study refers to prior literature on algorithmic platforms to uncover situational characteristics and coping resources likely to influence users' appraisals of GenAI. Given the black-box nature of algorithms, people glean insights through direct experiences with them (Cotter and Reisdorf 2020). Using technologies in diverse ways can provide users with varied opportunities and scenarios to accumulate knowledge about different features of the technology (Blank and Dutton 2012). In support of this, users' frequency and breadth of search using search engines were positively related to their algorithmic knowledge regarding search engines (Cotter and Reisdorf 2020). In the context of the cutting-edge technology of GenAI, more frequent and a variety of experiences with GenAI tools can help them reflect on their observations and intuitively form beliefs about such platforms, helping them make an informed decision regarding whether the tool is an opportunity or a threat (i.e. perceived opportunity and threat) and whether they have the ability and resources to employ it (i.e. perceived control).

> **H8**: Frequency of using GenAI tools is positively related to (a) perceived opportunity and (b) perceived control and negatively related to (c) perceived threat.

> **H9**: Breadth of using GenAI tools is positively related to (a) perceived opportunity and (b) perceived control and negatively related to (c) perceived threat.

Lastly, users' psychological engagement of user involvement might be relevant to explaining users' cognitive appraisals of GenAI tools (Bala and Venkatesh 2016). When users perceive that a GenAI tool is important and relevant, they might be more inclined to learn and leverage its features, resulting in a higher sense of control over the tool and a better understanding of its benefits. They are more likely to perceive the potential opportunities brought by the tool and feel less threatened by it. Thus, this study proposes the following:

> **H10**: User involvement with GenAI tools is positively related to (a) perceived opportunity and (b) perceived control and negatively related to (c) perceived threat.

2. Method

2.1. Survey procedures and participants

To examine how individuals adapt to GenAI tools, this study used a partial sample from a more extensive survey study on GenAI usage. The survey was set up on Prolific, an online crowdsourcing data collection platform that provides higher data quality in terms of attention checks, answer content, following instructions, and response accuracy, etc., compared to other major online panel platforms – MTurk or Qualtrics (Douglas, Ewell, and Brauer 2023).

As this study focuses on understanding adaptation behaviours among GenAI users, we used a purposive sampling method to limit our sample to participants who have used a GenAI tool at least once in the past month and located in the US. We also set up a gender quota to ensure a roughly equal number of males and females in our sample, corresponding with the gender distribution in the United States (United States Census 2020). The survey took about 15 min, and we paid £ 1.50, roughly equivalent to the US federal minimum wage.

In total, 510 adult respondents from the United States were recruited from 27 November 2023 to 6 December 2023. Upon agreeing to participate in the online survey, the respondents were asked to answer the screening question about whether they had heard of any GenAI tools. Only those who selected 'yes' were then moved to subsequent questions regarding whether they have put a prompt for a GenAI tool at least once in the past month. After that, they were asked to answer the rest of the survey, which included a wide range of questions on users' adoption and adaptation of GenAI tools, influencing factors, and demographics.

In line with the leading methodological practices for ensuring high-quality data collection through online crowdsourcing platforms (Lowry et al. 2016), we took measures to guarantee the quality of our data. Following Buchanan and Scofield (2018), we assessed both attention check and response times to screen for low-quality data in the data preparation stage. Based on the mean character reading speed per minute, we calculated a critical score that indicated the minimal survey reading time to flag potential speeders whose survey response time was below this score. In addition, we checked whether there were inaccurate respondents who failed the attention check question. As any data quality check measure alone may not be sufficient to exclude participants (e.g. Buchanan and Scofield 2018; Goodman, Cryder, and Cheema 2012), we excluded six respondents flagged as problematic at both response time and attention checks. The final sample contains 410 GenAI users who have entered a prompt for a GenAI tool at least once in the past month.

The sample characteristics are as follows: age (M = 41.67, SD = 13.42, Median = 39 years old), gender (52.9% male, 44.9% female, and 1.4% of those who identified themselves as transgender, non-binary, or other categories) and White, non-Hispanic was the most common race (61.5%), followed by Black or African American (19%), Asian (6.1%), Hispanic or Latino (5.4%), with other races making up less than 8% (Native Hawaiian or other Pacific Islanders were less than 1% and Mixed racial group 7.1%). For education, 38.8% of respondents had a Bachelor's degree, followed by some college, no degree (20%), Master's degree (14.6%), High school graduate or equivalent (13.4%), Associate's degree (10.2%), Doctoral degree (1.5%), and less than high school graduate (less than 1.5%) (Median: Bachelor's degree). The median household income is between $50,000 and $74,999.

