



# **Adoption of smart voice assistants technology among Airbnb guests: A revised self-efficacy-based value adoption model (SVAM)**

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# Motivation

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- **Airbnb** is one of the **most successful sharing economy models** that has disrupted the **hospitality industry**.
  - One key differentiating factor of Airbnb: **engaging communication** between the hosts and guests.
- Not all guests appreciate atmospheric interactions, and some **prefer the serenity of being left alone**.
- Also, the **COVID-19 pandemic** has forced hospitality providers to offer **contactless service**.
- The **installation** of a smart speaker and voice assistant (SVA) in **hospitality and Airbnb accommodation** has **gained momentum** in recent years.

# Motivation

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- Extant literature in SVAs adoption in the traditional hotels suggests:
  - Customers have **increased sophisticated expectations** for the technological in-room amenities.
  - On the contrary, **non-tech savvy guests lack the confidence** to use SVAs.
  - **Privacy risks** of using smart technologies might **hinder** guests from technology adoption.
- However, **little study** has investigated the adoption of SVAs among Airbnb Guests.
  - Customer **expectations and needs may be different** from that of the traditional hotels.
- Consequently, the paper aims to **understand Airbnb guests' intention to adopt SVAs** by **developing a theoretical model** examining the **influential factors** in Airbnb listings.

# Literature review

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- **SVA technology:**
  - **'internet-connected software** which responds to **voice commands** to **provide content and services, interacting** with users **via digitally-generated voice responses'** (*Centre for Data Ethics and Innovation, 2019*).
- **Social cognitive theory (SCT):**
  - proposes that **individual factors, social factors and behaviours** are **interconnected**.
  - among other SCT elements, **self-efficacy** has been widely applied in information system adoption studies mostly as a control variable.

# Literature review

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- **SVAM** (self-efficacy-based value adoption model, *Zhu et al., 2017*):
  - **applies SCT** to the context of ridesharing applications, where **self-efficacy** plays a pivotal role **influencing cognitive, emotional and social determinants** of behaviour in the model.
  - **integrate** a range of **perceived value factors (negative and positive)**.
- A **revised SVAM** is applied within the **Airbnb setting**, examining three research questions:
  - What **factors influence** Airbnb guests' **intention to adopt SVAs**?
  - How is **self-efficacy** related to Airbnb guests' intention to adopt SVAs?
  - To what extent does SVA **adoption intention differ** between **different participant groups** by their SVAs user experience (e.g. more frequent users versus occasional users)?

# Hypotheses development

- Hypotheses are **based on the theoretical structure of self-efficacy** that refers to the extent of an **individual's confidence** in their **capabilities to perform a task or achieve a goal** (*Bandura, 1986*).

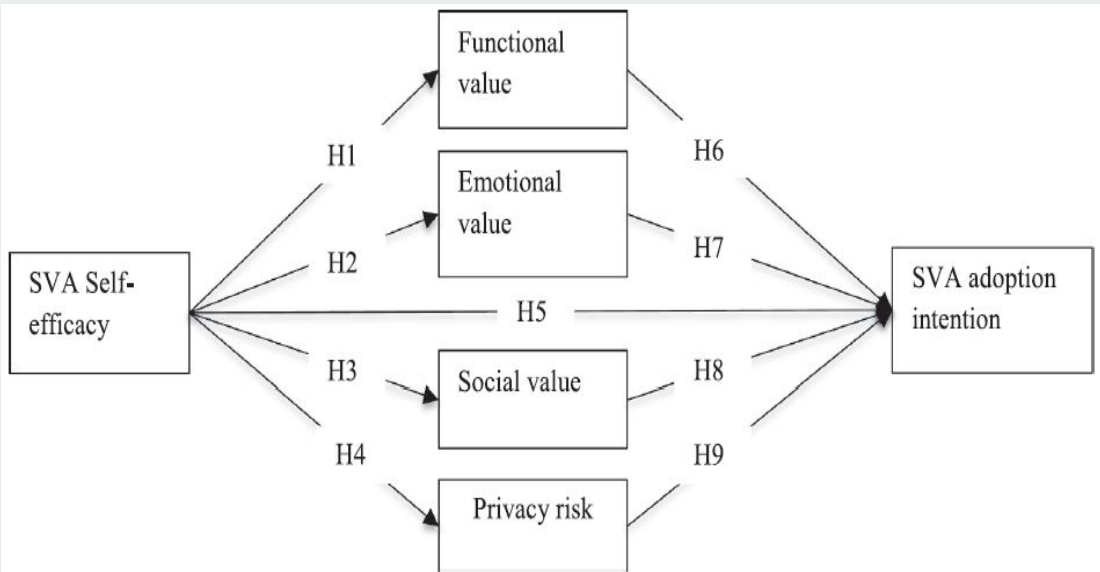


Fig. 1. Conceptual model of guests' SVA adoption in Airbnb.

