"Ok, Google!" are my data safe?
The mediated effect of perceived privacy risk on brand trust

Michela Patrizi, Maria Vernuccio*, Alberto Pastore**

PhD Student in Management
Sapienza University of Rome
michela.patrizi@uniroma1.it

*Associate Professor of Marketing
Sapienza University of Rome
maria.vernuccio@uniroma1.it

**Full Professor of Management
Sapienza University of Rome
alberto.pastore@uniroma1.it

Abstract

The diffusion of voice assistants (VAs) has begun to attract the attention of marketing scholars. The user-VA interaction is based on dynamic learning and adaptation algorithms, which require data regarding multiple users' personal profile, attitudes and behaviours to operate correctly. On a more general level, practices of the mass collection/processing of consumer data by companies are growing, and in parallel, the protection of privacy is increasingly subject to important regulatory restrictions (e.g., the GDPR in Europe). Early studies in the marketing field have investigated consumers' perceptions about the risk of privacy violation regarding individual data (perceived privacy risk) collected by VAs and its relationships with attitudinal and behavioural responses towards these technologies. However, consumers' responses towards brands (e.g., Google), with which the user interacts through the name-brand voice assistant (e.g., Google Assistant), have not yet been studied. Consequently, this article aims to begin to fill this gap by analysing the relationship between perceived privacy risk and brand trust mediated by attitude towards the brand in the specific name-brand voice assistant experiential context. To achieve this objective, a quantitative research design is developed based on the administration of questionnaires and the application of regression analyses. The results show significant direct and indirect effects of perceived privacy risk on brand trust. Finally, this article contributes to the nascent strand of studies on the effects of users' perceptions on branding outcomes in the name-brand voice assistant context and makes practitioners aware that perceived privacy risk can damage both brand attitude and brand trust.

Keywords: *voice assistants; privacy risk; brand attitude; brand trust; mediation analysis*

1) Introduction

Voice assistants (VAs) are a type of virtual assistant that dialogues with users as a human interlocutor through algorithms of recognition and understanding of spoken language (Accenture, 2018). The number of VA users is starting to become particularly relevant since, in the USA alone in 2019, there were 200 million monthly active users, mainly on smartphones (120 million) and smart speakers (88 million) (Voicebot, 2020a). Globally, the most used VA is provided by Google (i.e., Google Assistant), which has more than 500 million monthly active users and is available in more than 90 countries (Voicebot, 2020b). Inside the VAs macro category, we can identify a subcategory composed of the so-called name-brand voice assistants (NBVAs), which have specific characteristics: they are developed in-house by a company/brand, are activated by users by pronouncing the brand name (e.g., "Hey Google!", "Hey Mercedes!, "Hey BMW!") and have a specific brand voice (Vernuccio *et al.*, 2020). Currently, the Mercedes NBVA is available in 27 languages and countries and more than 80% of its vehicles are equipped with the NBVA (Daimler Media, 2020), while the BMW NBVA in available in 23 countries (BMW Group, 2019). The growing offering of VAs on the market and their increasing adoption by consumers is stimulating the development of a new line of research in the field of marketing aimed at analysing users' perceptions, attitudes and behavioural responses related to the interaction

with these new technologies. Since the user-VA interaction is based on dynamic learning and adaptation algorithms that require the personal and behavioural data of multiple consumers (Fivesight Research, 2017), in a period where the legislation is paying particular attention to the protection of privacy (e.g., the GDPR), some studies have begun to investigate consumers' perceptions about the risk of privacy violation during interactions with VAs (Rase *et al.*, 2018; Liao *et al.*, 2019). In the abovementioned studies, the perception of risk is studied with reference to the "perceived privacy risk" construct, which is related to the fear that data may be collected without individual consent and illegally stolen by third parties. This fear produces a negative effect on the attitude towards the VA (Rase *et al.*, 2018) and the VA trust (Liao *et al*, 2019). Similarly, when users interact with the brand through the NBVA, the perception of risk may affect both brand attitude and brand trust. However, research on perceived privacy risk and its consequences in the VA field is still in an early stage, and no studies have analysed the effect of this construct on branding outcomes in the name-brand voice assistant context. Therefore, the current study attempts to address this knowledge gap by developing a research model to test the relationships between perceived privacy risk and brand trust mediated by brand attitude when users interact with a brand through a NBVA. This paper is organized as follows. In the next section, we present the conceptual model and specify the research hypotheses. Then, the methodology and empirical results are described. Finally, we propose academic and managerial implications, limitations and future research directions.