2.2. Measures

This study adopted and adapted previously validated multiple-item scales based on a comprehensive review of relevant literature. In addition, minor changes in their wording were made to fit the context of GenAI. Unless noted otherwise, all variables were measured on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

2.2.1. Adaptation behaviors

First, adapted from Bala and Venkatesh (2016) and Muhammad et al. (2021), four different categories of adaptation behaviours were measured by sixteen items. On a scale from 1 = hardly ever do this to 7 = almost always do this, participants indicated their agreement to the statements related to the different types of adaptation behaviours: Exploration-to-innovate (e.g. I explore generative AI tools for potential new application to accomplish my tasks, α = .96, M = 3.84, SD = 1.58), Exploitation (e.g. I use the same features of generative AI tools that I learned from tutorials or others to perform my tasks, α = .96, M = 3.82, SD = 1.58), Exploration-to-revert (e.g. I use generative AI tools in ways that would support my old ways of accomplishing tasks, α = .94, M = 3.78, SD = 1.51), and Avoidance (e.g. I try to avoid generative AI tools as much as I can, α = .90, M = 3.69, SD = 1.63).

2.2.2. Cognitive appraisal

For cognitive appraisal, perceived opportunity, perceived threat, and perceived control were assessed on the items adapted from Bala and Venkatesh (2016), Dinev et al. (2013), and Muhammad et al. (2021). Regarding perceived opportunity, participants were asked to indicate their agreement with the statements to four items, including 'I am confident that generative AI tools will have positive consequences for me', 'I feel that generative AI tools will open new avenues for accomplishing my tasks' (α = .90, M = 5.03, SD = 1.24). For perceived threat, participants were asked to indicate their degree of agreement to statements such as 'I am scared that generative AI tools will have harmful (or bad) consequences for me' and 'I feel that generative AI tools might actually negatively affect my task performance' (α = .93, M = 2.85, SD = 1.45). Regarding perceived control, four items were used such as 'I personally have what it takes to deal with the situations caused by generative AI tools' and 'I have the knowledge necessary to use generative AI tools' (α = .88, M = 5.13, SD = 1.09).

2.2.3. Affective reactions

Based on Hassanein and Head (2007), this study measured participants' enjoyment. Participants were asked to indicate their level of agreement with four items, including 'I have found my experiences with generative AI tools interesting' and 'I have found my experiences with generative AI tools pleasant' (α = .92, M = 5.52, SD = 1.09). Trust was measured based on Shin, Zhong, and Biocca (2020) and Shin (2021). Participants were asked to indicate their level of agreement to three items, including 'I trust the results generated by generative AI tools' and 'I believe that the results made by generative AI tools are reliable' (α = .96, M = 4.74, SD = 1.33). Anxiety was assessed on the items adapted from Hohenberger, Spörrle, and Welpe (2017) and Venkatesh (2000). Participants indicated their agreement to statements such as 'Using generative AI tools makes me nervous' and 'I feel comfortable working with generative AI tools (reverse-coded)' (α = .76, M = 2.28, SD = 0.96).

2.2.4. Experiential engagements

Based on Cotter and Reisdorf (2020), this study measured the frequency of using GenAI tools on a 7-point Likert scale, ranging from 1 (never) to 7 (several times a day) (α = .87, M = 3.35, SD = 1.63). The breadth of using GenAI tools was adapted from Cotter and Reisdorf (2020) on a scale calculated from the average of responses to ten questions, including 'Generating content for work-related or professional purposes', 'Generating content for personal use', and 'Finding entertaining content, such as music or videos' (M = 2.53, SD = 0.87). Responses for the breadth of using GenAI tools ranged from 1 (never) to 5 (very frequently). User involvement was assessed on the items adapted from Bala and Venkatesh (2016). Participants were asked about their degree of agreement with the items such as 'I consider generative AI tools to be important to me' (α = .80, M = 4.87, SD = 1.22).

2.2.5. Control and socioeconomic variables

Lastly, perceived AI threat and several socioeconomic variables, including age, income, gender, education, and race, were measured as potential confounding variables. Perceived AI threat was measured using Esch et al.'s (2021) six-item scale, rating the extent to which participants perceived AI's threat in general as threatened, attacked, challenged, etc. Possible answers ranged from 1 (not at all) to 7 (very much) (α = .92, *M* = 2.05, *SD* = 1.18). See the Appendix for the items used to measure each key variable.

