

“Ok, Google!” are my data safe?

The mediated effect of perceived privacy risk on brand trust

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, attitudinal and behavioural 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!”) and have a specific brand voice (Vernuccio *et al.*, 2020). 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 (e.g., attitude towards the VA) and behavioural responses (e.g., intention to use) 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; McLean & Osei-Frimpong, 2019; Hong *et al.*, 2020). 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 intention to use this technology (McLean & Osei-Frimpong, 2019) and is positively related to

resistance to use (Hong *et al.*, 2020). Research on perceived privacy risk and its consequences in the VA experiential context is still in an early stage, and no studies have analysed the effect of this construct on branding outcomes in the context of the name-brand voice assistant. 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 in this specific experiential context. 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 or using their VA to make payments (Moorthy & Vu, 2015). Early studies in the marketing field have investigated the effect of perceived privacy risk on attitudinal and behavioural responses towards VAs. In particular, perceived privacy risk has a negative influence on the attitude towards VAs (Rase *et al.*, 2018) and the intention to use this technology (McLean & Osei-Frimpong, 2019) and has a positive influence on resistance to use (Hong *et al.*, 2020).

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; Urban *et al.*, 2000). These criticalities, especially in branded e-commerce contexts (e.g., websites), are mainly related to privacy and data security (Ha & Perks, 2005). In particular, Ha (2005) highlights a positive relation between the perceived level of privacy protection of the website and brand trust. Similarly, Alan & Yasin (2010) show that consumers' perceived privacy risk negatively influences online brand trust. This evidence could also be reflected in the NBVA experiential context; thus, the following hypothesis is formulated:

H1: In the name-brand voice assistant experiential context, perceived privacy risk is negatively related to 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 an advertising context, emphasize how this evaluation of the brand 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 attitude towards the brand. Therefore, we hypothesize the following:

H2: In the name-brand voice assistant experiential context, perceived privacy risk is negatively related to 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 relation with brand trust:

H3: In the name-brand voice assistant experiential context, brand attitude is positively related to 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). The survey was conducted in Italy, and the respondents were selected by involving 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). 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 sample is composed of 52.4% women, and respondents had an average age of 24 years. The SurveyMonkey® online 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), brand attitude (BA) was measured through the three-item scale developed by Bruner II *et al.* (2005), and brand trust (BT) was measured using the four-item scale by Chaudhuri & Holbrook (2001)¹. Finally, in the second section, structural data (i.e., gender and educational qualifications) were obtained.

4) Data analyses and results

4.1. Consistency and validity checks

To evaluate the internal consistency of the perceived privacy risk, brand attitude and brand trust measurement scales, we preliminarily run 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. With reference to the perceived privacy risk four-item scale, all factor loadings

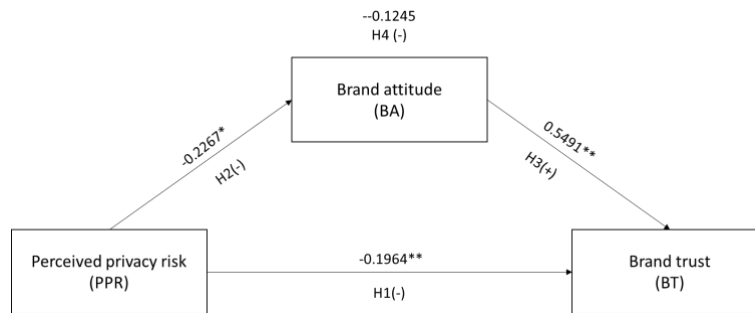
¹ Details of the measurement scales are available upon request.

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 five-item scale, all factor loadings range from 0.779 to 0.825, Cronbach's is 0.85 and ITC is greater than 0.607. Finally, with respect to the brand trust three-item 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 confirmatory factor analysis (CFA) to check the convergent and discriminant validity of the measurement scales. The results showed a very good model fit, $\chi^2(41) = 50.61$, $p > 0.05$; normed chi-square statistic ($\chi^2/df = 1.23$, 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 as suggested by Fornell & Larcker (1981), 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 (attitude towards the brand - 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. According to the Process model templates (Hayes, 2017), our theoretical model conforms to Model 4, which uses bootstrapping for mediation analysis. In particular, we execute 5,000 bootstrap samples with 95% bias-corrected confidence intervals (CIs) for probing the indirect effect. The standardized regression coefficients for all paths are reported in Figure 1, and the direct, indirect, and total effects are shown in Table 2.

Figure 1. Model results



Notes: * $p < 0.01$, ** $p < 0.001$ (two-tailed significance)

Source: authors' elaboration

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 ($\beta = -0.1964$, $SE = 0.0463$, $p < 0.001$). H2 states that PPR has a negative effect on BA. According to the results, the effect is negative and significant ($\beta = -0.2267$, $SE = 0.0497$, $p < 0.01$); consequently, H2 is supported. Moreover, we found support for H3. In fact, BA has a positive and significant effect on BT ($\beta = 0.5491$, $SE = 0.0635$, $p < 0.001$). 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 2: 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

4.3. Robustness analyses

To check the robustness of the results, we conducted two auxiliary analyses. First, we verified that the model does not suffer multicollinearity problems by computing the variance inflation factor (VIF) and condition indices. All resulting VIFs (highest VIF = 1.054) are below the threshold value suggested in the literature (e.g., Hair *et al.*, 2005), thus indicating no multicollinearity problems. Second, we conducted a White test of the null hypothesis of homoskedasticity in the model ($F = 7.360$, $p > .10$). Therefore, the assumption of homoskedasticity can be accepted.

5) Conclusion

This study contributes to the nascent strand of studies on users' perceptions related to the interaction with VAs (Rase *et al.*, 2018; McLean & Osei-Frimpong, 2019; Hong *et al.*, 2020) by representing the first attempt to investigate the effect of perceived privacy risk on branding outcomes in the specific name-brand voice assistant experiential context. Specifically, our article develops a conceptual model in which perceived privacy risk negatively influences brand trust directly and indirectly through the mediating effect of attitude towards 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 by means of 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 can extend the survey 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. Finally, control variables, such as gender or expertise, could be included in the model.

Key References²

- Chérif, E., & Lemoine, J.-F. (2019). Anthropomorphic virtual assistants and the reactions of Internet users: An experiment on the assistant's voice. *Recherche et Applications En Marketing (English Edition) (Sage Publications Inc.)*, 34(1), 28–47.
- Hong, A., Nam, C., & Kim, S. (2020). What will be the possible barriers to consumers' adoption of smart home services?. *Telecommunications Policy*, 44(2), 2-15.
- Rase, Y., Ormaza Cuadra, A. & de Moerloose, C. (2018). *The use of personal voice assistants in the context of retail digitalization: An empirical study of consumers' attitude and privacy concerns* (Doctoral dissertation, Master's thesis).
- Vernuccio, M., Patrizi, M. & Pastore, A. (2020). Brand Anthropomorphisation and Brand Voice: the role of the name-brand voice assistant, *2020 Digital Marketing and eCommerce Conference (DMeC 2020), Social Media and Commerce, 25-26 June, based in Barcelona, Spain*, 31-39.

² The complete list of references available upon request.