



# Main concept of the "European approach" to occupant-centered adaptive façades assessments and interaction

Authors: Sébastien GARAT  
Supervisor: Shady ATTIA

E-mail: sebastien.garat@epfedu.fr  
Address: Building Design Lab (SBD)  
Quartier Polytech 1  
Allée de la Découverte 9  
4000 Liege, Belgium  
www.sbd.ulg.ac.be  
Tel: +32 43.66.91.55  
Fax: +32 43.66.29.09

## ABSTRACT

Through this study, we are looking for a way to effectively evaluate adaptive facades from an occupant's perspective. Our method consists in developing a survey evaluating five main aspects: thermal perception, visual perception, adaptation control, user interaction and view.

This questionnaire will be distributed twice two weeks apart to the occupants of AGC HQ in Louvain-la-Neuve. The results will be analyzed and statistical studies will be conducted to optimize this survey. The result of this work will be the development of a final survey, intended to be generalized to other buildings with adaptive facades

## KEYWORDS

Evaluation, Survey, Occupant satisfaction, Comfort perception, Adaptation control, User interaction

## PROBLEM

The evaluation of adaptive facades is a complicated challenge, due to their dynamic nature and a certain novelty in the market. There is often a gap between the automated behavior of these facades and the requirements of users, which creates discomfort.

In order to reduce this discomfort and improve the quality of interaction between the user and the facade, we need to know the requirements and troubles of the occupants

## OBJECTIVE / HYPOTHESIS

- Define assessment concept
- Develop a survey based on the concept
- Test through a case study

## AUDIENCE

- AGC HQ and other building resident with the same technology
- Facades buildings operators
- Designers of adaptive facades and control systems
- Readers of Energy and Building journal

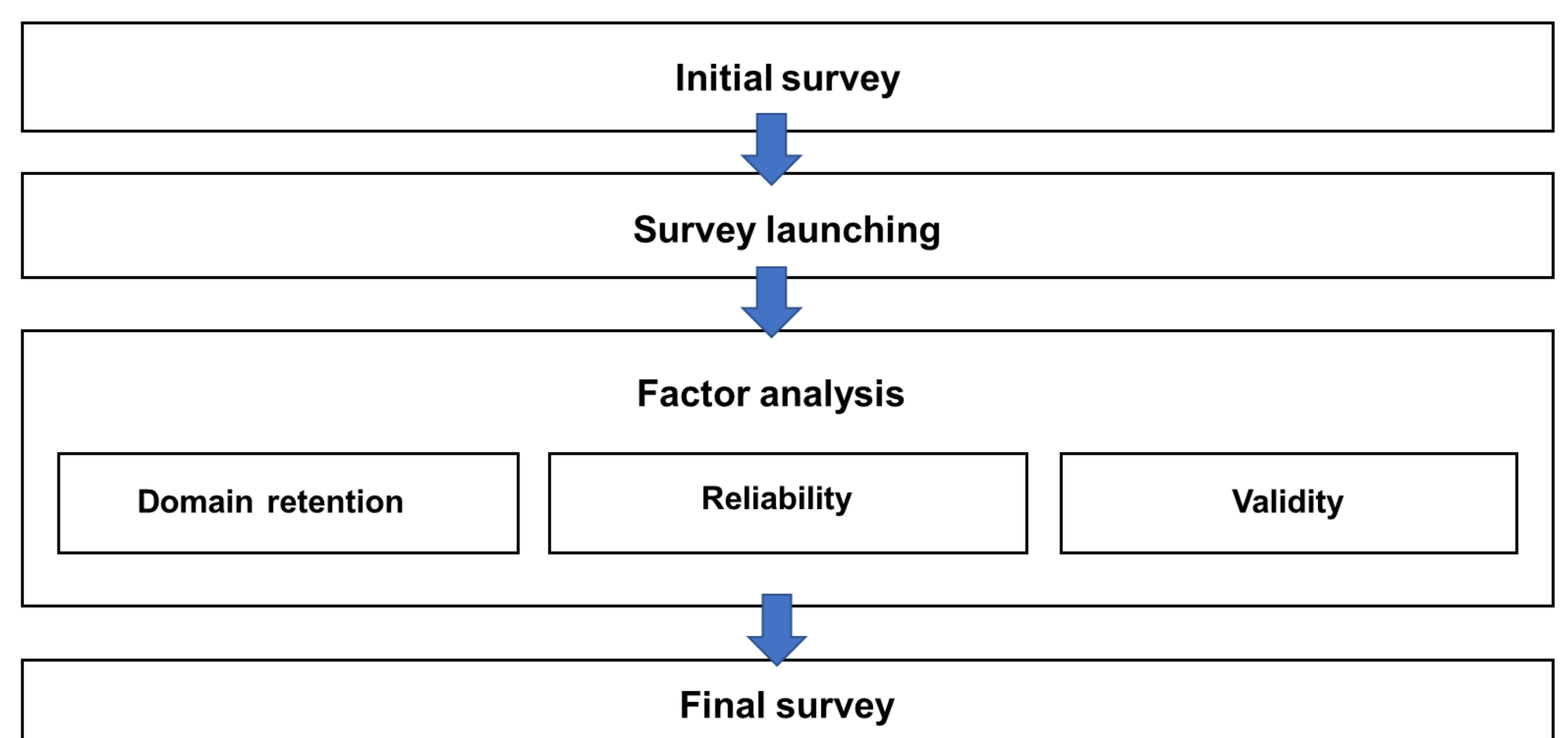
## RESEARCH QUESTION

Is the adaptive facade smart enough to be in harmony with the needs of users and beneficial to them?