3. Results

3.1. Effects of cognitive appraisals and affective reactions on adaptation

A multiple regression analysis was performed with exploration-to-innovate as the dependent variable. Perceived opportunity, control, enjoyment, and trust were entered as the predictors, and perceived AI threat, age, income, gender, education, and race were entered as covariates. Overall, 47.4% of the variance of exploration-to-innovate was explained by the variance of the predictors and covariates, $F(12, 392) = 31.37$, $p < .001$. The results showed that, as expected, participants who perceived greater opportunity ($b = .64$, $p < .001$, 95% CI [.49, .78]) and greater control ($b = .19$, $p < .01$, 95% CI [.05, .32]) of GenAI tools were more likely to engage in extra effort to use the technology to its fullest potential and innovate their use, confirming **H1**. Regarding the impact of affective reactions, neither enjoyment ($p = .13$) nor trust ($p = .50$) were significant predictors of exploration-to-innovate, lending no support to **H5a** and **H6a**.

In addition to the main hypotheses, we found that education was positively associated with exploration-to-innovate ($b = .10$, $p < .05$, 95% CI [.01, .19]). The results also indicated that household income was positively related to exploration-to-innovate ($b = .08$, $p < .05$, 95% CI [.02, .15]). In addition, compared to males, female participants were less likely to engage in exploration-to-innovate behaviours ($b = -.32$, $p < .01$, 95% CI [−.54, −.09]). Black or African Americans in our sample were more likely to innovate in their GenAI tool usage than White Americans ($b = .33$, $p < .05$, 95% CI [.04, .63]). Interestingly, participants' perceived threat of AI in general ($b = .18$, $p < .01$, 95% CI [.08, .28]) was positively related to exploration-to-innovate.

Second, to examine the predictors of exploitation, a similar multiple regression analysis was performed with exploitation as the dependent variable. The regression results indicated that the model explained 36.3% of the variance, $F(12, 392) = 20.15$, $p < .001$. In line with what was predicted, participants who perceived greater opportunity ($b = .50$, $p < .001$, 95% CI

[.34, .66]) of GenAI tools were more likely to leverage the tool according to tutorials or suggestions from others to achieve these benefits, confirming **H2**. To answer **RQ1**, this study found that perceived control was not a significant predictor of exploitation ($p = .38$).

Regarding the impact of affective reactions, trust ($b = .17$, $p < .01$, 95% CI [.05, .30]) was found to be positively related to users' exploitation, while enjoyment ($b = .15$, $p = .05$, 95% CI [−.003, .31]) was in a marginally significant positive relationship with exploitation, lending support to **H6b** only. Besides the main hypotheses, we found that Black or African Americans in our sample were more likely to exploit and leverage the features of GenAI tools as suggested by tutorials or others than White Americans ($b = .34$, $p < .05$, 95% CI [.01, .67]). Participants' perceived threat of AI in general ($b = .16$, $p < .01$, 95% CI [.05, .27]) was positively related to exploitation.

Third, a multiple regression analysis was performed with exploration-to-revert as the dependent variable to examine its antecedents. Perceived threat, perceived control, and anxiety were tendered as predictors, and perceived AI threat and the same socioeconomic variables were entered as covariates. Overall, 15.4% of the variance of exploration-to-revert was explained by the variance of the predictors and covariates, $F(11, 393) = 7.67$, $p < .001$. Unlike predicted, perceived threat ($p = .89$) was unrelated to exploration-to-revert, lending no support to **H3**. To answer **RQ2**, this study found that perceived control of GenAI tools ($b = .48$, $p < .001$, 95% CI [.33, .63]) was positively related to exploration-to-revert.

Regarding the impact of affective reactions, anxiety ($p = .76$) was not a significant predictor of exploration-to-revert, lending no support to **H7a**. Additionally, Black or African Americans in our sample were more likely to leverage the features of the technology to fit with their old ways of doing things than White Americans ($b = .49$, $p < .01$, 95% CI [.14, .85]). Participants' perceived threat of AI in general ($b = .15$, $p < .05$, 95% CI [.002, .30]) was positively related to exploration-to-revert.

Fourth, a similar multiple regression analysis was performed with avoidance as the dependent variable. The regression results indicated that the predictors and covariates explained 31.7% of the variance, $F(11, 393) = 18.07$, $p < .001$. Per prediction, perceived threat of GenAI tools ($b = .32$, $p < .001$, 95% CI [.18, .47]) was positively related to avoidance, while perceived control ($b = -.21$, $p < .01$, 95% CI [−.36, −.06]) was negatively related to avoidance, showing support for H4. Regarding the impact of affective reactions, anxiety ($b = .36$, $p < .001$, 95% CI [.15, .56]) was found to be positively related to avoidance, lending support to **H7b**. None of the control variables were found to be significant predictors. See the Appendix for tables demonstrating the detailed hypotheses testing results.