2) Theoretical background and research hypothesis

The concept of "perceived privacy risk" was born in the human-computer interaction field to indicate the threat of the violation of privacy perceived by users, which is due to the increase in the level of information that technologies collect without the awareness of individuals (Collier, 1995). As technologies have become central to individuals' daily lives, the perception of the risk of breach related to improper data collection is beginning to become particularly relevant (Hoy, 2018). In addition, VAs present security vulnerabilities that can be exploited by hackers to illegally access data collected by these technologies (Lei *et al.*, 2018). Therefore, in this study, we consider perceived privacy risk to be the fear that data may be collected without individual consent by the VA and illegally stolen by third parties (McLean & Osei-Frimpong, 2019). Studies have shown high levels of perceived risk, so some users avoid talking about sensitive topics (Moorthy & Vu, 2015). Early studies in the marketing field show that perceived privacy risk has a negative influence on the attitude towards VAs (Rase *et al.*, 2018) and trust in the VA (Liao *et al.*, 2019).

Brand trust has been defined as a “feeling of security held by the consumer in his/her interaction with the brand, that it is based on the perceptions that the brand is reliable and responsible for the interests and welfare of the consumer” (Delgado-Ballester *et al.*, 2003, p. 35). Studies have explored several critical issues in brand trust development and maintenance on the web (e.g., Fournier & Yao, 1997). These criticalities, especially in branded e-commerce contexts (e.g., websites), are mainly related to privacy and data security (Ha & Perks, 2005). Ha (2005) highlights a positive relation between the perceived level of privacy protection of the website and brand trust. Similarly, Alam & Yasin (2010) assert that consumers’ brand trust is negatively influenced by the level of risk they perceive on the brand website. In the light of this evidence, it is reasonable to think that perceived privacy risk may affect brand trust, when users interact with brands through NBVA. Thus, the following hypothesis is formulated:

H1: In the name-brand voice assistant experiential context, perceived privacy risk negatively influences brand trust.

Brand attitude has been considered a relatively long-lasting “individual’s internal evaluation of the brand” (Mitchell & Olson, 1981, p. 318). Previous studies, in the advertising

context, emphasize how this brand evaluation can be affected by negative and/or positive feelings towards the ad. Specifically, positive feelings (e.g., joy) enhance brand attitude, while negative feelings (e.g., fear) have a negative effect (Spears & Singh, 2004). Moreover, Yu *et al.* (2018) highlight the negative relation between perceived risk and attitude towards the brand in the e-commerce experiential context. Since perceived privacy risk is a dimension of the "perceived risk" construct (Hong *et al.*, 2020), we can assume that the fear that data may be collected without individual consent by the NBVA and illegally stolen by third parties negatively influences the brand attitude. Therefore, we hypothesize the following:

H2: In the name-brand voice assistant experiential context, perceived privacy risk negatively influences brand attitude.

Although among the consequences of the brand attitude, there are mainly behavioural constructs (e.g., intention to use), in the advertising context, marketing scholars point out that attitude towards the advertised brand produces relevant positive effects on brand trust (Sheinin *et al.*, 2011). Similarly, Jung *et al.* (2014) propose brand trust as a key consequence of a positive brand attitude in online brand communities. Consequently, it is reasonable to hypothesize that attitude towards the brand, with which the user interacts through the name-brand voice assistant, has a positive effect on brand trust:

H3: In the name-brand voice assistant experiential context, brand attitude positively influences brand trust.

In sum, as the literature provides evidence that, on the one hand, perceived privacy risk has a negative impact on brand attitude (H2) and that, on the other hand, brand attitude positively impacts brand trust (H3), we expect that brand attitude plays a key role in the process hypothesized in H1. Hence, we propose the mediation hypothesis:

H4: In the name-brand voice assistant experiential context, the negative effect of perceived privacy risk on brand trust is mediated – at least partially – by attitude towards the brand.