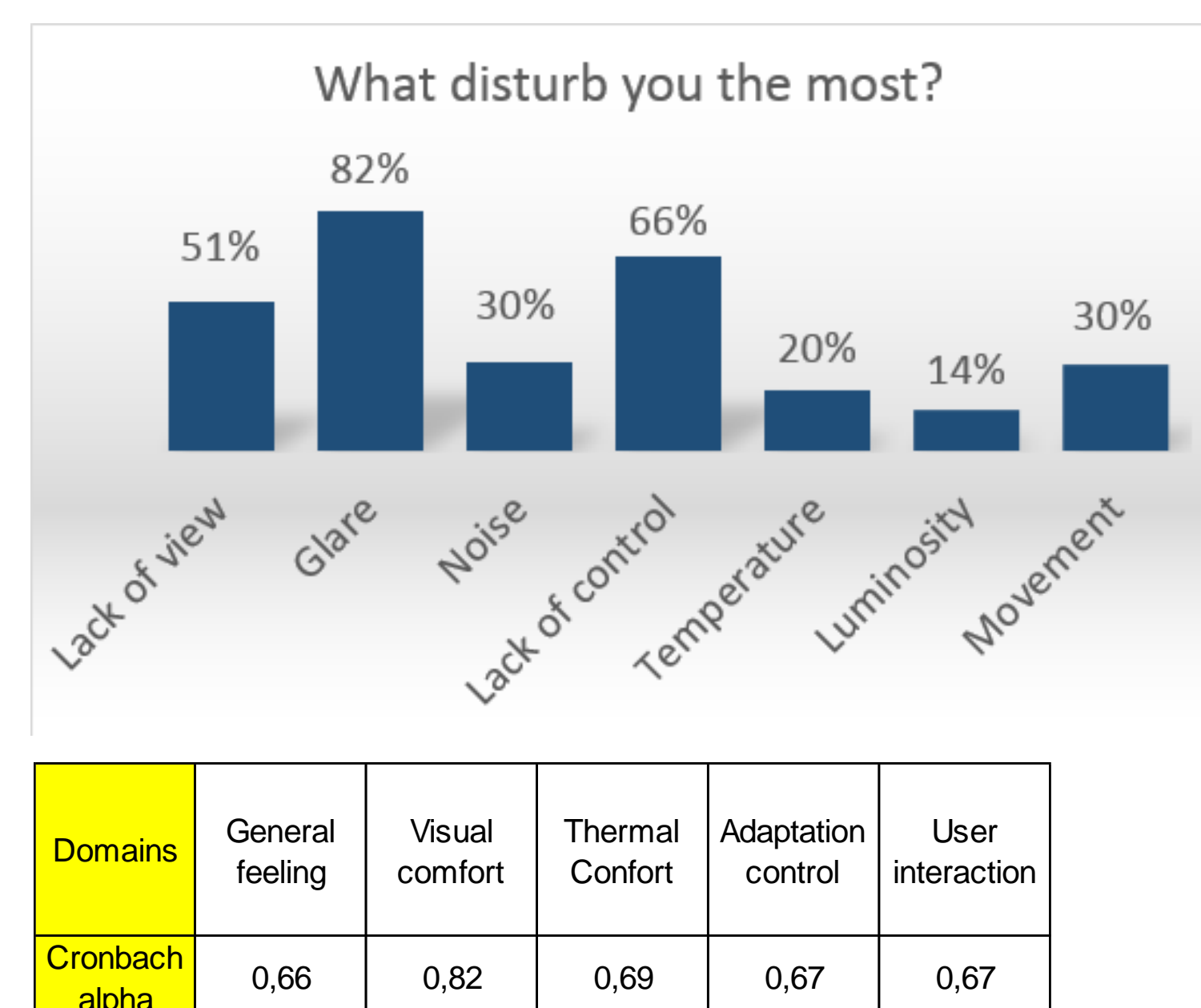
## ORIGINALITY

- Occupant-centred facade assessment method
- Creation of a new occupant-based behavioral and opinion survey
- Provides new data on the users' perception

## METHODOLOGY



## RESULTS



## CONCLUSION

This study provided a better understanding of the problems of occupants of buildings with adaptive facades

Thanks to the statistical analyses, we were able to identify the problem issues and thus improve the final questionnaire

## RESOURCES

- Lavan, R. P. (2013). Development and validation of a survey for quality of life assessment by owners of healthy dogs. *The Veterinary Journal*, 197(3), 578–582.
- Attia, S. & Bashandy, H. (2016). Evaluation of Adaptive Façades: The Case Study of AGC Headquarter in Belgium. In Belis, Bos, & Louter (Eds.) *Challenging Glass 5 – Conference on Architectural and Structural Applications of Glass*. Ghent University, Belgium, ISBN 978-90-825-2680-6.
- Attia, S., Luna Navarro, A., Juaristi, M., Monge-Barrio, A., Gosztonyi, S., Al-Doughmi, Z. (2018). *Post-occupancy evaluation for adaptive facades*, *J. Facade Des. Eng.* 3 25–33
- Karlsen, L., Heiselberg, P., Bryn, I. (2015). Occupant satisfaction with two blind control strategies: Slats closed and slats in cut-off position. *Solar Energy*, 115, 166–179.
- Attia, S., Bilir, S., Safy, T., Struck, C., Loonen, R., & Goia, F. (2018). Current Trends and Future Challenges in the Performance Assessment of Adaptive Façade Systems. *Energy and Building*, 179, 165-182
- Chinazzo, G., Wienold, J., & Andersen, M. (2018) Combined effects of daylight transmitted through coloured glazing and indoor temperature on thermal responses and overall comfort. *Building and Environment*, 144, 583–597.