3.2. Effects of engagement characteristics on cognitive appraisals

First, a multiple regression analysis was performed with perceived opportunity as the dependent variable. Three engagement characteristics (i.e. frequency and breadth of using GenAI tools and user involvement) were entered as predictors, and perceived AI threat, age, income, gender, education, and race were entered as covariates. Overall, 54.8% of the variance of perceived opportunity was explained by the model, $F(11, 393) = 45.60$, $p < .001$. Breadth of using GenAI tools ($b = .22$, $p < .01$, 95% CI [.08, .37]) and user involvement ($b = .56$, $p < .001$, 95% CI [.47, .64]) was positively related to the perceived opportunity. Thus, **H9a** and **H10a** were supported. However, frequency of using GenAI tools ($p = .20$) was not a significant predictor of perceived opportunity, showing no support for **H8a**. In addition to the main hypotheses, we found that education was negatively associated with the perceived opportunity of GenAI tools ($b = -.08$, $p < .05$, 95% CI [−.14, −.01]). Perceived AI threat was also negatively related to the perceived opportunity of GenAI tools ($b = -.23$, $p < .001$, 95% CI [−.30, −.16]).

Second, a similar multiple regression analysis was performed with perceived control as the dependent variable. Overall, 32.1% of the variance of perceived control was explained by the predictors and covariates, $F(11, 393) = 18.40$, $p < .001$. Frequency of using GenAI tools ($b = .16$, $p < .001$, 95% CI [.08, .25]) and user involvement ($b = .27$, $p < .001$, 95% CI [.17, .37]) was positively related to the perceived control over the ability and resources to leverage the tools. Thus, **H8b** and **H10b** were supported. However, the breadth of using GenAI tools ($p = .90$) was not a significant predictor of perceived control, showing no support for **H9b**. In addition to the main hypotheses, we found that age was negatively associated with perceived control ($b = -.01$, $p < .05$, 95% CI [−.02, −.002]), which means that the older participants had less perceived control of the use of GenAI tools. Perceived AI threat was also negatively related to perceived control of GenAI tools ($b = -.24$, $p < .001$, 95% CI [−.32, −.17]).

Third, perceived threat was entered as the dependent variable for a similar multiple-regression analysis. Overall, 42.2% of the variance of perceived threat was explained by model, $F(11, 393) = 27.86$, $p < .001$. As predicted, frequency of using GenAI tools was negatively related to perceived threat ($b = -.20$, $p < .001$, 95%

Table 1. Summary of hypotheses testing.

No.	Hypothesis	Hypothesis result
H1	(a) perceived opportunity and (b) perceived control → exploration-to-innovate	Supported
H2	perceived opportunity → exploitation	Supported
RQ1	perceived control → exploitation	*ns*
H3	perceived threat → exploration-to-revert	*ns*
RQ2	perceived control → exploration-to-revert	Positive relationship
H4	perceived threat → avoidance perceived control → avoidance	Supported
H5	enjoyment → (a) exploration-to-innovate and (b) exploitation	*ns*
H6	trust → (a) exploration-to-innovate and (b) exploitation	H6a *ns*; H6b supported
H7	anxiety → (a) exploration-to-innovate and (b) avoidance	H7a *ns*; H7b supported
H8	Frequency of use → (a) perceived opportunity, (b) perceived control, and (c) perceived threat	H8a *ns*; H8b supported; H8c supported
H9	Breath of use → (a) perceived opportunity, (b) perceived control, and (c) perceived threat	H9a supported; H9b *ns*; H9c *ns*
H10	User involvement → (a) perceived opportunity, (b) perceived control, and (c) perceived threat	H10a supported; H10b supported, H10c *ns*

CI [−.30, −.09]), confirming **H8c**. However, breadth of using GenAI tools ($p = .16$) and user involvement ($p = .17$) were not significant predictors of perceived threat, showing no support for **H9c** and **H10c**. Additionally, age was negatively associated with perceived threat ($b = -.01.$, $p < .05$, 95% CI [−.02, −.002]). Participants who identified as transgender, non-binary, or others reported a greater level of perceived threat than males ($b = 1.08.$, $p < .05$, 95% CI [.17, 1.99]). Perceived AI threat ($b = .69$, $p < .001$, 95% CI [.60, .79]) was positively related to the perceived threat of GenAI tools. Table 1 below summarises the hypotheses testing results.

3.3. Mediation test

To examine whether the effects of engagement characteristics on cognitive appraisals identified above could, in turn, differentially impact users' adaptation to the tools, several separate mediation analyses were conducted using Model 4 (5,000 bootstrap samples) of the PROCESS macro in SPSS (Hayes 2017). First, frequency of GenAI use was entered as the predictor, perceived control served as the mediating variable, and *exploration-to-innovate* was used as the criterion. Perceived AI threat, age, income, gender, education, and race were entered as covariates. A significant indirect effect was found regarding the influence of frequency of GenAI use on *exploration-to-innovate* via perceived control ($\beta = .09$, BootSE = .02, 95% CI [.05, .13]) when controlling for the potential influence of covariates. At the same time, the main effect of frequency of GenAI use on *exploration-to-innovate* ($b = .56.$, $p < .001$, 95% CI [.48, .64]) was also significant, indicating a partial mediation effect of perceived control.

