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Voice Commerce: Understanding Shopping-Related Voice Assistants and their Effect on Brands

Mari, Alex

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Alex Mari

University of Zurich, Switzerland

Alex Mari *(alex.mari@business.uzh.ch)* is a Research Associate and Ph.D. candidate at the Chair for Marketing and Market Research, University of Zurich.

Introduction

Artificial intelligence *(AI)* technologies have left the server room to enter the lives of billions of consumers. AI enables objects to perform activities that resemble cognitive functions associated with the human mind, such as learning and problem solving (Russell & Norvig, 2009). AI-powered smartphones, smart homes, and smart speakers connect the various nodes of consumers' lives into one ubiquitous experience that seamlessly accompanies them in every routine. Every intelligent object, from cars to toothbrushes, is expected to collect relevant information that helps to identify consumption patterns and predict future individual behaviors (Hoffman & Novak, 2017). Within the Internet of Things *(IoT)* market, the fast adoption and rising performance of voice platforms like Amazon Echo, Apple HomePod, Google Home, Alibaba Tmall Genie, Xiaomi Xiao AI, and Baidu Xiaodu suggest that in-home voice assistants will be central to the development of smart homes. The voice touchpoint is rapidly becoming a focal point in academic, business, and industry research because of its swift adoption and disruptive potential in buying dynamics (Dawar & Bendle, 2018). Given its interdisciplinary nature, the research on voice assistants is highly fragmented with contributions from a variety of disciplines (Knote et al., 2018). Recent studies have produced insights on the functional characteristics of voice assistants (Sciuto et al., 2018; Gollnhofer & Schüller, 2018, Hoy, 2018), their adoption and social roles (Han & Yang, 2018; Purington et al., 2017; Schweitzer et al., 2019), attitudes towards the technology (Moriuchi, 2019; Ahmadian & Lee, 2017; Brill, 2018), and applications for marketing (Kumar et al., 2016). However, these investigations have not led to a deeper understanding of consumer judgment and behavior towards brands. At the same time, studies on consumer technologies for shopping, such as—personal computers, smartphones, tablets—seem insufficient to understand the unique nature of this new channel and shopping method. Although exemplary research on consumer behavior and media possess insights that are likely transferable to voice assistants, the peculiarities of this technology require new theories that are not yet fully developed (Kumar et al., 2016). This study sheds light on the potential impact that the diffusion of shopping-related voice assistants has on consumer brands. The main contribution is to reconcile existing interdisciplinary literature and review how voice assistants may alter market dynamics as emerged during in-depth interviews with 31 AI-aware executives. Key conceptual nodes related to the dual agency/mediator role of voice assistants and their anticipated effects on consumer brands are explored.

Keywords: Voice assistants *(VA)*, voice commerce, artificial intelligence, machine behavior, brand management.

The rise of voice assistants for shopping

The term voice assistant *(VA)* refers to conversational agents that perform tasks *with or for* an individual, whether of functional or social nature and own the ability to self-improve their understanding of the interlocutor and context. This software, embedded in smart objects, leverages a combination of AI techniques, such as automatic speech recognition *(ASR)*, text-to-speech synthesis *(TTS)*, and natural language understanding *(NLU)*, to engage in natural conversational interactions with humans (Gaikwad, Gawali & Yannawar, 2010). Such category of IoT goes under various names that include but are not limited to smart speaker (Bentley et al., 2018), AI assistant (Dawar & Bendle, 2018), intelligent personal assistant (Han & Yang, 2018), personal digital assistant (Milhorat et al., 2014), voice-controlled smart assistant (Schweitzer et al., 2019), voice-activated intelligent assistant (Jiang et al., 2015), and conversational agent (Lee & Choi, 2017).

Voice assistants can take various forms of in-place and mobile devices such as Bluetooth speakers (e.g., Amazon Echo) or built-in software agents for smartphones and computers (e.g., Apple Siri). With over 70 million U.S. owners, in-home voice assistants currently see a faster adoption rate than smartphones and tablets (Newman, 2018). Their most popular functions are playing music, controlling smart home appliances, providing weather information, answering general knowledge questions, and setting alarms (Sciuto et al., 2018). However, from a commercial standpoint, digital assistants represent a novel touchpoint that allows for new forms of interaction between consumers and brands (Sterne, 2017).

