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Adopting Smart Pet Devices in Thailand: A UTAUT Perspective

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ABSTRACT

The purpose of this study was to examine the adoption of pet owners in Thailand to Internet of Things (IoT)-enabled smart pet devices using the unified theory of acceptance and use of technology (UTAUT). Using the UTAUT model, the authors investigated the roles of performance expectancy, effort expectancy, and social influence on the intention to adopt smart pet devices in the context of pet care. The authors found that consumers view smart pet devices as convenient, better for their animals' well-being, and more responsible forms of pet care than traditional methods. Although consumers perceive smart pet devices as being convenient and better for their pets, there is a significant barrier to adoption -- the perceived complexity of using them; therefore, it is critical for device manufacturers to develop easy to use and localized interfaces, as well as provide users with adequate support. Consumers' social networks, including family members, veterinarians, and online pet communities also significantly affect the dissemination of new ideas about the adoption of smart pet devices. While this study examined consumer acceptance of smart pet devices, it demonstrated that they can contribute to the goal of sustainable living by reducing waste and encouraging consumers to make eco-friendly choices. The results of this study provide a comprehensive understanding of how technology adoption of pet owners in Thailand relates to their lifestyles, cultural values, and environmental concerns, and provides recommendations for product design, entrepreneurship, and policy makers to foster innovative products that are responsible and culturally relevant. The results were framed within the broader cultural dynamic of Thailand and recognized the impact of globalized influences and daily practices on the technology adoption behaviors of Thai pet owners.

Keywords: Smart Pet Devices, IoT Technology, UTAUT Model, Thailand, Social Networks

INTRODUCTION

The development of Internet of Things (IoT) technology began in the late 1990s and later gained broad recognition in the 2010s (Madakam et al., 2015). IoT is a multifaceted concept which assists in the interconnection of a wide range of devices through the internet, thus helping in the efficient acquisition, dissemination and analysis of data. The fuel behind this technological revolutionary change lies in the advancement of sensor technologies, wireless communication methodologies, and cloud-based solutions that are jointly creating seamless connectivity among devices and the exchange of data (Gokhale et al., 2018). Moreover, IoT has moved from simple device-to-device connectivity to a complex ecosystem that integrates artificial intelligence (AI) and machine learning (ML) technologies, hence giving birth to intelligent systems with the ability to respond autonomously. This evolution has given rise to new opportunities for the deployment of IoT in a plethora of sectors including the pet care industry (Laghari et al., 2021). Within this context, IoT technologies have been applied to different aspects to increase the welfare of pets and decrease the burden on pet owners. Significantly, this technology has demonstrated efficacy in health monitoring, automated feeding, and ensuring the safety of pets in the absence of their guardians (Chen & Elshakankiri, 2020), as well as within intelligent pet protection frameworks that utilize IoT devices to identify and mitigate potential threats to pets, such as wandering or accessing hazardous environments (Xu et al., 2022). Beyond technical functionality, smart pet devices increasingly act as cultural artefacts in Thai households—mediating attentiveness, responsibility, and emotional connection in everyday pet care—consistent with pet humanization trends and domestication of technology in daily life (TGM Research, 2024; The Nation Thailand, 2024; Silverstone & Haddon, 1996).

The Department of Business Development, Ministry of Commerce, has revealed analysis data indicating that the pet industry in Thailand has experienced continuous growth over the past five years. This growth is attributed to changes in contemporary lifestyles, where people increasingly view pets as companions that alleviate loneliness and as family members. Consequently, businesses related to pet care have also flourished, particularly in three main segments: pet food and toys, services and care, and pet farming. As of June 30, 2024, Thailand has registered a total of 5,009 pet businesses, with a combined registered capital of 98.798 billion baht. The pet food and toys segment has shown significant growth, generating a revenue of 196.304 billion baht in 2023, marking an 8.64% increase from the previous year. Furthermore, the pet services and care sector is also on the rise, especially in health-related services such as veterinary hospitals, pet boarding services, and grooming facilities. Additionally, the trend of keeping exotic pets is gaining popularity among urban dwellers with limited space for tradtional pets, including snakes, giant reptiles, chinchillas, and parrots, some of which require permits under CITES. The future outlook for the pet industry remains bright due to increasing competition and a growing consumer base. The popularity of pet ownership is also linked to social media, with pets becoming vibrant content creators (Petfluencer), turning into revenue-generating assets. New businesses related to pet care, such as health and wellness services and ceremonial events for pets, are also emerging as significant players (Department of Business Development, 2024). These market dynamics situate smart pet technologies within Thailand's broader digital lifestyle, where social media and "petfluencers" normalize device-supported care routines (DBD via Nation Thailand, 2025; TGM Research, 2024).