- Functional value:
  - convenience and hands-free control
- Emotional value:
  - the degree to which users expect to gain hedonic rewards
- Social value:
  - ability to interact with SVA using natural language
- Privacy risk:
  - negative association with disclosing performance information of SVA usage

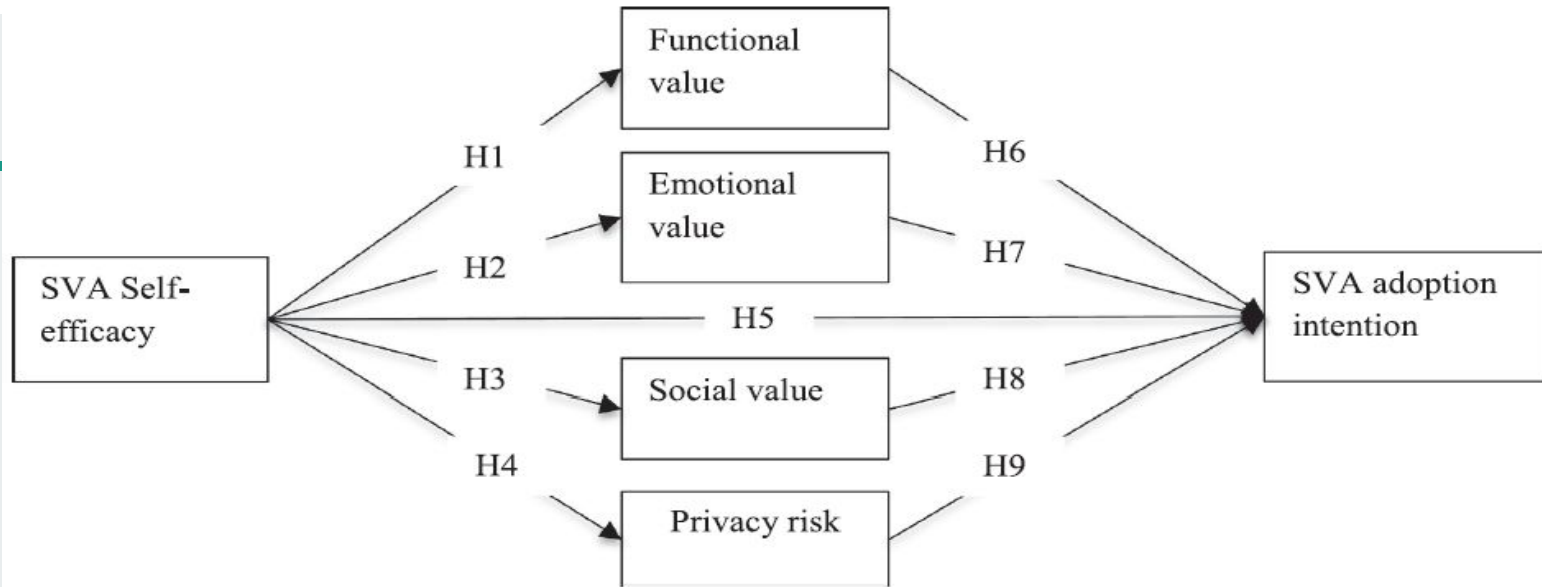


Fig. 1. Conceptual model of guests' SVA adoption in Airbnb.

- H1: SE is positively related to Airbnb guests' perceived Functional value of SVA usage.
- H2: SE is positively related to Airbnb guests' perceived Emotional value of SVA usage.
- H3: SE is positively related to Airbnb guests' perceived Social value of SVA usage.
- H4: SE is positively related to Airbnb guests' perceived Privacy risk of SVA usage.
- H5: SE is positively related to Airbnb guests' SVA adoption intention