Voice commerce (or voice shopping) identifies the act of placing orders online using voice assistants. This topic captures mainstream media headlines (e.g., Creswell, 2018; Chaudhuri & Terlep, 2018) and is often used to speculate about the dominance of U.S. tech giants—Google, Amazon, Apple (see Galloway, 2017). Although the number of consumers who have completed at least one purchase through a smart speaker is rising fast, the percentage of buyers using VAs varies widely among product categories. A report suggests that 21% of U.S. smart speaker owners have purchased entertainment such as music or movies, 8% household items, and 7% electronic devices (eMarketer, 2019). Meanwhile, Alexa's users can order items like household products and fresh produce from a local Whole Foods and receive delivery within two hours.

Functional characteristics of voice assistants

Unique from other consumer applications, VAs can converse with users naturally, interpret and handle requests contextually, expand their knowledge, and learn from mistakes.

Natural conversation represents the main difference in this new communication channel. Voice assistants are built to mimic human-to-human interactions. Similar to interpersonal relationships, VAs react to the interlocutor when their name is called (Sacks & Schegloff, 1979). VAs can "memorize" relevant facts from previous conversations, giving a sense of continuity from past interactions. Also, they assume a persona and refer to themselves as "*I*." For instance, when asking Google Home, "Okay Google, what do you think about Alexa?" the answer is, "*I* like *her* blue light." VAs' ability to naturally dialog with users as well as the sense of "spontaneity" that originates from unexpected answers can facilitate the emergence of closeness feelings (Han & Yang, 2018).

Context-awareness is a constituting factor of VAs (Knote et al., 2018). The context of a device is represented by any information that can be used to characterize a situation relevant to its users (Abowd et al., 1999). Context-aware computing collects and processes information about the context of a device in order to customize services to the particular contextual clues such as the identity of the user, location of the device, time and date, purchasing history, and declared user preferences (Kwon, 2003). Ultimately, a VA becomes context-aware if its interactions with the

human, and other machines, are personalized to the current context. Contextual information is necessary to precisely learn personal preferences and automate routines (Milhorat et al., 2014).

Self-learning allows VAs to interpret customers' words better and reduce friction during interactions (Sarikaya, 2017). With the recent introduction of unsupervised systems, which operate without manual human annotation, VAs can detect unsatisfactory interactions or failures of understanding and automatically recover from these errors. For instance, if the user says "Play 'Good for What'" but meant to say "Nice for What" by Drake, the VA corrects the error and initiates a successful song request (Sarikaya, 2018). The system learns how to address these accuracy issues and deploys updates shortly after. Automatically applying corrections to a large number of queries each day using self-learning techniques allows VAs to develop at a faster pace.

Interactional characteristics of voice assistants

The uniqueness of VA technologies brings up a new set of interaction rules modeled after the active (and proactive) nature of these smart devices (Rijsdijk & Hultink, 2009). In contrast to traditional media, voice touchpoints emphasize a bidirectional interaction with consumers. VAs are designed to process one request at a time and on a turn-by-turn basis to decrease the speech recognition error rate coming from a possible voice overlap (Hansen, 1996). This style of interaction represents a radical difference compared to sensorially richer devices like computers or smartphones, which present multiple pieces of information on a screen concurrently. As such, voice channels present both challenges and opportunities for the diffusion of voice commerce.

On the positive side, e-commerce has paved the way for voice shopping (Labecki, Klaus & Zaichkowsky, 2018). With the rise of the Internet, users have learned to deal with a combination of social, cultural, economic, and technical barriers. In doing so, they have needed to overcome the initial diffidence of buying without directly seeing, touching, or smelling an object. Voice technologies further limit the users' senses; besides, consumers are asked to make shopping decisions without browsing photos, videos, or any other animated content. Another celebrated feature of voice shopping is the ease of making low involvement purchases. VAs are "always on" devices that can access a user's personal information upon request (Clark, Dutta & Newman, 2016). With a simple "yes" and without providing additional information such as credit cards or address details, VAs can process orders, or even automate them.

