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DECADIESE: a new method to assess buildings' sustainable value through functional performance and externalities integration

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► **To cite this version:**

François Cluzel, Bernard Yannou, Pascal da Costa. DECADIESE: a new method to assess buildings' sustainable value through functional performance and externalities integration. 7th International Conference on Life Cycle Management - LCM 2015, Aug 2015, Bordeaux, France. hal-01188801

HAL Id: hal-01188801

<https://hal.science/hal-01188801>

Submitted on 31 Aug 2015

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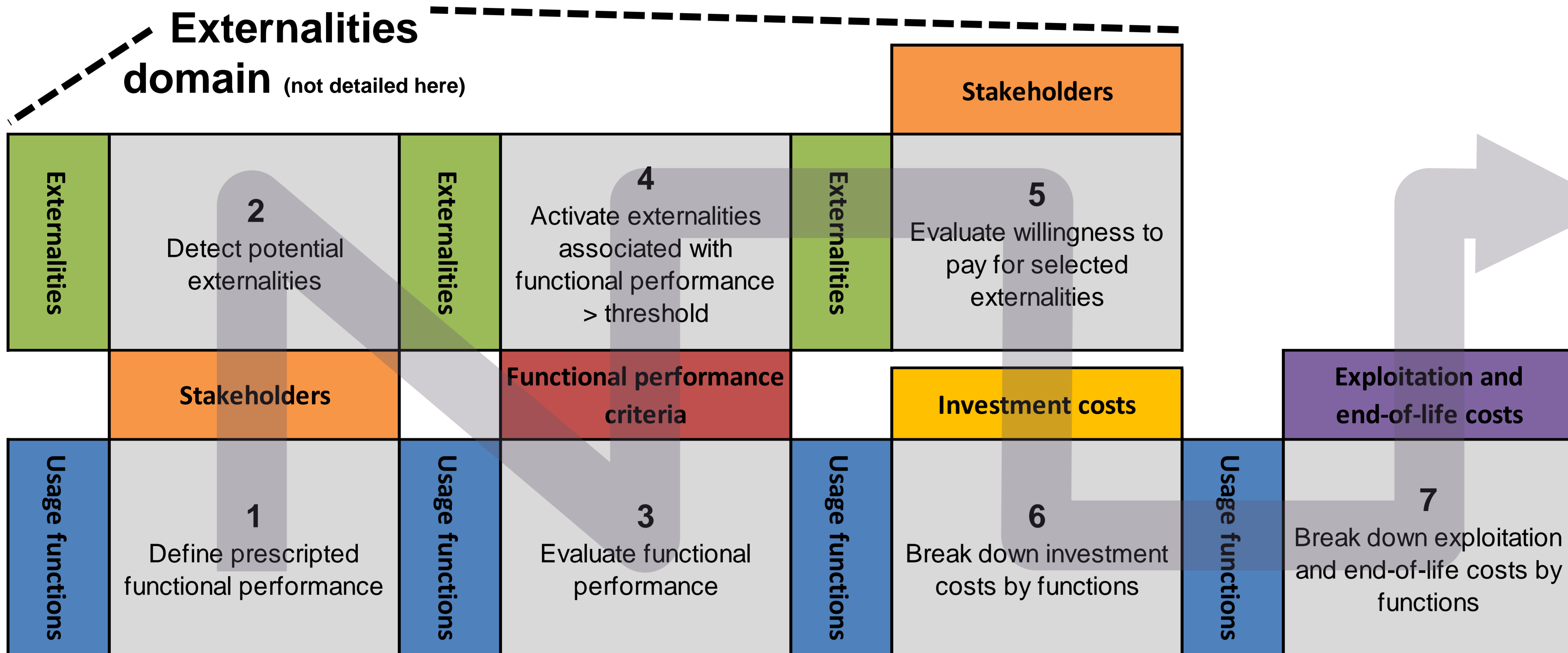
Context

- Hard to **justify ambitious building retrofits** by energy savings only
- Return on investment** to divide energy consumption of a building by two is **more than 25 years**
- DECADIESE methodology to **capture the sustainable value of a building** with an original focus
 - beyond the scope of classical analytic methods
 - by extending the perimeter of associated stakeholders in order to allow ambitious building projects.