The Department of International Trade Promotion has revealed findings derived from a market analysis concerning intelligent pet products in China, obtained from the Overseas Trade Promotion Office located in Qingdao, China. The results suggest a persistent increase in the appeal of smart pet devices that incorporate Cloud and 5G technologies to facilitate IoT connectivity among Chinese consumers, particularly within the demographic of young adults aged 22 to 31, who represent nearly 40% of the market share. The market for smart pet products in China has undergone considerable expansion in recent years, particularly during festive periods, with sales on the Tmall platform surging by 500%. On Taobao, the proportion of new customers acquiring smart pet devices exceeded 50% of total sales, while JD.com recorded a remarkable 33-fold escalation in sales within a mere 10 minutes. At present, the frontrunners in the Chinese smart pet product sector can be classified into two principal categories: pet food producers capitalizing on brand equity and entities predominantly concentrating on smart pet devices, including brands such as PETKIT, Yourpet, and Kitten & Puppy. Moreover, a multitude of small and medium-sized enterprises are penetrating this market, leading to an increase in the availability of similar products, mainly highlighting functionalities such as scheduling, portion control, food preservation, and remote operation of devices. The entrance of prominent corporations such as Midea and Xiaomi into this arena generates substantial interest regarding their capacity to revolutionize the industry and the ecosystem of smart pet products in China, a phenomenon that is being closely observed by market participants (Department of International Trade Promotion, 2021). For Thailand, China's trajectory—platform endorsement, integrated brand ecosystems, and retail guidance—signals pathways that can accelerate diffusion among younger urban owners (DITP via The Nation Thailand, 2024; CKGSB Knowledge, 2025; PETS International, 2021).

Guided by UTAUT, we focus on performance expectancy, effort expectancy, and social influence as key determinants of intention and use, while interpreting them through Thai socio-cultural practices—domesticated routines and community endorsement (Tamilmani et al., 2021; Dwivedi et al., 2019; Silverstone & Haddon, 1996).

This study uses the UTAUT conceptual framework and includes a deep investigation into three main dimensions: performance expectations, effort expectations, and social impact. These constructs are examined to determine their impact on the future and sustainable adoption of smart pet products. This analysis highlights the potential ecological benefits of IoT-enhanced pet solutions, including reducing food waste, safeguarding energy resources, and promoting responsible consumption practices, in addition to the consequences for customers and markets. The study aims to provide key insights not only for investors and entrepreneurs looking for a competitive advantage, but also for lawmakers and designers committed to supporting eco-friendly innovation in the pet care industry. Our framing offers context-specific insights for culturally sensitive design and responsible innovation in Thailand's digital pet ecosystem, aligned with current evidence on the country's fast-growing pet economy (GlobalPETS, 2025; Thailand NOW, 2025).

LITERATURE REVIEW

The investigation about the patterns of assimilation of intelligent pet apparatuses that use Internet of Things (IoT) innovation endeavors to clarify the enormous elements that affect the choice of procurement and utilization decisions of pet proprietors in Thailand. This academic inquiry focuses on three important determinants: performance anticipation, effort anticipation, and social dynamics. The implications that are drawn from this examination will benefit investors or entrepreneurs who intend to venture into the pet industry through the use of the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

Despite the fact that the research in consumer technology often uses alternative frameworks such as the Diffusion of Innovation (DOI) theory and the Technology Acceptance Model (TAM), the UTAUT model was selected due to its superior predictive power and integrative nature (Venkatesh et al., 2003; Williams et al., 2015). UTAUT has social and enabling features, which are particularly relevant in the case of IoT and smart pet gadgets, as opposed to TAM, which only considers perceived utility and ease of use.

Theoretical Background: UTAUT as a Socio-Cultural Lens

The Unified Theory of Acceptance and Use of Technology (UTAUT) assigns the technology adoption to four main factors (performance expectancy (PER), effort expectancy (EFF) and social influence (SOC) which together predict behavioural intention to use (TER) in a wide range of contexts (Venkatesh et al., 2003). These pathways receive additional empirical validation in the form of consumer and service scenarios (Dwivedi et al., 2019; Williams et al., 2015; Tamilmani et al., 2021), and extensions, i.e., variants of the UTAUT, are proposed in order to account for consumer specific considerations, while not disrupting the core logic of PER, EFF, SOC and TER. In keeping with this literature, the present study retains the original model specification and hypotheses, using validated constructs and relationships that have demonstrated predictive adequacy in prior research (Venkatesh et al., 2003; Tamilmani et al., 2021).

At the same time, UTAUT can be read as a socio-cultural lens that links adoption to everyday life. The "domestication of technology" perspective highlights how innovations are appropriated, objectified, and incorporated into household routines and moral orders, not merely evaluated as technical artefacts (Silverstone & Haddon, 1996; García de Blanes Sebastián et al., 2022). Interpreted through this lens, PER in smart-pet contexts aligns with owners' expectations of responsible, effective care; EFF reflects the fit between interfaces/workflows and habitual caregiving routines; SOC captures community endorsement via veterinarians, pet-shop advisors, family norms, and online pet groups; and Facility Condition includes the availability, compatibility, and localized support infrastructures that enable enactment of intentions (Venkatesh et al., 2003; Williams et al., 2015). This framing preserves the constructs and their theorized directions while situating them in culturally meaningful practices.

