

# Augmented Reality Smart Glasses: Societal Benefits and Risks

Daniel W. E. Hein

Jannah Jodoin

Philipp A. Rauschnabel

Björn S. Ivens



## Background

Today's computers are small, mobile and permanently online devices strapped to or worn like glasses by their user. Next to changed technology, today's consumers are ethically more engaged than ever and aware of the consequences of their consumption behavior, for the environment and society. Their adoption decision is not just driven by efficiency and hedonic motivations, but rather a question of where widespread adoption of a product might lead society at large.

With these consumers setting the stage, smart glasses will soon enter the consumer electronics market. Smart glasses are wearable devices that are worn like regular glasses and possess the ability to merge the physical environment with virtual information within the view field of the AR technology user. Often, they are equipped with various sensors which gather information about the user's situational context, a WiFi-antenna to receive and send online information, a small memory, a processing unit and a small screen located in front of one eye or integrated into one or both of the translucent lenses. The processing unit allows the smart glasses to operate various recognition technologies to give the user context-relevant information on his/her social and spatial surrounding (Rauschnabel, Brem, & Ro, 2015). As this innovation possesses the potential to alter society for better or for worse, our **Research Questions** emerge:

### RQ1:

How do consumers evaluate the potential opportunities and threats of smart glasses for society?

### RQ2:

How are these potential opportunities and threats related to consumers' desired and anticipated success of smart glasses?

To research these questions, the following framework was used which was refined using interviews with an AR expert not involved in this study and in the group of researchers.

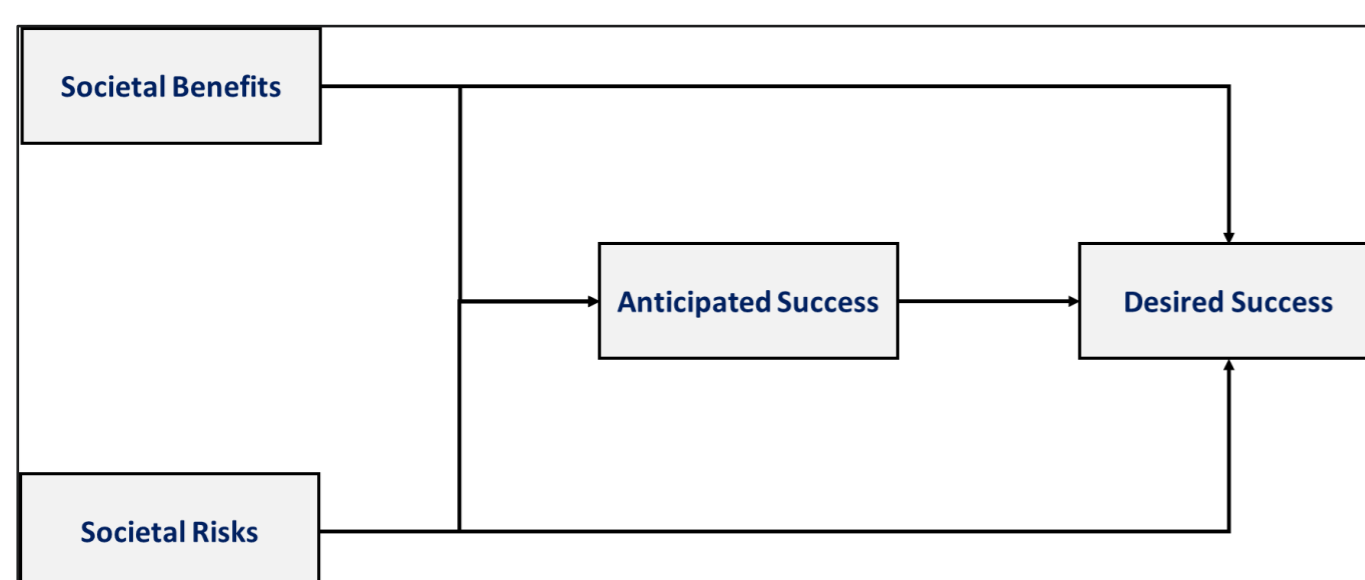


Figure 1: Framework

## Identified Factors

- Loss of Awareness is the risk of society members losing their sense for processes and events happening in their immediate environment.
- Loss of Social Cohesion is the extent to which consumers expect smart glasses to diminish the amount of social behavior in a society in general.
- Loss of Public Privacy refers to consumers' fear that widespread use of smart glasses may make infringements to their right to informational self-determination.
- Public Safety Improvement can become the result of widespread smart glass adoption, with benefits covering crime prevention and disaster management.
- Societal Progress Potential: Smart glasses proliferation will enable societal progress to happen. We suggest that this societal progress has a social and an economic side to it, which both are interlinked.
- Societal Perceived Usefulness: Drawing on classical Technology Adoption Literature, we found a general assessment of perceived usefulness at a society dimension without further specifications, thus measuring a utilitarian value.