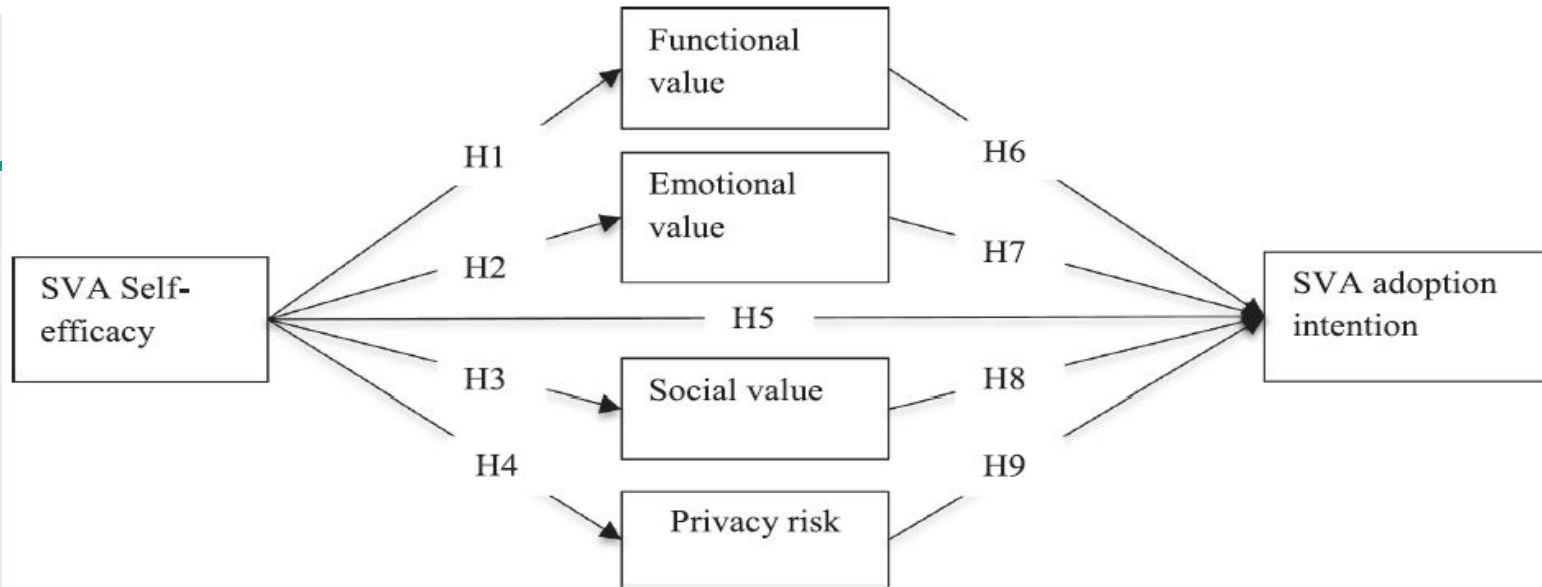


Fig. 1. Conceptual model of guests' SVA adoption in Airbnb.

- H6: The perceived **Functional** value of using SVA is **positively** related to SVA adoption intention.
- H7: The perceived **Emotional** value of using SVA is **positively** related to SVA adoption intention.
- H8: The perceived **Social** value of using SVA is **positively** related to SVA adoption intention
- H9: The perceived **Privacy** risk of using SVA is **negatively** related to SVA adoption intention.



# Methodology

- **Measurement:**
  - The theoretical model consists of **six constructs**:
    - Self-efficacy, functional value, emotional value, social value, privacy risk, and adoption intention.
    - Each of them is measured by several items according to previous research.
  - **A 5-point Likert scale** was used:
    - labelled from 'strongly disagree' ('1' ) to 'strongly agree' ('5' ).
- **Sampling:**
  - **target population:**
    - UK Airbnb guests who have experienced Airbnb stay (at least one stay) and SVAs usage.
  - The case of **Amazon Alexa** and **Google SVA** in Airbnb will be investigated.
  - The participants were **recruited via Amazon Mechanical Turk** (MTurk)
    - an online platform popular in social science research

# Methodology

- **Data and procedure:**
  - **pilot study:**
    - Eight voluntary respondents
      - three fellow postgraduate researchers.
      - five local residents who all had experience of Airbnb stay and SVA usage.
  - final dataset:
    - 255 responses were extracted as valid for further analysis
  - statistical analysis:
    - partial least squares structural equation modelling (PLS-SEM)
      - estimate complex cause-effect relationship models with latent variables

# Methodology

- Statistical analysis on collected data:

**Table 2**  
Descriptive statistics of the respondents.

Indicator	Category	Frequency	Per cent
<i>Gender</i>	Female/Male/Prefer not to say	871617	34.1/63.1/2.8
<i>Age</i>	18 to 24/25 to 34/35 to 44/45 to 54/55 and above	4712954196	18.4/50.6/21.2/7.4/2.4
<i>Education</i>	High school or less/College or university/Advanced degree	2715771	10.6/61.6/27.8
SVA use experience	Everyday user/Occasional user	125130	49/51
SVA current usage <sup>a</sup>	Amazon Alexa/Google Assistant/Apple Siri	13311991	52.2/46.7/35.6
Airbnb stays	Once/2–5 times/6 and more times	4314369	16.9/56.1/27.0

<sup>a</sup> This is a multiple-choice question to the indicator, SVA current usage. Some use more than one SVA, and therefore, the sum of the frequency is more than the sample size ( $n = 255$ ).