Accordingly, This study analysis employs UTAUT both predictively and interpretively: the structural paths remain identical to the original hypotheses, whereas the discussion reads the same constructs through Thai socio-cultural practices surrounding pet care. This approach maintains theoretical fidelity to UTAUT and prior operationalizations (Venkatesh et al., 2012; Dwivedi et al., 2019; Tamilmani et al., 2021) while providing a context-sensitive account consistent with domestication theory (Silverstone & Haddon, 1996). Although a significant portion of the scholarship has concentrated on the utilization of smart devices for pets within the overarching consumer framework, there are also inquiries that delve into agricultural and livestock applications. As a case in point, the role of IoT in advanced agriculture has been scrutinized through the UTAUT model concerning the Middle East (Ronaghi and Forouharfar, 2020). These investigations underscore the necessity of accounting for cultural influences and con-textual variables when assessing the acceptance of smart technologies for pets in disparate settings (Giua et al., 2022). Furthermore, the UTAUT framework has been augmented to scrutinize the intention to uti-lize smart pet devices embedded with IoT technology, elucidating that concerns pertaining to privacy and data security also play a critical role in shaping technology acceptance (Chen and Lin, 2024).

Smart Pet Technologies in Everyday Thailand Context

In Thailand, the normalization of device-supported pet care is tightly linked to pet humanization and to the dense network of care intermediaries—veterinary clinics, specialty retailers, and social-media communities—that collectively validate what counts as "responsible" and "easy" daily routines (TGM Research, 2024; The Nation Thailand, 2025; Mintel, 2025). Within households, smart feeders, trackers, and interactive cameras materialize attentiveness and reliability, aligning performance benefits with owners' peace of mind while lowering perceived effort through localized onboarding and after-sales support (Madakam et al., 2015; Chen & Elshakankiri, 2020). These practices reflect the domestication of technology, where artifacts are appropriated and fitted to moral orders and caregiving rhythms rather than judged as mere technical devices (Silverstone & Haddon, 1996). Interpersonally, endorsements from veterinarians, retail advisors, family members, and online pet groups serve as salient social influence, while the availability of compatible devices, language-appropriate guidance, and store-based installation assistance constitute enabling facilitating conditions (Dwivedi et al., 2019; Tamilmani et al., 2021). Regionally, China's platform-driven pet economy provides diffusion cues for Thailand. Especially the role of marketplaces, brand ecosystems, and influencer signaling in accelerating adoption trajectories (The Nation Thailand, 2024). Echoing recent cultural analyses, globalization and the proliferation of digital media are reshaping everyday norms in urbanizing societies; we therefore read Thai smart-pet adoption within these broader cultural dynamics (Rahman et al., 2025).

Performance Expectancy, Effort Expectancy, and Social Influence

Performance Expectancy (PER) is a foundational determinant of technology acceptance in UTAUT, capturing users' belief that a system will help them attain valued outcomes more efficiently (Venkatesh et al., 2003). Consistent with this definition, PE has been shown to shape adoption across service and consumer contexts by aligning perceived utility with task performance (Tamilmani et al., 2021). In educational and everyday-use technologies, PE reflects the expectation that technology streamlines activities and improves results (Nikolopoulou et al., 2021). Applied to smart pet devices, PE denotes users' belief that connected feeders, trackers, and interactive cameras can enhance pet care, convenience, and the reliability of health/safety routines (Chen & Elshakankiri, 2020). Evidence from adjacent domains reinforces this logic: in e-banking, PE significantly shaped adoption as users anticipated greater efficiency and convenience (Ghalandari, 2012), while in platform-mediated food delivery, PE was pivotal to digital behavioral intentions when users expected technology to meet performance needs (Tannady & Dewi, 2024). Together, these findings support treating PE as a primary antecedent of intention in smart pet technology use (Dwivedi et al., 2019).

Hypothesis 1: Performance Expectancy positively influences the Intention to Use Smart Pet Devices

Effort Expectancy (EFF) denotes the perceived ease of learning and using a technology and is a central antecedent of acceptance in UTAUT (Venkatesh et al., 2003). When users judge a system as straightforward—low setup friction, intuitive interfaces, and clear guidance—they are more inclined to adopt it (Shaikh et al., 2021; Dwivedi et al., 2019; Tamilmani et al., 2021). Empirical evidence also indicates cross-construct spillovers: in electronic banking, users who find systems accessible tend to anticipate greater effectiveness, implying that EE can bolster Performance Expectancy (PER) (Fedorko et al., 2021). Likewise, in mobile commerce, perceived simplicity raises intention to adopt, underscoring EFF's direct role in shaping behavioral intention (Sair & Danish, 2018). In smart pet settings, reductions in installation and configuration effort—along with localized onboarding and after-sales support—facilitate the domestication of device routines within households, thereby strengthening intention and smoothing the transition from trial to continued use (Silverstone & Haddon, 1996; Chen & Elshakankiri, 2020).

Hypothesis 2: Effort Expectancy positively influences the Intention to Use Smart Pet Devices

Hypothesis 3: Effort Expectancy positively influences Performance Expectancy.