3) Methodology

In the selection of the specific experiential context, we decided to focus on Google Assistant, which can be classified as name-brand voice assistant since 1) it was developed in house; 2) it allows users to talk directly with the brand (i.e., Google) by saying the voice command "Hey Google!"; and 3) it speaks with a specific brand voice. To test the research hypothesis, we conducted a web survey focused on Generation Y, i.e., 18-34-year-old users (Nassivera *et al*., 2020), which is the segment with the highest rate of Google Assistant usage (Voicebot, 2018). As a preliminary step, a pilot study was conducted with 15 respondents to test the survey. Based on the results, the questionnaire was revised slightly. The survey was conducted in Italy, and the respondents were selected by involving undergraduate and postgraduate university students. We achieved a 74.6% response rate (242 questionnaires), which is considered valid for evaluating nonresponse bias in web survey study (Menachemi, 2011). Moreover, the survey included screening questions to select monthly active Google Assistant users between 18 and 34 years of age. Therefore, the final sample is composed of 206 target respondents (85.3% of the total respondents). The sample is composed of 52.4% women, and respondents had an average age of 24 years. The SurveyMonkey® platform was used to administer the questionnaire, which consisted of two sections. First, perceived privacy risk (PPR) was measured using the four-item scale developed by McLean & Osei-Frimpong (2019) (e.g., "*I am worried that Google Assistant collects too much information about me*", "*I am worried that my personal details stored with Google Assistant could be stolen*"), brand attitude (BA) was measured adapting to this context the three-item scale developed by Bruner II *et al.* (2005) (e.g., "*When I interact with Google through Google Assistant, I think Google is pleasant*"), and brand trust (BT) was measured adapting the four-item scale by Chaudhuri & Holbrook (2001) (e.g., "*When I interact with Google through Google Assistant, I trust*

Google")[1]. Respondents were asked to think about their interactions with Google through Google Assistant and rate their agreement with items using a Likert scale ranging from (1) totally disagree to (7) totally agree. Finally, in the second section, structural data (i.e., gender and educational qualification) were obtained.

4) Data analyses and results

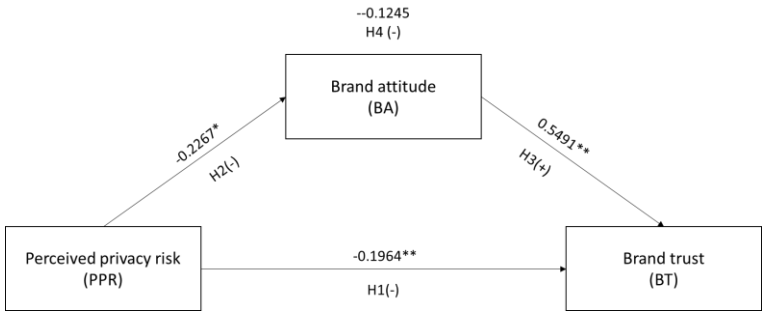
4.1 Consistency and validity checks

To evaluate the internal consistency of the measurement scales, we preliminarily ran an exploratory factor analysis using SPSS 25.0. The principal component analysis with Promax rotation clearly shows three correlated components that correspond to the three dimensions of the study (Kaiser-Meyer-Olkin = 0.82, total explained variance = 66.32%). The resulting measurement scales all show internal consistency. Concerning the perceived privacy risk scale, all factor loadings range from 0.739 to 0.873, Cronbach's alpha is 0.813 and ITC (item-to-total correlation) is greater than 0.53. In the attitude towards the brand scale, all factor loadings range from 0.779 to 0.825, Cronbach's is 0.85 and ITC is greater than 0.607. Finally, about the brand trust scale, all factor loadings range from 0.727 to 0.886, Cronbach's is 0.808 and ITC is greater than 0.621. Moreover, we performed a CFA to check the convergent and discriminant validity of the measurement scales. The results showed a very good model fit, $\chi2(41) = 50.61$, $p > 0.05$; normed chi-square statistic ($\chi2/df$) = 1.23, comparative fit index (CFI) = 0.99, root mean square error of approximation (RMSEA) = 0.034 and standardized RMR (SRMR) = 0.044 (Byrne, 2001). With reference to the convergent validity, all constructs showed satisfactory levels of average variance extracted (AVE; all AVE values > 0.54) and composite reliability (all composite reliability values > 0.81). Moreover, we checked the condition for discriminant validity among constructs and all AVEs were larger than any squared correlation among latent constructs (largest squared correlation = 0.48). Therefore, convergent and discriminant validities were achieved.