# Analysis and results

- measurement model analysis:
  - including factor loadings, internal consistency, convergent and discriminant validity.

Construct (reference)	Questionnaire items	Mean/SD	Loadings
Self-efficacy (SE)( <a href="#">Hsu and Chiu, 2009</a> )	SE1: I believe I have the ability to use a smart voice assistant SE2: I am confident that I am able to control in-room devices via a smart voice assistant SE3: I am confident that I am able to find information about local restaurants using a smart voice assistant SE4: I am confident that I am able to play music using a smart voice assistant	4.176/.9523.973/ .9553.918/1.0514.204/ 1.005	0.8790.8570.8670.897
Functional value (FV)( <a href="#">McLean and Osei-Frimpong, 2019</a> ; <a href="#">Kabadayi et al., 2019</a> )	FV1: Completing tasks with a smart voice assistant can be time-saving during my stay in Airbnb FV2: Completing tasks with a smart voice assistant can be convenient during my stay in Airbnb FV3: Using a smart voice assistant can personalise my stay in Airbnb FV4: Overall, a smart voice assistant can be useful during my stay in Airbnb	3.706/1.0233.529/ 1.0983.686/.9843.686/ .964	0.8250.8180.8420.867
Emotional value (EV)( <a href="#">Zhu et al., 2010</a> )	EV1: Using a smart voice assistant may be enjoyable during my stay in Airbnb EV2: Using a smart voice assistant may be fun during my stay in Airbnb EV3: Using a smart voice assistant may be exciting during my stay at Airbnb	3.639/1.0463.533/ 1.1023.651/1.102	0.8820.9090.882
Social value (SV)( <a href="#">Camilleri and Neuhofer, 2017</a> ; <a href="#">Johnson and Neuhofer, 2017</a> )	SV1: A smart voice assistant could help me to learn about home amenities when my host is not around SV2: A smart voice assistant could help me to learn about the neighbourhood when my host is not around SV3: I believe a smart voice assistant might effectively replace interactions with my host during a stay in Airbnb	3.094/1.2113.780/ 1.0583.686/1.042	0.7350.8420.842
Privacy risk (PR)( <a href="#">McLean and Osei-Frimpong, 2019</a> )	PR1: I have my doubts over the confidentiality of my interactions with a smart voice assistant PR2: I am concerned that a smart voice assistant collects too much information about me PR3: I am concerned to share my information with a smart voice assistant installed in Airbnb accommodation PR4: I am concerned that the host may be able to access my personal information if I use a smart voice assistant during my stay	3.373/1.2423.286/ 1.1953.376/1.2143.267/ 1.198	0.8500.8160.8510.851
Adoption intention (AI)( <a href="#">Zhu et al., 2010</a> )	AI1: Assuming I have access to a smart voice assistant next time I stay in Airbnb, I am likely to use it AI2: In the future, I intend to book Airbnb accommodation featuring a smart voice assistant	3.561/1.1533.278/1.072	0.9260.885

- factor loadings exceed the recommended threshold value of 0.7, indicating acceptable measurement reliability

# Analysis and results

- measurement model analysis:
  - including factor loadings, internal consistency, convergent and discriminant validity.

**Table 4**  
Construct internal consistency, convergent and discriminant validity.

	CR	CA	AVE	1	2	3	4	5	6
1 Adoption intention	0.929	0.898	0.766	0.906					
2 Emotional value	0.904	0.859	0.702	0.805	0.891				
3 Functional value	0.920	0.870	0.794	0.735	0.803	0.838			
4 Privacy risk	0.849	0.733	0.653	-0.205	-0.072	-0.018	0.842		
5 Self-efficacy	0.907	0.865	0.709	0.327	0.499	0.585	0.229	0.875	
6 Social value	0.902	0.784	0.821	0.629	0.700	0.748	0.009	0.487	0.808

- used Cronbach's alpha (CA) and composite reliability (CR) coefficients to examine internal consistency:
  - Based on *Hair et al.'s (2019)* guidelines, both parameters should exceed a minimum of 0.7 and remain below 0.95.
  - According to the table, the proposed model for the present study meets the criteria.