Social Influence (SOC) is a critical determinant of technology acceptance, capturing the extent to which individuals believe that salient others—family members, friends, professionals, or opinion leaders—approve of their using a new system (Aronson & Carlsmith, 1962; Venkatesh et al., 2003). SI can arise through direct encouragement, perceived expectations within one's social circle, or observational learning when trusted others are seen using the technology (Dwivedi et al., 2019; Tamilmani et al., 2021). Empirically, SOC has been shown to affect adoption decisions in service contexts: for e-banking in Iran, stronger social or familial pressure heightened acceptance (Ghalandari, 2012). Beyond a direct path to intention, SI may also shape cognitions about usefulness and ease—enhancing Performance Expectancy (PER) and Effort Expectancy (EFF) by legitimizing benefits and reducing perceived difficulty (Rahi et al., 2019). In settings where expert or community endorsement is salient (e.g., veterinarians, retail advisors, online groups), SOC functions as social capital that reduces uncertainty and encourages trial. Consistent with this literature and our unchanged model specification, we posit a positive relationship between SI and behavioral intention in the present context (Graf-Vlachy et al., 2017).

Hypothesis 4: Social Influence positively influences the Intention to Use Smart Pet Devices

Hypothesis 5: Social Influence positively affects Performance Expectancy.

Hypothesis 6: Social Influence positively influences Effort Expectancy.

Smart Pet Devices and the Internet of Things (IoT)

The deployment of Internet of Things (IoT) technology in pet-care devices has expanded rapidly, as integrated hardware–software systems increasingly support animal welfare and assist owners in routine caregiving. IoT architectures enable continuous sensing of activity, location, and environmental cues, transmitting data to owners through mobile applications for timely oversight (Madakam et al., 2015; Chen & Elshakankiri, 2020). Practice application: pet-care applications are using connected sensors to track the health factors and offering real-time visualization on the smartphone of owners, improving the remote vigilance and decision-making (Luayon et al., 2019).

The trend of pet-care technologies that embrace Internet-of-Things (IoT) solutions has clearly gone upwards, and modern systems are meeting the many-sided needs of pets and humans taking care of them. As an illustration, the IoT platforms may be programmed to use motion sensors and sensor-based analytics installed in various places in the home settings (Lee et al., 2021). In addition to simple monitoring, smart pet-homes combine IoT and artificial intelligence (AI) to derive usage patterns and adapt to the behaviour of the animals, thus moving beyond connectivity to context-dependent support (Song et al., 2019). On the household scale, motion detection and multi-sensor fusion of the living rooms helps the owners to observe their pets when they are not at home; edge-based analytics and cloud-based analytics convert raw data into actionable information (Lee et al., 2016; Xu et al., 2022). IoT platforms can automatically discern trends and share recommendations when combined with machine-learning pipelines. An example is Smart Pet Insights, which is an IoT-driven data collection and learning model to interpret pet behaviour and health and provide insight into the decisions needed in a timely manner (Harshika et al., 2022). Given these capabilities—ranging from real-time monitoring to adaptive analytics—the adoption of IoT in pet care is expected to continue rising as users seek greater efficiency, reliability, and convenience in managing everyday routines (Chen & Elshakankiri, 2020).

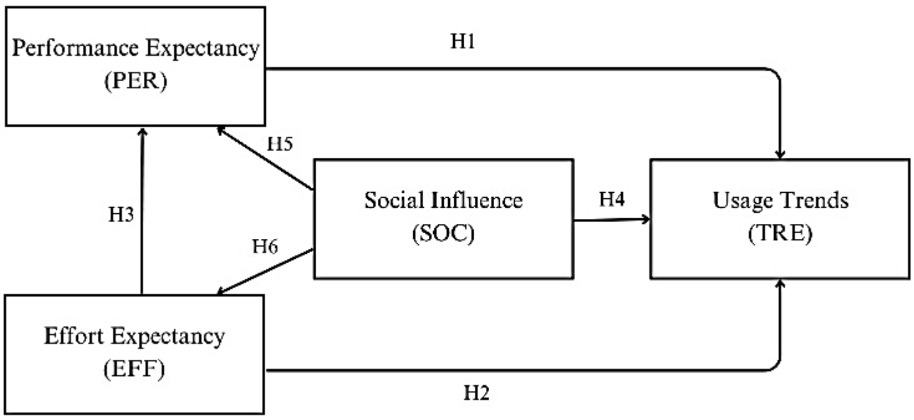

Figure 1: Conceptual Framework

METHODOLOGY

Population and Sample

The target population comprised Thai pet owners of companion animals (e.g., dogs, cats). Eligibility required respondents to be adults (≥ 18 years) who currently owned at least one pet; non-owners were excluded. Because the total number of Thai pet owners could not be determined with confidence, we employed a non-probability sampling strategy and planned the sample size to satisfy accepted adequacy guidelines for covariance-based SEM—namely, a minimum of 200 cases (Hair et al., 2017). The achieved sample totaled n = 329 valid responses, which exceeds this benchmark.

Participants were recruited via convenience sampling complemented by snowball referrals through relevant community channels. Recruitment covered major urban and peri-urban areas in five large Thai cities—Bangkok, Nakhon Ratchasima, Chiang Mai, Phuket, and Chonburi—to reduce single-cluster dominance and reflect heterogeneous ownership contexts. Duplicate entries were prevented by a one-response-per-account rule enforced on the survey platform. Participation was voluntary and anonymous. The study protocol was approved by Maha Sarakham University (Ethics Approval No. 626-625/2567), and all participants provided informed consent prior to responding.