ANR (French research agency) project



Methodology



DECADIESE objectives

Aiding decision for buildings' project owners thanks to:

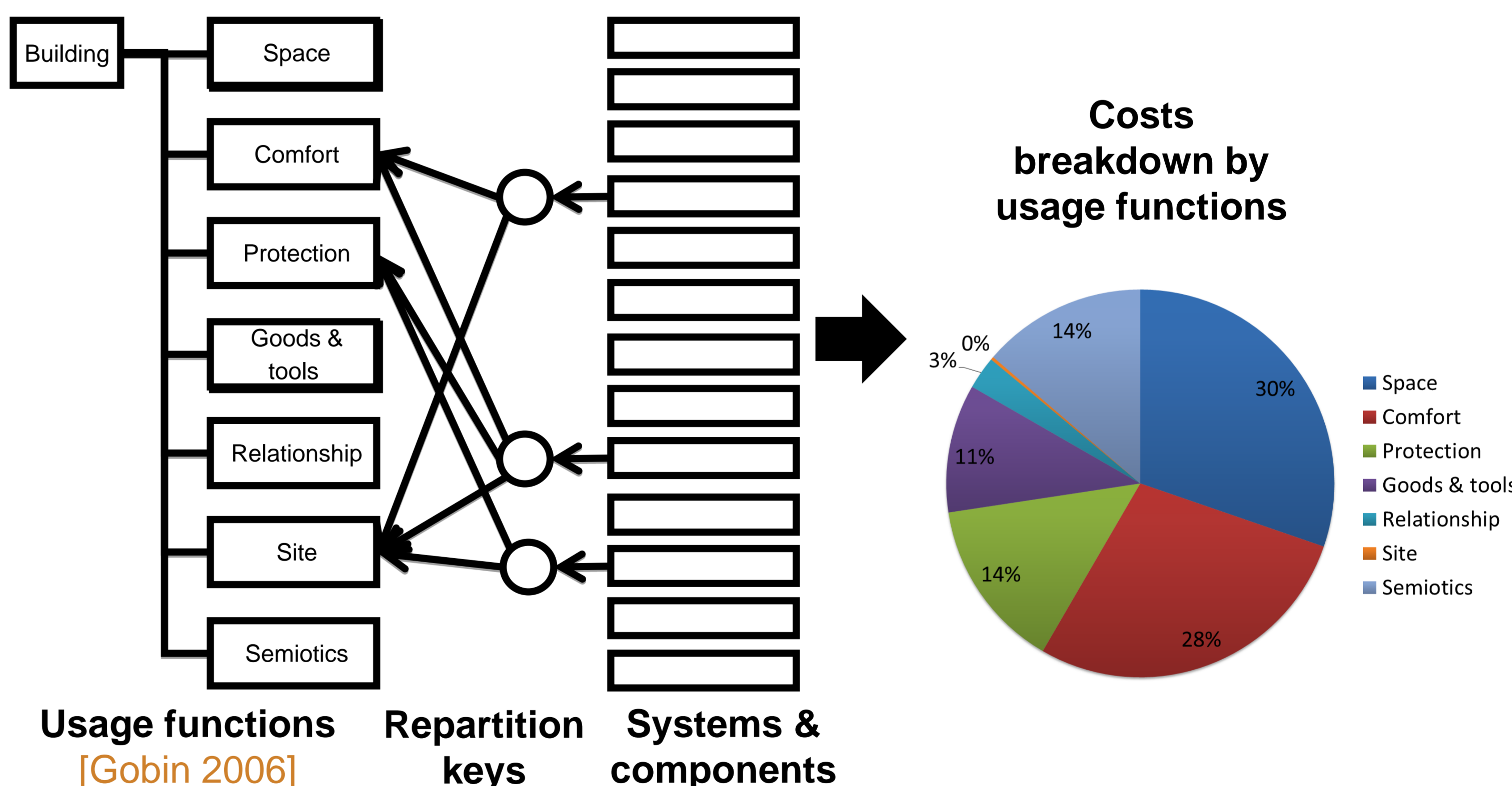
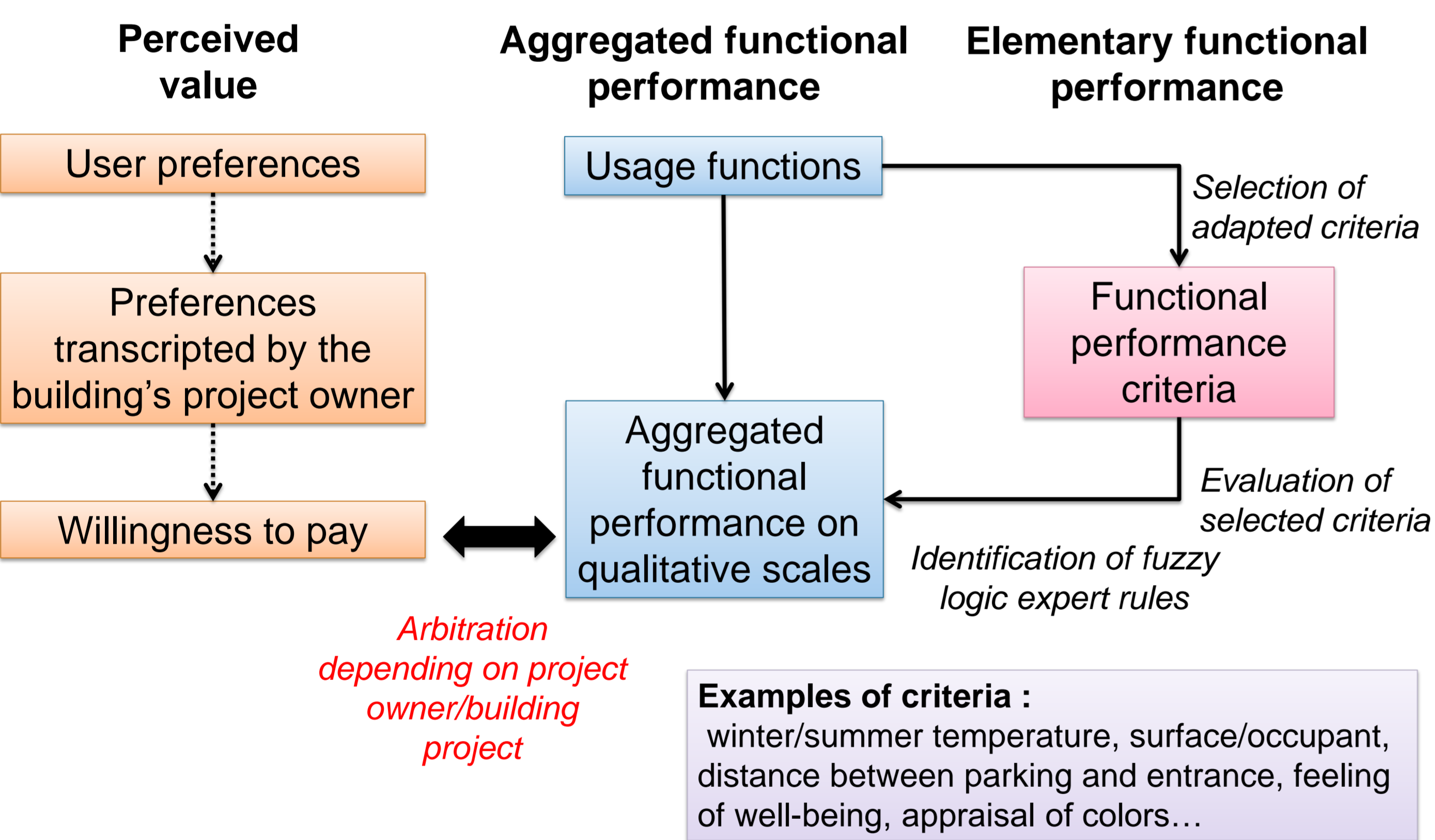
- A **functional perspective** centered on users
- Externalities elicitation** to identify new value creations

Functional performance domain

Approach based on a list of **95 functional performance criteria** and **fuzzy logic** to aggregate functional performance on usage functions

Usage function costs domain

Approach based on Value Management and **Functional Analysis** [NF EN 12973:2000, Ehrlenspiel et al. 2006]



Application & first results

- Prototype tools** developed to support DECADIESE methodology

DECADIESE methodology partially applied on Skyline building in Nantes (France)

- Building designed, constructed, operated and partially occupied by Bouygues subsidiaries → all data available
- Good results obtained by applying function costs and externalities parts → **DECADIESE is feasible**



Serious game developed and run for one day to test appropriation of the methodology by real building sector's actors

- **High interest from these actors**
- **New directions for future developments**

Perspectives

- Make the methodology more reliable** by
 - Going further in scientific validation
 - Testing the methodology in more extrem case studies
- Develop **professional DECADIESE software** to support the methodology
 - For different types of applications (offices, housing, hospitals, schools...)
 - For different businesses (building owner, engineering contractor...)
- Implement DECADIESE methodology on **on-going buildings projects**

References

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- Gobin, C., 2006, Développement durable en BTP - Fonctions d'usage, Techniques de l'Ingénieur