# Analysis and results

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- Average variance extracted (AVE) measures the convergent validity of a construct.
  - the suggested threshold value: above 0.5 (Hair et al., 2019).
- Discriminant validity was examined via cross-loading indicators on unrelated constructs and the Fornell-Larcker criterion (Hair et al., 2019).
  - AVE's square root on the diagonal is higher than its corresponding correlations with other latent variable, suggesting good discriminant validity (Hair et al., 2019).

# Analysis and results

- Structural model analysis:
  - conducted Algorithm test and Bootstrapping test with 5000 subsamples.

**Table 5**

Test results of the hypotheses and the model.

Paths	Coefficients	T Statistics	Result
H1: SE → FV	0.585***	11.686	Supported
H2: SE → EV	0.499***	8.722	Supported
H3: SE → SV	0.486***	8.056	Supported
H4: SE → PR	0.229**	3.155	Supported
H5: SE → AI	-0.141**	2.848	Supported
H6: FV → AI	0.295***	3.905	Supported
H7: EV → AI	0.576***	7.747	Supported
H8: SV → AI	0.075*	1.373	rejected
H9: PR → AI	-0.126**	3.272	Supported

Note: \*\*\* $\rho < 0.001$ , \*\* $\rho < 0.01$ , \* $\rho < 0.05$  (two-tailed).

- suggest that except for H8, eight of the nine proposed hypotheses were supported.
  - Self-efficacy was a strong predictor of perceived SVAs values

# Analysis and results

- Multi-group analysis:
  - test if participant groups (everyday vs occasional) have significant differences in the model.



Table 6

PLS-MGA results (Everyday users G1 versus Occasional users G2).

	Coefficients ( $\beta$ )		t-Values		$\Delta\beta$	p-Values
	G1	G2	G1	G2		
Emotional value -> Adoption intention	0.616***	0.560***	4.491	6.082	0.056	0.363
Functional value -> Adoption intention	0.128	0.262**	0.734	2.600	0.134	0.735
Privacy risk -> Adoption intention	-0.079	-0.167*	1.218	2.532	0.088	0.168
Self-efficacy -> Adoption intention	-0.086	-0.195**	0.745	3.118	0.109	0.202
Self-efficacy -> Emotional value	0.603***	0.412***	6.281	4.832	0.191	0.075
Self-efficacy -> Functional value	0.709***	0.457***	10.939	5.330	0.252*	0.011
Self-efficacy -> Privacy risk	0.218	0.295**	0.970	2.942	0.077	0.573
Self-efficacy -> Social value	0.559***	0.377***	6.011	3.527	0.182	0.102
Social value -> Adoption intention	0.193	0.105	1.711	1.412	0.088	0.256

Note: \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$  (two-tailed).

- The effect of self-efficacy on functional value differs significantly ( $\Delta\beta = 0.252$ ;  $p = 0.011$ ) between the two groups
- Effects of functional value, privacy risk, and self-efficacy on adoption intention, and the effect of self-efficacy on privacy risk, are all significant in G2 but insignificant in G1.

# Discussion and conclusion

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- This study **aims to understand guests' intentions to adopt SVA technology** in **Airbnb** accommodation.
- Our evidence suggests that **SVA self-efficacy** is a **strong predictor** of **perceived functional, emotional and social values** (H1, H2 and H3).
  - It implies that people with greater confidence to perform SVA tasks are more likely to perceive SVA values.
- **SVA Self-efficacy** is found to be **positively** related to **perceived privacy risk** (H4).
  - It suggests that higher self-efficacy is more likely to cause perceived privacy risk of using SVA.
- **SVA self-efficacy** is **positively** related to **SAV adoption intention** (H5) in the Airbnb setting.
- Both **perceived functional and emotional values** as **strong predictors** of **SVA adoption intention** during a stay in Airbnb (H6 and H7).
- **Perceived social value** attributes a **smaller and insignificant contribution** (H8).

# Limitations



- The study deliberately **restricted the demographic profile** to match a typical audience of in-home smart speaker users and Airbnb users.
  - not be generalizable beyond the young, educated and tech-savvy population.
- Some results from comparing the different groups of consumers within the sample were **not fully explained** in the current study.



Thank you!