Second, to test whether perceived control and threat mediate the effect of frequency of GenAI use on *avoidance*, frequency of GenAI use was entered as the predictor, perceived control and threat served as the mediating variables, and *avoidance* was used as the criterion. The same group of covariates were entered. The indirect effect was significant for the impact of frequency of GenAI use on *avoidance* only via perceived threat ($\beta = -.07$, BootSE = .02, 95% CI [−.11, −.04]), not through perceived control ($\beta = -.02$, BootSE = .02, 95% CI [−.07, .02]). The main effect of frequency of GenAI use on *avoidance* ($b = -.39.$, $p < .001$, 95% CI [−.48, −.30]) was still significant, indicating a partial mediation effect of perceived threat. A similar mediation analysis was conducted to examine whether perceived control mediates the effect of frequency of GenAI use on *exploration-to-revert*. The indirect effect via perceived control ($\beta = .07$, BootSE = .02, 95% CI [.03, .12]) and the main effect ($b = .40.$, $p < .001$, 95% CI [.31, .49]) were all significant, indicating a partial mediation effect of perceived control.

Third, a similar mediation analysis was conducted to test whether perceived opportunity mediates the effect of breadth of GenAI use on *exploration-to-innovate*. Similarly, a significant indirect effect was found regarding the influence of breadth of GenAI use on *exploration-to-innovate* via perceived opportunity ($\beta = .20$, BootSE = .03, 95% CI [.15, .25]) when controlling for covariates. At the same time, the main effect of breadth of GenAI use on *exploration-to-innovate* ($b = .85.$, $p < .001$, 95% CI [.71, .98]) was also significant, indicating a partial mediation effect of perceived opportunity.

Next, exploitation was entered as the criterion, examining the influence of breadth of using GenAI tools via the mechanism of perceived opportunity. When controlling for covariates, the indirect effect was significant for the impact of breadth of GenAI use on *exploitation* only via perceived opportunity ($\beta = .17$, BootSE = .03, 95% CI [.12, .22]). The main effect of breadth of GenAI use on *exploitation* ($b = .83.$, $p < .001$, 95% CI [.67, .99]) was still significant, indicating a partial mediation effect of perceived opportunity.

A similar mediation analysis was conducted to examine whether perceived control and opportunity mediate the effect of user involvement on *exploration-to-innovate*. When controlling for covariates, indirect effects were significant for the impact of user involvement on *exploration-to-innovate* via both perceived control ($\beta = .05$, BootSE = .02, 95% CI [.001, .09]) and perceived opportunity ($\beta = .23$, BootSE = .04, 95% CI [.15, .32]). The main effect of user involvement on *exploration-to-innovate* ($b = .44.$, $p < .001$, 95% CI [.32, .57]) was still significant, indicating the partial mediation effects of perceived control and opportunity.

Moreover, the potential mediating roles of perceived opportunity and control on the effect of user involvement on *exploitation* were tested. The indirect effect was significant for the impact of user involvement on *exploitation* via only perceived opportunity ($\beta = .21$, BootSE = .04, 95% CI [.12, .30]), not perceived control ($\beta = .02$, BootSE = .02, 95% CI [−.03, .06]). The main effect of user involvement on *exploitation* ($b = .44.$, $p < .001$, 95% CI [.29, .58]) was still significant, indicating the partial mediation effect of perceived opportunity. Similarly, an indirect effect was found for the effect of user involvement on *avoidance* via perceived control ($\beta = -.06$, BootSE = .02, 95% CI [−.11, −.02]), indicating a partial mediation effect since the main effect of user involvement on *avoidance* ($b = -.54.$, $p < .001$, 95% CI [−.66, −.41]) was still significant. Another indirect effect was found for the effect of user involvement on *exploration-to-revert* via perceived control ($\beta = .09$, BootSE = .03, 95% CI [.04, .15]), indicating a partial mediation effect since the main effect ($b = .51$, $p < .001$, 95% CI [.39, .63]) was still significant.

4. Discussion

As the rapid technological advancement of GenAI technology has brought forth numerous GenAI tools and a wide variety of activities users can perform using such tools, researchers recently began to examine and predict users' adoption of GenAI tools. Building upon this nascent line of research, this study further examined users' post-adoption adaptation behaviours. Heeding existing research's call for a better understanding of the influence of cognitive appraisals and affection reactions, this study examined perceived opportunity, threat, and control as the cognitive appraisals affecting users' varied adaptation behaviours while at the same time exploring the preceding experiential and psychological engagements as the antecedents affecting such appraisals. Additionally, this study incorporated enjoyment, anxiety, and trust as the affective reactions potentially influencing users' GenAI adaptation behaviours.