Data Collection

A self-report, anonymous online survey was administered during a single fieldwork window from February to April 2025. The questionnaire was disseminated through channels commonly used by Thai pet owners, namely Facebook groups for pet owners and the LINE messaging application and was hosted on a secure web form. A convenience-plus-snowball procedure was employed: in each of the five focal urban/peri-urban areas (Bangkok, Nakhon Ratchasima, Chiang Mai, Phuket, and Chonburi), an initial seed respondent who owned a companion animal (e.g., dogs, cats) was identified through community contacts and then asked to refer other eligible owners. Eligibility screening ensured that only adults (≥18 years) who currently owned at least one companion animal proceeded to the questionnaire. To prevent duplicate submissions, the platform enforced a one-response-per-account rule. Participation was voluntary and uncompensated.

Across the fieldwork period, 329 questionnaires were submitted by eligible pet owners. After applying pre-registered exclusion criteria (e.g., ineligible ownership status, failed attention checks, incomplete key sections) and routine data-quality controls, the final analytic sample comprised n = 3, which exceeds recommended adequacy for covariance-based SEM (minimum ≈200; Hair et al., 2017). Responses from individuals lacking pet ownership experience were systematically excluded from the analysis. A response rate of 82.25% is considered adequate for subsequent data analysis, given that a general survey response rate of 20% is conventionally regarded as satisfactory (Aaker et al., 2001).

It is acknowledged that online convenience and snowball procedures can overweight tech-savvy and urban participants. Coverage across the five major cities was used to mitigate single-cluster dominance; nonetheless, future work may consider stratified or quota-based designs to better represent rural populations and later adopters while retaining the present model specification and measurement approach.

Research Instruments

A structured, Thai-language questionnaire was used to obtain standardized responses from pet owners. The form comprised three parts: (A) eight demographic and ownership items (age, gender, education, income, pet-care expenditure, type/number of pets, ownership experience, prior use), (B) the antecedent constructs, and (C) the outcome construct. All latent variables were measured with 5 point Likert scales (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree), with higher scores indicating stronger agreement. Construct names and codes follow the model specification: Performance Expectancy (PER), Effort Expectancy (EFF), Social Influence (SOC), and Usage Trends/Intention to Use (TRE); item wordings were adapted from established UTAUT measures and contextualized to device-supported pet care. The instrument underwent forward–back translation by bilingual reviewers. A pilot with 20 owners confirmed clarity and timing; Cronbach's α exceeded .70, indicating acceptable internal consistency.

Table 1 Variables and Measurement Items

Variables	Items	Factor loading	Cronbach's Alpha	AVE
Performance Expectancy (PER)	P1 P2 P3 P4 P5	0.677 0.741 0.605 0.689 0.650	0.847	0.542
Effort Expectancy (EFF)	E1 E2 E3 E4 E5	0.627 0.784 0.661 0.678 0.705	0.804	0.504
Social Influence (SOC)	S1 S2 S3 S4 S5 S6	0.750 0.648 0.762 0.803 0.820 0.761	0.890	0.574
Usage Trends (TRE)	T1 T2 T3 T4 T5	0.765 0.770 0.823 0.841 0.712	0.899	0.639

Measurement quality in the main study is summarized in Table 1, the factor loadings of the variables ranged from 0.605 to 0.841, all exceeding the threshold of 0.40, as suggest-ed by Stevens (1992), indicating acceptable statistical validity. For PER (5 items), standardized loadings ranged .605–.741, α = .847, AVE = .542; for EFF (5 items), .627–.784, α = .804, AVE = .504; for SOC (6 items), .648–.820, α = .890, AVE = .574; and for TRE (5 items), .712–.841, α = .899, AVE = .639. These values satisfy common criteria for reliability and convergent validity (α ≥ .70, AVE ≥ .50; cf. Hair et al., 2017; Fornell & Larcker, 1981). To reduce common-method bias, the questionnaire assured anonymity and voluntariness on the cover page, separated predictors (PER, EFF, SOC) from the outcome (TRE), and varied item order within sections. Full Thai item wordings appear in Appendix A; descriptive statistics and subsequent validity checks are reported with the measurement model alongside Table 1.

RESULTS

Research Findings

The findings derived from the demographic analysis of the survey respondents revealed that a significant proportion of pet owners were female, amounting to 195 individuals (58.9%). The most populous age cohort was identified as being between 18 and 25 years, constituting 174 respondents (52.6%). A considerable majority of the participants were single, with a total of 232 individuals (70.1%). The data revealed that the leading educational level achieved by respondents was a bachelor's degree, with 199 people (60.1%) confirming this credential. Focusing on monthly income, 96 survey takers (29%) claimed to earn under 15,000 baht, succeeded by 81 survey takers (24.5%) who indicated incomes from 15,000 to 20,000 baht. In relation to average monthly expenditures for pet care, the most frequently cited range was between 1,000 and 3,000 baht, as reported by 167 individuals (50.5%). The majority of respondents were currently pet owners of 1-2 animals, comprising 179 individuals (54.1%). Experience in pet ownership was predominantly observed within the duration of 1 to 3 years, with 127 individuals (38.4%), followed by 118 individuals (35.6%) who possessed over 6 years of experience. With respect to familiarity with smart pet devices, the majority of respondents reported never having utilized such technology.