On the negative side, an effortless decision-making process does not guarantee an optimal level of consumer satisfaction. Shopping-related voice assistants offer a limited set of items for each product category based on their understanding of the consumer and context. This simplified representation of the marketplace reduces consumers' visibility of product alternatives and emphasize the critical role of ranking algorithms. The algorithm that ranks the information represents a "black box" for the VA user, and often for its developers (Voosen, 2017). Such visual limitations may increase product (and brand) polarization while enhancing the risk of the so-called filter bubble or echo-chamber effects (Colleoni, Rozza & Arvidsson, 2014).

Methodology

A total of 31 semi-structured in-depth interviews were conducted in December 2018 to supplement an interdisciplinary literature review. During the interviews with international AI-aware corporate executives and consultants, theoretical perspectives were not employed to facilitate the emergence of insights (Avis, 2003). Interviews were audio-taped, and transcriptions analyzed adopting an inductive line-by-line coding approach. This process followed a constant comparative data analysis according to the grounded theory (Glaser & Strauss, 1967). Using NVivo 12 for Mac, codes were grouped into themes and then re-evaluated to ensure that they reflect data extracts.

Through conceptualization, relationships among categories and sub-categories were established (Figure 1). The emerging conceptual nodes were related to the dual agency and mediator roles of VAs as well as their main anticipated effects on consumer brands.
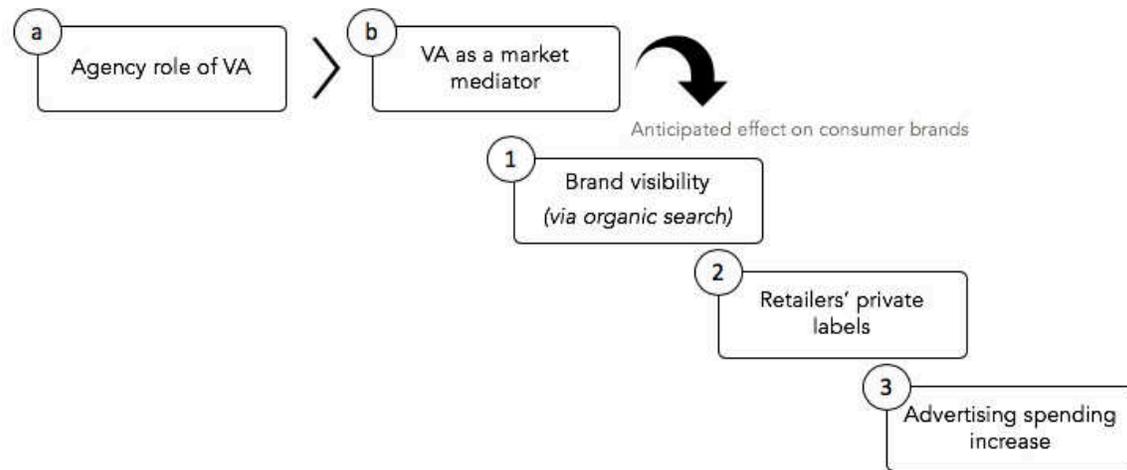

Figure 1. Key conceptual nodes emerged during qualitative investigation.

The agency role of voice assistants

In their recommender agent role, VAs attempt to predict which items a target user will like based on expressed preferences or implicit behaviors (Shen, 2014). This form of recommender system may replace traditional decision-making when consumers feel time constraints or recognize the referrer as a particularly knowledgeable source (Olshavsky & Granbois, 1979). End-users typically evaluate a virtual agent on its ability to personalize suggestions that satisfy their needs. Consumers adopt algorithmic recommender systems if they are believed to match their interests (Abdollahpouri et al., 2019). Higher accuracy of suggestions from a platform translates into not only an increase in consumer satisfaction but also their overall trust in the technology (Li & Karahanna, 2015). In this context, recommendation outcomes may correspond to consumer preferences more closely than if they had chosen independently (André et al., 2018).

Due to their central role in a complex business network (Snehota & Hakansson, 1995), VAs do not consider users as the only stakeholders benefiting from the recommendation outcome. The strategic goals of the retailer, merchant, advertiser, and voice assistant itself, may differ from those of end-users. Thus, the user is not the sole focus of a recommendation in almost every transaction on the VA. For instance, a VA might recommend a private label over a consumer brand following the retailer's objective to swiftly grow its shares in a specific product category. Thus, the objectives of several parties need to coexist (Abdollahpouri et al., 2019).