First, the findings indicate that users engaged in different adaptation behaviours to cope with the changes brought by GenAI, which were influenced by diverse cognitive appraisals and affective reactions. Regarding the impact of perceived opportunity and control of GenAI tools on exploration-to-innovate behaviours, users were more likely to spend extra effort to take advantage of GenAI tools to their fullest potential when they perceived more opportunities and resources to leverage the tools. This is consistent with prior adaptation studies examining users' adaptation behaviours to other cutting-edge technologies such as intelligent systems and social media (e.g. Chen, Hsieh, and Rai 2022; Muhammad et al. 2021). Unlike previous adoption literature suggesting the strong impact of affective reactions (e.g. Hohenberger, Spörrle, and Welpe 2017), enjoyment and trust were unlikely to influence exploration-to-innovate behaviours significantly. This suggests that cognitive appraisals were more robust in motivating users to maximise the technology features and find innovative ways to use it than affective reactions.

Concerning exploitation behaviours, this study found that perceived opportunity of GenAI tools and trust were significant predictors of users' leverage of the tool according to tutorials or suggestions from others to achieve these benefits, which is consistent with findings from adaptation literature (e.g. Bala and Venkatesh 2016; Muhammad et al. 2021). On the other hand, perceived control was not a significant predictor of exploitation, which aligns with Bala and Venkatesh (2016). This suggests that the primary appraisal of perceived opportunity is the salient appraisal for exploitation.

This study further showed that perceived threat was not a significant predictor of exploration-to-revert, unlike what was predicted in the adaptation literature (e.g. Bala and Venkatesh 2016). This discrepancy may be attributed to differences in the study context. In the organisational setting examined by Bala and Venkatesh (2016), threat appraisal may play a more prominent role, as it could lead to significant consequences for users' task performance or even pose risks to the organisation. In contrast, the current study focuses on individual usage of GenAI, where the potential consequences may be less severe, potentially explaining the non-significant relationship between threat appraisal and exploration-to-revert behaviours. In other words, the relationship between threat appraisal and exploration-to-revert may be more pronounced in professional settings compared to contexts involving personal use.

To provide a GenAI perspective to the previously conflicting finding on the impact of perceived control on exploration-to-revert, this study showed that users' perceived control of GenAI tools positively influenced their exploration-to-revert behaviours. When they perceived greater control over using GenAI tools, they were more likely to use their ability and resources to leverage the features of the technology to fit with their old ways of doing things to keep their control over any unexpected impacts. Additionally, anxiety was not a significant predictor of exploration-to-revert, showing a more substantial impact of cognitive appraisal over affective reactions on exploration-to-revert behaviours.

Regarding avoidance, the perceived threat of GenAI tools positively influenced users' avoidance, while perceived control showed the opposite influence. When users perceive threats associated with GenAI tools, they are motivated to avoid the technology to minimise these harmful consequences and restore emotional stability (Bala and Venkatesh 2016; Beaudry and Pinsonneault 2005). On the contrary, when people perceive a low ability and lack of resources to use the technology, they might try to avoid it, suggesting a negative influence on avoidance. This aligns with the previous adaptation research (e.g. Bala and Venkatesh 2016; Muhammad et al. 2021), attesting to the strong impact of perceived threat and control on users' avoidance. Anxiety was also found to be positively related to avoidance, which indicates that both cognitive appraisal and adverse affective reactions will result in people's avoidance of using GenAI tools.

Regarding experiential and psychological engagements as the antecedents influencing cognitive appraisal, this study showed that using GenAI tools for a variety of purposes affords users a multiplicity of chances to learn about the platforms and appraise the opportunities they bring, in turn, helps them focus more on the opportunities the tools might bring about. This is consistent with previous studies examining people's experiential engagement with cutting-edge technologies (Cotter and Reisdorf 2020).

In addition, our findings suggest that more frequent use of a GenAI tool helps them reflect on their observations and intuitively form beliefs about such platforms, helping them decide whether the tool poses any threat and whether they have the ability and resources to employ it. These findings align with previous algorithmic knowledge-building research, which found that frequent platform usage can help users develop perceptions and knowledge about platform algorithms (Cotter and Reisdorf 2020; Eslami et al. 2015). For example, frequent use of Facebook positively affected users' awareness of its news feed ranking algorithm (Eslami et al. 2015). Similarly, the frequency of use of search engines was found to be positively associated with users' search engine algorithmic knowledge (Cotter and Reisdorf 2020). Moreover, user involvement positively influenced their perceived opportunity and control over the ability and resources to leverage the tools. Thus, when users perceive that a GenAI tool is important and relevant, they might be more inclined to learn and leverage its features, thereby perceiving more opportunities and better control over it. Moreover, this study further showed that cognitive appraisals partially mediate the relationships between engagement characteristics and users' diverse adaptations.