## Method and Results

Comparison of means and Structural Equation Modelling (AMOS23) was applied to test the hypotheses. For RQ1, sub-group differences were identified. **Gender:** More females demonstrate agreement in the societal loss of social cohesion, societal loss of awareness, and Google brand. Males, on the other hand, demonstrate agreement with their desired success for Google Glass anticipated success for Google Glass and familiarity with Google Glass. **Familiarity:** High familiarity consumers tend to rate the risks higher. Surprisingly, high familiarity consumers also tend to have higher levels of anticipated and desired market success. **Google Brand Attitude:** For respondents with low Google brand attitude, there is larger agreement for societal loss of awareness and societal loss of privacy in public. Respondents with a more positive brand attitude, there is larger agreement for societal perceived usefulness and desired success. Figure 2 shows results of RQ2. ( $\chi^2=305.53$ ;  $df=212$ ;  $p<.001$ ;  $CFI=.98$ ;  $TLI=.98$ ;  $NFI=.95$ ;  $RMSEA = .035$ ;  $R^2=.289$  (anticipated success),  $R^2=.632$  ( $R^2\Delta=34,4\%$ ))

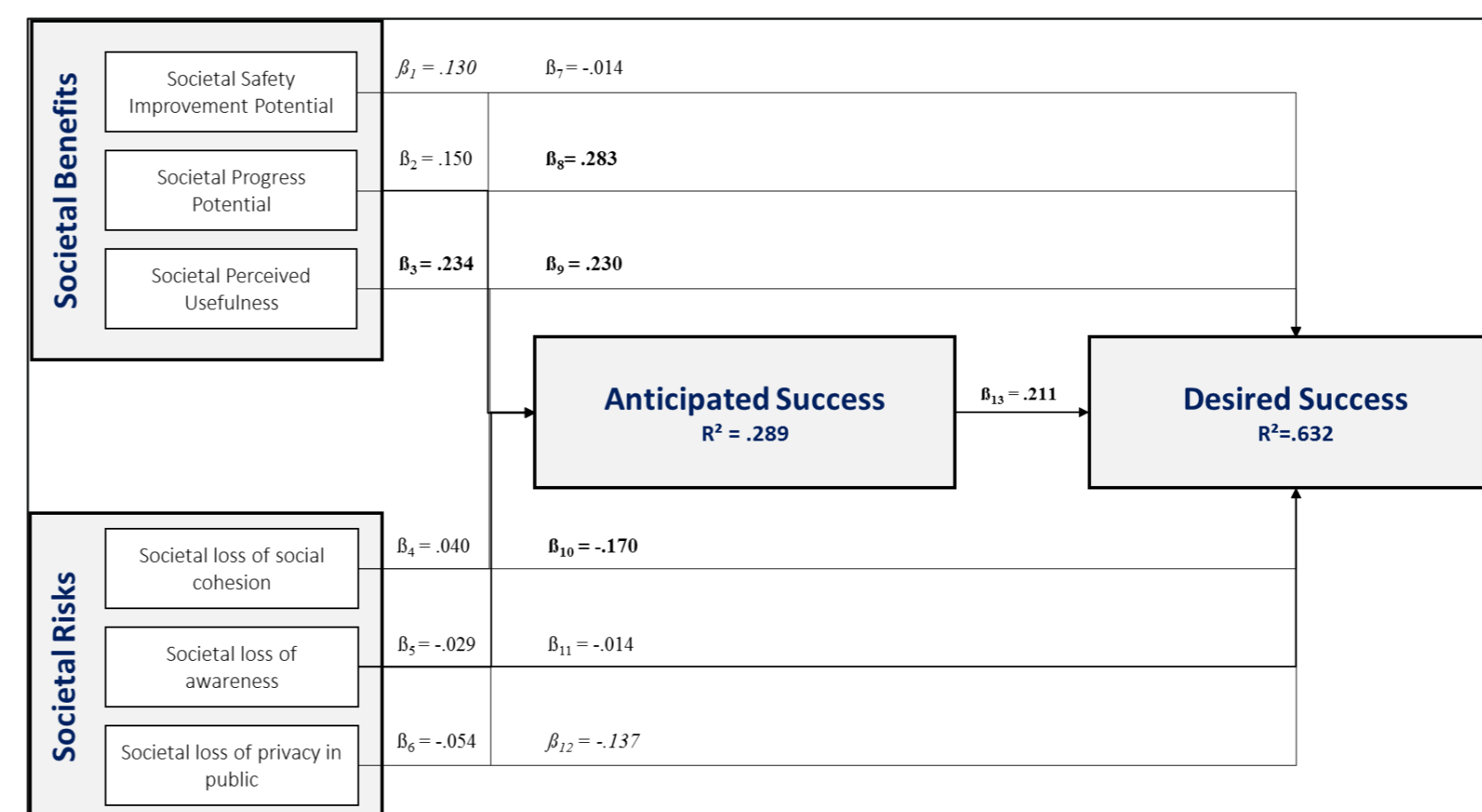


Figure 2: SEM results; note: bold letters:  $p<.05$ ; italics:  $p<.10$ ; only standardized coefficients reported

## Implications for Academics, Policy Makers and Managers

- Technology Acceptance may need to cover for a factor that represents consumers' ethical consciousness in the future. „Social norms“ seem to not suffice to cover environmental consciousness, calling for further scale development.
- Policy makers will need a steady hand when regulating public smart glass use, as some potentials are based on widespread adoption. Overregulating will possibly result in benefit potential annihilation.
- Managers may base new business models on use of widely adopted smart glasses (e.g. ,market research with eye-movement tracking) or find themselves using information delivered by consumers' smart glasses.

## Sample

Computer-assisted personal interviews with 364 students from a mid-sized German University were conducted in form of a laptop-based survey in summer 2014. Incentives consisted of candies and snacks (43.1% male, 56.9% females, AVG = 22.6 years ( $SD=2.4$ )). 61.7% were undergraduate students. The smart glasses model used as focal item was Google Glass because of its high popularity. Scales used ranged from 1 to 7 with higher values indicating higher agreement.