The ultimate goal of recommendation personalization is the automation of the buying experience. Throughout the collection of significant volumes of personal and behavioral information, VAs can push users to automate repurchase, for instance, via "subscribe & save" promotional activities, increasingly popular on the e-commerce websites. According to André et al. (2018), this power of attorney towards VAs goes at the expense of higher-order psychological processes such as emotions and moral judgments. In the context of purchase automation, consumers might have aspirational preferences that differ from the preferences suggested by their past behavior. These meta preferences, also called preferences over preferences (Jeffrey, 1974), are apparent in the case of an environmentally aware person who wants to use less bottled water but is regularly reminded to buy plastic bottles. The inherent tension

between the actual-self and the ideal-self represents a boundary for those consumers who follow VAs' suggestions to automate repurchases.

> There is a brand of soap that my wife loves. One day the Amazon says, "Hey, you buy this all the time, why don't you subscribe?". Now, we have a subscription to soap, and every six months we get a bunch. If we have more than we need, we adjust the delivery frequency. This product automatically shows up, and we are definitely going to buy the same brand. We are locked in.
>
> - *Jim Sterne, Emeritus Director of the Digital Analytics Association (DAA), Author of "AI for Marketing."*

While functioning as a salesperson, VAs are redefining relationships among consumers, brands, and retailers (Figure 2). As consumers' relationships with VAs shift from limited influence to steadfast dependency, brands need to understand which elements influence consumer choices and how to redesign their value chain (Mandelli, 2018). Consumer brands feel threatened by the rapid adoption of VAs as the bargaining power is shifting in favor of VA technology owners (Dawar & Bendle, 2018; WSJ, 2018). In the case of Amazon's Alexa, the VA manufacturer is also the retailer behind the most advanced voice shopping functionality, accounting for nearly 45% of the total U.S. retail e-commerce (eMarketer, 2018).
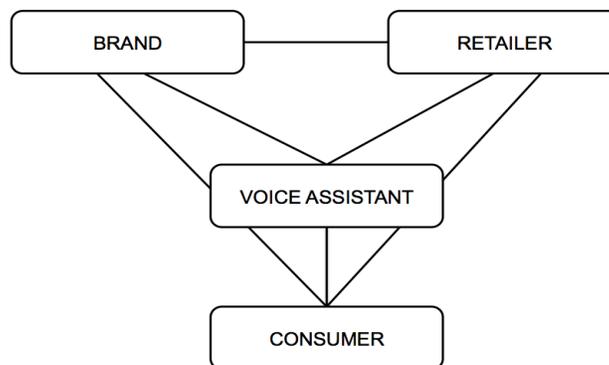

Figure 2. Triadic relationship between brand, retailer, and consumer mediated by a voice assistant.

The impact of market mediation on consumer brands and retailers

VAs' increasing mediation of consumer interactions with the market does affect the path to purchase dynamics. The main concerns from consumer brands around VAs' diffusion are related to brand visibility via organic search results, the rise of retailers' private labels, and the potential increase in advertising spending.

Search algorithms represent the gatekeeper for modern companies and retailers. Compared to display-enabled smart devices, the optimization of voice search results on VAs presents three structural challenges due to the nature of consumer interactions and information framing. First, during voice shopping users can review one to three options before they start forgetting information such as price or quantity of the mentioned products. Reduced attention span and short-term memory can negatively influence the satisfaction towards this shopping system, especially when the user is required to search for products in an explorative way extensively. Second, VAs deliver search results to users in the form of recommendations. The assistive nature of the interaction with VAs implies a delegation of responsibility, at least in the absence of explicit requests by the user. Whenever a user directly asks for a specific brand

or product, VAs respond with the closest option available to them. However, when shopping for items without specifying a brand, VAs are more likely to recommend their private labels, if available. In the case of Alexa, when a brand name is not proactively mentioned by the user, the private label, under the name of Amazon's Choice, appears as the first recommendation in over 50% of instances (Cheris, Rigby & Tager, 2017). Third, the search engine results continuously adapt to the user's purchase history and the evolving understanding that VA acquires about its interlocutor. However, after a user has purchased a product, for example, Nespresso coffee capsules, the subsequent suggestions for coffee start from the same manufacturer. As such, this dynamic might reduce variety seeking in shoppers.