4.1. Theoretical contributions

This study holds several important theoretical implications. First, it extends the adaptation literature to the context of GenAI, delineating users' diverse post-adoption adaptation to GenAI and exploring their influencing factors. Particularly, unlike prior AI-related research that focused on the strategic use of AI in organisational settings (e.g. Borges et al. 2021), this study focused on individual use of GenAI tools for professional or personal purposes. Since many users have already begun to use GenAI tools, examining their variation in actual uses and their influencing factors helps to understand its widespread diffusion among users. Our study is among the first to examine how people engage in different adaptation behaviours to GenAI tools and identify various cognitive and affective factors influencing their adaptation. In particular, it provided additional evidence for previously conflicting findings regarding the impact of perceived control on certain adaptation behaviours (e.g. exploration-to-revert). These findings serve as a springboard for future research on individual users' adaptation to GenAI.

Second, extending the AIT model (e.g. Bala and Venkatesh 2016; Beaudry and Pinsonneault 2005; Chen, Hsieh, and Rai 2022), we combined both cognitive appraisal factors from AIT model and affective reaction factors to explain users' GenAI adaptation behaviours. The results showed that cognitive appraisal factors had more robust evidence over affective reaction factors for explaining exploration-to-innovate and exploration-to-revert behaviours. Still, we showed that affective reactions such as trust would be important factors for exploiting the new technology. This theoretical advancement offers a more nuanced understanding of the factors influencing users' diverse usage behaviours of GenAI tools.

Third, this study makes another important theoretical contribution and presents an early attempt to uncover several experiential and psychological engagements as the antecedents influencing users' cognitive appraisals of GenAI tools and adaptation behaviours. Previous research on individuals' adaptation to cutting-edge technologies beyond organisational settings has typically overlooked the role of such antecedents on adaptation behaviours (e.g. Muhammad et al. 2021). Drawing on previous research on algorithmic technologies (e.g. Cotter and Reisdorf 2020), we incorporated frequency and breadth of GenAI use as experiential engagements and user involvement as psychological engagements, examining their impact on cognitive appraisals and adaptation. Our results indicate that these engagement factors represent important resources that help users learn about the opportunities and assess whether they have the abilities and control over the technology, thereby being significant antecedents of cognitive appraisals (i.e. perceived opportunity and perceived controllability), impacting their downstream adaptation behaviours.

Fourth, the different adaptations of using GenAI tools across different demographic and socioeconomic backgrounds would also contribute to the digital divide literature. In addition to our main findings, in line with the long history of digital inequality and knowledge gap (e.g. Cotter and Reisdorf 2020; Hargittai 2010; Hargittai and Shafer 2006; Litt 2013), this study examined how users' GenAI adaptation behaviours vary according to socioeconomic background. Specifically, this study uncovered that exploration-to-innovate is unevenly distributed based on socioeconomic advantage, with higher SES users (i.e. education and household income) engaging in extra effort to maximise the potential technological benefits and use the technology to its fullest potential than lower SES users. As research on knowledge inequalities proposes, this gap is likely attributable to the stratification of various resources, which gives socioeconomically privileged groups greater advantages in accessing and processing relevant information.

For gender, females were less likely to use GenAI tools innovatively, similar to previous literature on gender disparities in computer skills and information technology proficiency (e.g. Litt 2013). Previously, females tended to show lower self-assessment of using Web technology (Hargittai 2010; Hargittai and Shafer 2006), affecting their intention to use new technology innovatively. Interestingly, Black or African Americans in our sample were more likely to innovate in their GenAI tool usage and exploit the technological features according to tutorials or suggestions from others than White Americans. However, they were also found to be more likely to leverage the features of the technology to fit with their old ways of doing things than White Americans. This might be attributable to a more dispersed distribution of answers for African Americans.

4.2. Practical implications

This study also offers significant implications for developers and providers of GenAI tools, as well as for users and society at large. First, it classifies users' adaptation to GenAI into four distinct types, two of which reflect active engagement with the technology and demonstrate positive impacts on their business, while the other two indicate resistance or avoidance behaviours, which may adversely affect product adoption and business outcomes. This nuanced understanding of users' adaptation patterns and their corresponding influencing factors enables GenAI tool developers to design more targeted strategies tailored to each user group, thereby enhancing commercial effectiveness (e.g. leads generation and premium package purchase).