The data in Table 2 from the correlation analysis suggest that the correlations involving Performance Expectancy (PER), Effort Expectancy (EFF), and Social Influence (SOC) lie between 0.528 and 0.735, which is beneath the 0.8 threshold (Hair et al., 2010). Consequently, the issue of multicollinearity does not arise, thereby permitting the valid application of the data in subsequent path analysis. In conjunction, the correlation examination executed between the independent variables and the dependent variable, specifically the intention to embrace smart pet devices (TRE), highlights significant positive correlations that extend from 0.474 to 0.727, thereby validating the suitability of the data for subsequent regression analysis, as the independent variables clearly demonstrate causal interactions with the dependent variable.

Table 2 The Correlations Between Constructs

Constructs	$\bar{x}$	S.D.	PER	EFF	SOC	TRE
PER	4.249	0.566	1	0.735**	0.528**	0.474**
EFF	4.189	0.549		1	0.655**	0.553**
SOC	4.002	0.700			1	0.727**
TRE	4.015	0.742				1

Note. ** $p < 0.05$

Evaluation and Hypothesis Testing

The findings pertaining to the structural model fit, as detailed in Table 3, suggest that the fit indices are deemed satisfactory, with values surpassing 0.900, notably CFI = 0.960 and TLI = 0.943. The RMSEA value is recorded at 0.059, which remains below the threshold of 0.080 (Schumacker and Lomax, 2010), while the SRMR is also noted at 0.055, falling beneath the 0.080 criterion (Diamantopoulos & Siguaw, 2000). The outcomes derived from the Jamovi software substantiate that the model exhibits a commendable fit in alignment with the established benchmarks. The structural relationships of the proposed model were evaluated utilizing t-values at a statistical significance threshold of 0.05 for all hypotheses that were examined.

Table 3. The Structural Model Fit Analyses

Goodness of Fit	Recommended Values	Structural Model (result)
CFI	≥0.900 (Kelloway, 2015)	0.960
RMSEA	≤0.080 (Schumacker and Lomax, 2010)	0.059
TLI	≥0.900 (Schumacker and Lomax, 2010)	0.943
SRMR	≤0.080 (Diamantopoulos and Siguaw, 2000)	0.055

Table 4. Path Coefficient and Hypothesis Testing

Hypotheses	Hypothesis Test		Beta	T-values	P-values	Results
H1	PER ----> TRE		0.369	2.36	0.018*	S
H2	EFF ----> TRE		-0.422	-1.98	0.048*	S
H3	EFF ----> PER		1.021	7.33	<0.001*	S
H4	SOC ----> TRE		0.950	7.90	<0.001*	S
H5	SOC ----> PER		-0.227	-2.35	0.019*	S
H6	SOC ----> EFF		0.755	9.90	<0.001*	S

Notes. * = $p < 0.05$, S : supported, NS : not supported

Results of the Structural Equation Model

Table 4 encapsulates the results of hypothesis testing pertaining to the interrelations among Performance Expectancy (PER), Effort Expectancy (EFF), Social Influence (SOC), and the intention to utilize smart pet devices (TRE). The results reveal that Performance Expectancy exhibits a statistically significant correlation with the intention to engage with smart pet devices (H1: beta = 0.369, p = 0.018). Moreover, the association between Effort Expectancy and the intention to employ smart pet devices is likewise significant (H2: beta = -0.422, p = 0.048). Additionally, the interplay of Effort Expectancy and Performance Expectancy reflects a direct and meaningful impact (H3: beta = 1.021, $p < 0.001$). In the context of Social Influence, we identified positive direct relationships concerning the aim of embracing smart pet devices, alongside Performance Expectancy and Effort Expectancy (H4: beta = 0.950, $p < 0.001$; H5: beta = -0.227, p = 0.019; H6: beta = 0.755, $p < 0.001$).

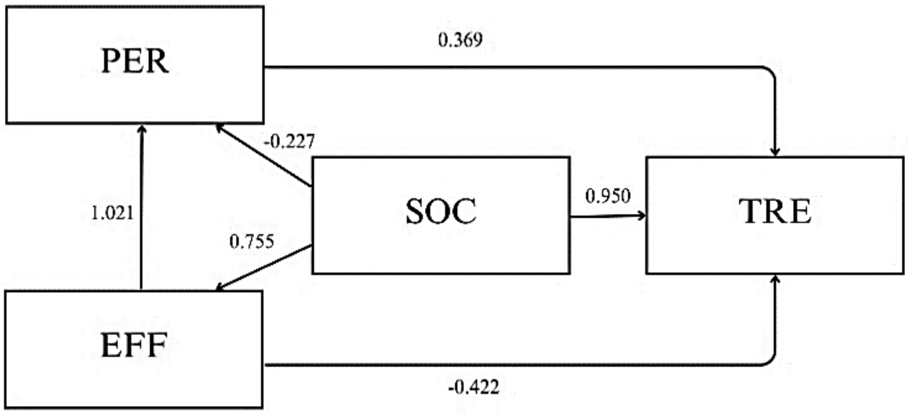

Figure 2: Testing of the Research Conceptual Framework

DISCUSSION

The Focus of this study is to investigate the adoption of smart pet devices in Thailand using the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. This arrangement underscores three vital factors: Performance Expectancy, Effort Expectancy, and Social Influence. The study explored how each impacts pet owners' intentions to adopt smart pet devices to improve pet care, convenience, and safety (Venkatesh et al., 2003; Kang et al., 2020). In light of the research outcomes, the ensuing deliberations may be articulated:

First, the analysis shows that the Intention to Use Smart Pet Devices is strongly influenced by the Performance Expectancy since the user believes that the implementation of such devices will help to improve the level of care and efficiency in the work with pets (Nikolopoulou et al., 2021). This observation correlates with previous research on the adoption of technology, which shows that users are more likely to accept technologies which they deem to have better results (Ghalandari, 2012). Indicatively, a study conducted by Ghalandari in the sphere of e-banking revealed that consumers preferred those systems that were convenient and effective in managing the transactions. Similarly, the participants in the current study expect that smart pet devices will ease the process of caring about pets and make their lives healthier, which is supported by other studies on the use of IoT-based technologies (Chen and Lin, 2024).

Second, Social Influence emerged as a key driver in the Intention to Use Smart Pet Devices. Pet owners' decisions were shaped by the views and endorsements of family, friends, and influencers, reflecting the significant role of social endorsement in technology adoption (Aronson & Carlsmith, 1962). This is consistent with Ghalandari's (2012) research, which showed that Social Influence positively impacts technology acceptance, particularly in environments where social pressures exist. Additionally, Social Influence was found to affect both Performance Expectancy and Effort Expectancy, as observed in prior studies where social networks increased users' confidence in technology's utility and ease of use (Rahi et al., 2019).

Moreover, the positive linkage between Effort Expectancy (EFF) and Performance Expectancy (PER) is theoretically plausible: when setup, pairing, and routine operation feel straightforward, users infer that the device will deliver reliable outcomes, because fewer cognitive and procedural hurdles signal more effective functionality (Dwivedi et al., 2019; Tamilmani et al., 2021). Evidence from adjacent services shows the same spillover—perceived ease raises expectations of effectiveness in e-banking (Fedorko et al., 2021). In smart-pet use, localized onboarding, clinic/retailer assistance, and clear Thai interfaces can domesticate device routines and translate "ease" into anticipated gains in timeliness, safety, and oversight (Chen & Elshakankiri, 2020). Critically, this mechanism is conditional: if "ease" is read as hands-off automation without credible assurances (privacy, uptime, accuracy), the EFF→PER boost can attenuate or reverse, as trust and perceived risk reframe expectations (Li et al., 2021; Shuhaiber et al., 2023). Hence, the positive EFF→PER pathway is strongest where ease is coupled with visible control and support.

The result shows a positive effect of Social Influence (SOC) on Effort Expectancy (EFF) is theoretically consistent with social learning and normative endorsement: when veterinarians, specialty retailers, family members, or online communities demonstrate and recommend smart pet devices, they lower users' perceived learning and setup costs, making the system feel easier to use (Burnkrant & Cousineau, 1975; Bearden et al., 1989; Venkatesh et al., 2003; Zhao et al., 2018). In practice, peer tips, in-store onboarding, and community tutorials "domesticate" device routines—pairing, calibration, and updates—so that ease becomes a socially scaffolded experience rather than a purely individual judgment (Silverstone & Haddon, 1996; Chen & Elshakankiri, 2020). However, this pathway is conditional. If social cues are hype-heavy or fragmented, they can create overconfidence and mask hidden effort, particularly around privacy settings, reliability, or integration with other apps (Li et al., 2018; Shuhaiber et al., 2023). Thus, SOC raises EFF most robustly where endorsements include credible guidance and risk-aware practices, not mere persuasion (Dwivedi et al., 2019; Tamilmani et al., 2021; Fu et al., 2020).

By contrast, Social Influence relates negatively to Performance Expectancy. Social cues from family, retailers, and online groups can lift willingness to try, yet they also raise promises that are hard to meet in first use. When owners meet lag, false alerts, or awkward permission steps, judged performance falls. This aligns with expectation-confirmation logic: unmet promises lower perceived effectiveness (Wang et al., 2023). The Thai market context sharpens the effect. Many devices are imports from China, and users still need basic technical literacy for pairing, network setup, and firmware. If localization and after-sales service feel thin, owners also perceive quality variance and financial risk. In such cases, social endorsement may help with tips and setup, but it does not secure outcomes or reduce worry about reliability and data handling (Pärnamets & Olsson 2020; Shuhaiber et al., 2023). The result is a clear trade-off. Owners place trust, control, and visible results above frictionless onboarding, which helps explain the negative SOC → PER path and, together with risk signals around automation, the negative EFF → TRE path observed here.