> Alexa does commoditize entire product categories, all the way from diamonds to detergents. During a product search, by the time you get to the third item, you have forgotten what the first was and what the price of the second one was. You're done beyond the third results. You've become a commodity fighting for air space.
>
> - *Dr. A. K. Pradeep, CEO at MachineVantage, Co-author of "AI for marketing and product innovation."*

Private label development is seen as particularly dangerous by national brands (see Quelch & Harding, 1996). In utilitarian product categories characterized by low purchase involvement, the parallel expansion of private labels and VAs represent a risk for category "commoditization" (Pradeep, Appel & Sthanunathan, 2018). An emblematic example of this process comes from the battery business. A few years after its launch in 2009, Amazon's private label "AmazonBasics" accounts for 31% of the overall battery sales online by large margins from national brands such as Duracell (21%) and Energizer (12%) (Neff, 2016). The price of private labels is reported to be 20%-30% lower than national brands, on average (Collins & Metz, 2018). With Amazon's private label portfolio growing to 135 brands and more than 330 Amazon exclusive brands, similar trends gradually become visible in a variety of product categories such as skincare, home improvement tool, and golf equipment (Jumpshot, 2018). The limited "shelf space" available to merchants on in-home smart devices strengthens the private brands' position. According to Cheris, Rigby, and Tager (2017), in categories in which Amazon offers private-label products, Alexa recommends the private-label products 17% of the time, although these products represent only about 2% of the total volume sold. Amazon's biased placement on VAs of its private labels against national brands challenges the traditional retail marketing practice that expects a distribution of a given brand, "share of shelf," proportional to its sales, "market share." Furthermore, consumers can decide to automate fully (e.g., subscription) or semi-automate (e.g., product added to the shopping list) their purchases creating self-established lock-in mechanisms.

> If I ask Alexa to send me twenty AA batteries, I will probably get Amazon's branded batteries. However, if I explicitly ask for Duracell, I receive my preferred brand, provided it is available on the platform. Thus, companies have to invest in branding even more than they did before so that consumers asked for a product by the name.
>
> - *Jim Sterne, Emeritus Director of the Digital Analytics Association (DAA), Author of "AI for Marketing."*

For decades, *advertising* represented the primary tool to generate brand awareness, improving both recall and recognition. With the rise of the Internet, the concept of advertising transmuted to search engines where advertisers buy promotional spaces in response to a set of keywords searched by the user. Within digital advertising, "search advertising" represents the most successful format, accounting for 45% of the total spending (IAB & PWC, 2018). Advertisers face an overall cost increase of search ads with a particular impact on highly competitive consumer products. For instance, the cost per click on the search term "laundry detergent liquid" reached $17 on Amazon in a

given period (Koksal, 2018). Search advertising in the form of voice has a paramount role in voice commerce marketing. Although brands are generally positive towards this new form of investment, the peculiarities of the voice channel induce concerns. Compared to web browser navigation where search engines can display ten results per page and up to five advertisements, VAs can only suggest a few results with limited space for sponsored messages. This scarcity of space might increase competition among advertisers with a consequent rise in advertising costs.

From the voice commerce perspective, VAs pose a challenge to advertisers. They bring up a "real estate" problem. While I can display several ads on the same Google Search results page, I don't have the same ad space on smart speakers. Thus, I expect the cost of voice ads to be more than two times higher than regular search ads. Am I able to justify this cost increase?

- *Maurizio Miggiano, Head of Digital at Generali (Ex Mediacom).*

Conclusions

As voice assistants become better at learning consumer preferences and habits, they will increasingly influence consumer behaviors (Simms, 2019). In doing so, VAs may assume a central relational role in the consumer market and progressively mediate market interactions. These fast-changing market dynamics within the context of voice shopping may have a severe impact on consumer brands and retailers. Loss of brand visibility, the increased relevance of retailers' private labels, and the growth in advertising costs are just some of the consequences anticipated by marketing and technology experts. In light of these potential dynamics, researchers are called to study the interplay between consumers, brands, and retailers' behaviors in response to "machine behaviors" (Rahwan et al., 2019). Providing structure and guidance to researchers and marketers in order to further explore this emerging stream of research is fundamental.

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