More specifically, we recommend further promoting the benefits of increased trials and diverse use cases to encourage the two adaptation behaviours that are likely to yield positive impacts on their businesses while discouraging avoidance behaviours. This study unveils that broad usage experiences with the tool enable users to assess its potential, thereby fostering innovative and exploitative behaviours. Similarly, frequent usage of GenAI helps users develop a sense of control over the technology and reduce perceived threats to task performance, stimulating innovative usage behaviours and mitigating avoidance tendencies.

Furthermore, it is advisable for GenAI developers to prioritise building user trust through strategic marketing materials, intuitive interface design, and robust product development to mitigate issues such as hallucinations. The findings indicate that higher levels of trust will encourage exploitation behaviours. On the other hand, developers should focus on alleviating user anxiety by offering accessible resources, such as user-friendly tutorials, to facilitate hands-on learning and familiarity with the technology. The results demonstrate that anxiety is a key driver of avoidance behaviours, underscoring the importance of reducing such negative affective reactions.

Second, our findings offer several implications for users seeking to leverage GenAI tools to their advantage. Users are encouraged to actively explore a variety of use cases, both personal and professional, to gain a deeper understanding of the opportunities and potential these tools offer. Additionally, increased exploration and usage can enhance users' perceived competence and control over the tools while reducing the perceived threats associated with their usage. Furthermore, for organisations that provide training to employees on the adaptation to new technologies, it would be advantageous to offer opportunities for employees to engage with these tools across various applications. This approach can cultivate an innovative mindset and encourage employees to explore creative and strategic uses of these tools.

Third, our findings offer broader societal implications concerning the disparities in GenAI adaptation behaviours. This study reveals an uneven distribution of exploration-to-innovation behaviours, influenced by demographics and socioeconomic status (SES), with users of higher SES (e.g. those with greater educational attainment, household income, and certain gender demographics) demonstrating more innovative usage patterns. These users are better positioned to maximise the potential benefits of the technology and utilise it to its fullest extent compared to their lower SES counterparts. There has been discussion about how GenAI tools would create a new digital divide according to user competencies for critical assessment, effective interaction, and innovative usage of AI in various settings (Hendawy 2024). This underscores the need for systemic interventions, such as integrating GenAI literacy programmes at various educational levels, to promote equitable adaptation practices and broaden the scope of usage cases across diverse socioeconomic groups.

4.3. Limitations and suggestions for future research

The current study has several limitations that should be addressed in future studies. First, this study is limited to using a non-probability and purposive sample to examine the adaptation behaviours to GenAI tools. As we collected the survey data from those who have already used GenAI tools, their perception of using generative AI was likely to be favourable (e.g. $M_{\text{anxiety}} = 2.28$, $M_{\text{perceived threat}} = 2.85$, $M_{\text{perceived control}} = 5.13$, $M_{\text{perceived opportunity}} = 5.03$, $Mtrust = 4.74$). However, when comparing results from other survey studies (e.g. Choudhury and Shamszare 2023; Fletcher and Nielsen 2024), there has been a tendency for the general public to hold positive viewpoints toward GenAI tools. Nevertheless, these findings should be interpreted with caution when applied to the general public. Conducting similar studies with a larger, representative sample across different socioeconomic backgrounds would be worthwhile.

This study also used cross-sectional data to examine the relationship between cognitive and affective appraisals and adaptation behaviours. Thus, it is difficult to make causal relationships between variables. Future research could provide valuable insights by collecting longitudinal studies that examine individual users' adaptation patterns over time as GenAI evolves. Additionally, future research could differentiate how people adapt to GenAI tools in various contexts (e.g. personal, professional, etc.) and examine how contextual usage (e.g. professional vs. personal tasks) might moderate the relationships.

Furthermore, this study provides actionable insights for GenAI developers, such as implementing trust-building features, demonstrating diverse GenAI capabilities, and introducing training programmes or tutorials to alleviate user anxiety and enhance perceived control. Future research could investigate the long-term effectiveness of these strategies in strengthening users' perceived control, thereby contributing to the development of more robust intervention guidelines for GenAI platforms. Lastly, this study used the AIT model to predict users' adaptation behaviours. Future studies should consider how other important variables suggested by different models affect user adaptation behaviours.

Overall, this study yields meaningful results regarding how cognitive appraisal and affective reactions affect different adaptation behaviours: exploration-to-innovate, exploitation, exploration-to-revert, and avoidance. The results demonstrate the usefulness of the AIT model in explaining users' adaptation behaviours to GenAI tools. The findings suggest that cognitive appraisal factors would be more crucial for predicting exploration-to-innovate and exploration-to-revert behaviours than affective reactions. However, different affective reaction factors still affect certain types of adaptation (e.g. exploitation and avoidance). Furthermore, engagement factors, including the frequency and breadth of using GenAI tools and user involvement, can help users appraise the opportunities or threats associated with the tools and the ability and resources to leverage the tools.

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