Likewise, The structural pattern showing a negative link from Effort Expectancy to Usage Trends/Intention suggests that, in this market, "ease" may be interpreted as hands-off automation rather than dependable simplicity, thereby heightening concerns about reliability, privacy, and control. This reading aligns with smart-home/IoT evidence that perceived simplicity can be offset by perceived risk and trust deficits—particularly when devices act autonomously in the background (Almubark & Masmali, 2023; Karale, 2021). In Thailand, many smart pet devices are imports from China, and everyday use typically requires basic technical literacy (pairing with smartphones, network setup, firmware updates). Where localization is partial (language, app servers, after-sales), "low effort" claims may ring hollow or even signal loss of oversight, depressing intention despite recognized benefits—an expectation-confirmation tension observed in other consumer IoT (Wang et al., 2023; Kalsoom et al., 2025).

Overall, the evidence substantiates the explanatory power of UTAUT for smart-pet adoption in Thailand, showing that intention is jointly shaped by social endorsement and cognitions about performance and effort, yet these determinants operate through culturally embedded meanings of care and control (Dwivedi et al., 2019; Tamilmani et al., 2021). The pattern we observe—strong social influence on intention, a positive linkage from effort to perceived performance, but context-specific tensions when "ease" is read as hands-off automation—aligns with prior work on domestication and risk in consumer IoT, where trust and perceived vulnerabilities recalibrate users' expectations (Silverstone & Haddon, 1996; Shuhaiber et al., 2023). Framed in this way, the findings extend the model's portability to a pet-care domain in which moral salience and social signaling are pronounced, reinforcing UTAUT's relevance across technologies and cultural settings without altering its core structure (Venkatesh et al., 2003)

IMPLICATIONS

Theoretical Implications

The results refine how UTAUT operates in a morally salient, household care domain. Intention is not solely a product of perceived usefulness and ease; it is co-constructed through social legitimation. The observed configuration—strong social influence on intention, a positive spillover from effort to perceived performance, and context-dependent tensions when "ease" is interpreted as hands-off automation—clarifies boundary conditions for the model. In particular, effort functions as a credibility signal only when coupled with visible control and oversight, while social cues can simultaneously mobilize intention and recalibrate performance beliefs. These dynamics suggest that future theorizing should treat social influence and effort as contingent mechanisms whose effects depend on the alignment between routinized care practices, perceived control, and the transparency of device operation.

Practical Implications

Design and delivery should make "ease" demonstrable, auditable, and local. Clear onboarding, language-appropriate interfaces, and stepwise guidance that foreground permissions, updates, and recovery procedures can convert perceived ease into confidence in performance. Retail and clinical touchpoints are pivotal: in-store demonstrations, assisted setup, and accessible after-sales channels can transform diffuse social endorsement into concrete reductions in perceived learning and configuration costs. Given the prevalence of imported devices, attention to compatibility with local phones, networks, and service routines is essential. Packaging that bundles hardware, app setup, and quick-start materials, together with mechanisms that visualize data quality and uptime, will help align expectations with achievable outcomes and reduce the risk that "simplicity" is read as loss of oversight.

Policy, Ethics, and Sustainability

Responsible diffusion of smart pet technologies requires straightforward privacy communication and practical user control. Notices, consent flows, and dashboards should be concise, comprehensible, and oriented to routine caregiving tasks rather than technical jargon. Collaboration with veterinary and retail channels can support community-level literacy on safe configuration and data stewardship. From a sustainability perspective, emphasizing repairability, spare-part availability, and energy-aware defaults will anchor performance expectations in long-term reliability rather than novelty. Collectively, these measures align the social, technical, and ethical facets of adoption, enabling intentions to translate into stable, trustworthy use in everyday Thai pet-care contexts.

CONCLUSIONS AND FUTURE RESEARCH

This analysis is dedicated to grasping the trends concerning the integration of innovative pet technology powered by IoT in Thailand, employing the Unified Theory of Acceptance and Use of Technology (UTAUT) structure to examine the elements shaping their acceptance and application. This study underscores three essential factors: Performance Expectancy, Effort Expectancy, and Social Influence, which are pivotal in influencing consumers' selections related to the uptake of new technologies. The findings indicate that Performance Expectancy exhibits a substantial positive correlation with the intention to utilize smart pet devices, suggesting that consumers are inclined to believe that the employment of this technology will enhance their efficiency in pet care. In contrast, Effort Expectancy exerts a negative effect on the intention to adopt, implying that should consumers regard these devices as burdensome, their likelihood of embracing the technology diminishes. Furthermore, Social Influence demonstrates that the endorsement or viewpoints of peers, such as family members and friends, considerably bolster the propensity to utilize smart pet devices.

In conclusion, the proliferation of smart pet devices within Thailand is anticipated to persist, especially among pet owners who are in pursuit of contemporary and innovative care solutions. The advancement of these devices ought to prioritize the enhancement of user efficiency while simultaneously mitigating complexity, thereby facilitating consumer access to the technology. Moreover, fostering awareness among targeted demographics through diverse social media channels may augment the probability of acceptance and utilization of these products.

Future studies should be longitudinal in order to examine how customer sentiments evolve over time. Furthermore, include people who are unfamiliar with smart pet gadgets might provide a more thorough knowledge of the obstacles to the adoption of new technologies. Cross-national research might provide valuable comparative information on technological infrastructure and culture, especially in ASEAN.

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