4.2 Findings

Our mediation model involves an independent variable (perceived privacy risk - PPR), one mediator (brand attitude - BA), and a dependent variable (brand trust - BT). In line with the recommendations of Hayes (2017), Process Macro (version: 3.5) for SPSS (version 25.0) was used in our empirical tests. Moreover, we use bootstrapping for mediation analysis. In particular, we execute 5,000 bootstrap samples with 95% bias-corrected confidence intervals for probing the indirect effect. The standardized regression coefficients are reported in Figure 1, and the direct, indirect, and total effects are shown in Table 1.

Figure 1. Model results



Notes: *p<0.01, **p<0.001 (two-tailed significance)
Source: authors' elaboration

[1] Details of the measurement scales are available upon request.

The analysis of H1 tested the effect of PPR on BT. The results of the regression analysis support H1, since the direct effect is negative and significant (β = -0.1964, SE = 0.0463, $p < 0.001$). H2 states that PPR has a negative effect on BA. According to the results, the effect is negative and significant (β = -0.2267, SE = 0.0497, $p < 0.01$); consequently, H2 is supported. Moreover, we found support for H3. In fact, BA has a positive and significant effect on BT (β = 0.5491, SE = 0.0635, $p < 0.001$). Finally, we expected BA to mediate the relation between PPR and BT (H4). The mediating effect of BA is -0.1245 with 95% bias-corrected CIs [-0.1935, -0.519] excluding 0. This evidence provides support for H4.

Table 1: Total, direct and indirect effects

Key Dependent Variables	Std. coefficient	SE	LLCI (95%)	ULCI (95%)
Total effect	-0.3209	0.0545	-0.3709	-0.1562
Direct effect	-0.1613	0.0463	-0.2525	-0.0701
Indirect effect	-0.1245	0.0359	-0.1935	-0.0519

Source: authors' elaboration

Finally, auxiliary analyses allow us to confirm the robustness of the results: there aren't multicollinearity problems (all VIFs are below the threshold value suggested in the literature) and assumption of homoskedasticity can be accepted (White test: $F = 7.360$, $p > .10$).

5) Conclusion

This research contributes to the nascent strand of studies on users' perceptions related to the interaction with VAs (Rase *et al.*, 2018; Liao *et al.*, 2019) by representing the first attempt to investigate the effect of perceived privacy risk on branding outcomes when users interact with a brand through the NBVA. Specifically, our article develops a conceptual model in which perceived privacy risk negatively influences brand trust directly and indirectly through the mediating effect of brand attitude. Therefore, our findings suggest that when users perceive privacy risk, they assume a negative attitude toward the brand and, consequently, they do not trust the brand. Concerning managerial implications, our research findings can enhance managers' awareness of perceived privacy risk's negative effects on consumers' responses towards the brand with which they interact through NBVAs. Therefore, marketers can plan communication campaigns aimed at reducing the perception of risk and avoiding negative effects on attitudes and trust towards their brands. The limitations of this study suggest fruitful directions for future research. First, our study focuses only on the Generation Y segment and interaction with Google Assistant. Therefore, future research could be extended to other segments of users and NBVAs. Second, no moderators are included in our research model. Thus, future studies may investigate how the direction and/or strength of the relations shown in this article could be influenced by other attitudinal and behavioural variables (e.g., frequency of use). Finally, control variables (e.g., gender, expertise) could be included in the model.

Key References[2]

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[2] The complete list of references available upon request.