

# Voice assistants - Addressing user's privacy concerns

Esther Görnemann

Vienna University of Economics and Business, Welthandelsplatz 1, 1020 Vienna, Austria  
esther.goernemann@wu.ac.at

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## 1 Objectives

The presentation covers a broad spectrum of issues around the technology behind voice assistants. It gives a brief but comprehensive overview of the functioning of automated wake-word detection, speech recognition, language understanding and language generation. I conducted a qualitative research study focusing on the interactions between users and the Amazon Alexa voice assistant and uncovered a number of specific privacy and security concerns users expressed. These user concerns will be addressed one by one with the goal of identifying whether they are realistic and legitimate. Published research, hacking attempts, submitted patents, public corporate statements, media coverage and user experiences were analyzed and combined to reach satisfactory conclusions.

## 2 Core findings

- The wake word detection module balances out precision and latency, causing false positives: the wake word is often recognized although it was not said.
- Recent research points to discrepancies between transmitted recordings and recordings accessibly stored in the user's profile.
- Recent patent submissions suggest that voice recordings can be used to infer detailed and intimate knowledge about the user, especially in combination with other available information.
- Amazon's privacy policies, product information and terms of use are formulated vaguely and do not provide exhaustive information.
- The lack of access control and user authentication causes specific privacy and security problems.

## 3 About the author

In my work, I investigate how anthropomorphic technology is experienced. A particular focus lies on the relationship and interaction paradigms between user and voice assistants, including privacy concerns, usability, emotional reactions and adoption of the technology.