

### KEYWORDS

maintenance, energy poverty, urban governance, comfort and salubrity, investment return

### INTRODUCTION / LITERATURE REVIEW

- It is essential to deeply [1] retrofit [2] the Belgian building stock to achieve European objectives of GHGE decreasing by 80% through 2050.
- But despite some actions, the retrofit permit rate remain stable around 0,8%/year [3] and the building stock performances are increasing slowly.
- As we can see during the COP 21, the emphasis remains mainly on climatic urgency [4] and financial interest [5]. Yet many issues of renovation are little emphasized while they could be mobilizing [6].
- In the light of the literature review, barriers to renovation are numerous, but seem to fall into three main categories [6] (Fig. 1).
- Interviews were conducted to compare with the literature review and expand the research framework [7].

Renovation costs, energy price and financing	Communication and information	Rules
<ul style="list-style-type: none"> <li>• Low profitability and return on investment</li> <li>• Diverging interests of owner, co-owners and tenants.</li> <li>• Low and variable cost of energy</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of existing stock</li> <li>• Lack of diffusion of techniques</li> <li>• Lack of training</li> <li>• Lack of communication</li> <li>• Lack of overall strategy</li> </ul>	<ul style="list-style-type: none"> <li>• EPBD not suitable for renovation</li> <li>• Heritage conservation</li> <li>• Urban planning rules</li> </ul>

► Fig. 1: Renovation increasing barriers (Ruellan, 2016)

### QUESTION: WHY IS THE RENOVATION RATE NOT INCREASING ?

### METHODOLOGY

#### ► QUESTIONNAIRE (FIG. 2)

These questionnaire constitute a canvas on which both speakers can bounce back to develop.

#### ► EXPERT PANEL

The panel of experts is mainly composed of academic researchers involved in issues related to renovation. Despite this over-representativeness, it will be noted that the subjects of research are varied. Policy makers, agents of government agencies and cartels complete this panel to bring it more diversity.

#### ► RAW RESULTS

Each interview is transcribed literally. An analysis of this transcription makes it possible to highlight the stakes, the barriers and the strategies proposed by each expert. We note the prevalence of certain recurring ideas in the speech of certain experts, in connection with what had been identified during the review of literature. But the analysis also reveals some original or under-represented ideas in the literature.

#### ► EXPLOITATION (FIG. 3)

The ideas are grouped into categories so as to identify and quantify the main axes of reflection.

#### 1. Position of the interviewee

#### 2. General Question

- State of Belgian housing stock and evolution of the renovation market.

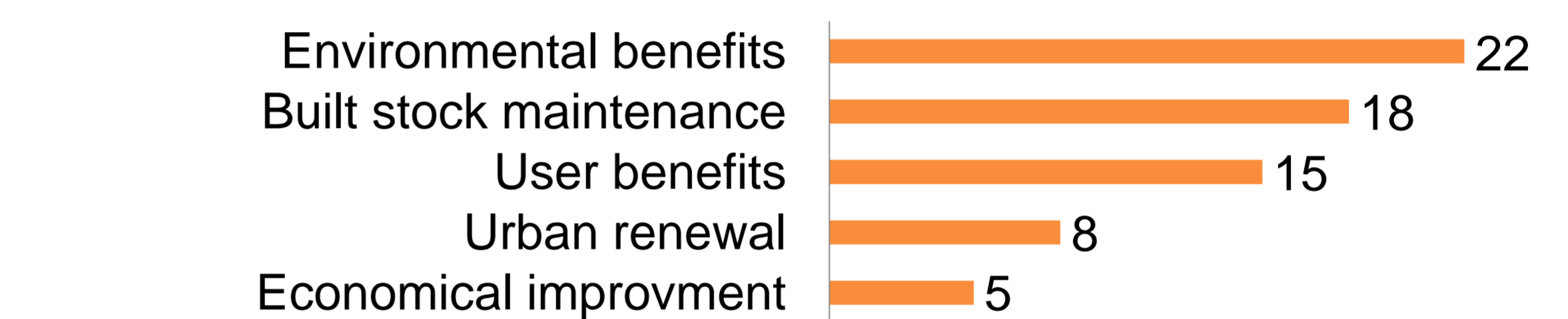
#### 3. Specific question

- Issues of the renovation sector ?
- Barriers to building renovation in Belgium ?
- Strategies to encourage renovation projects ?

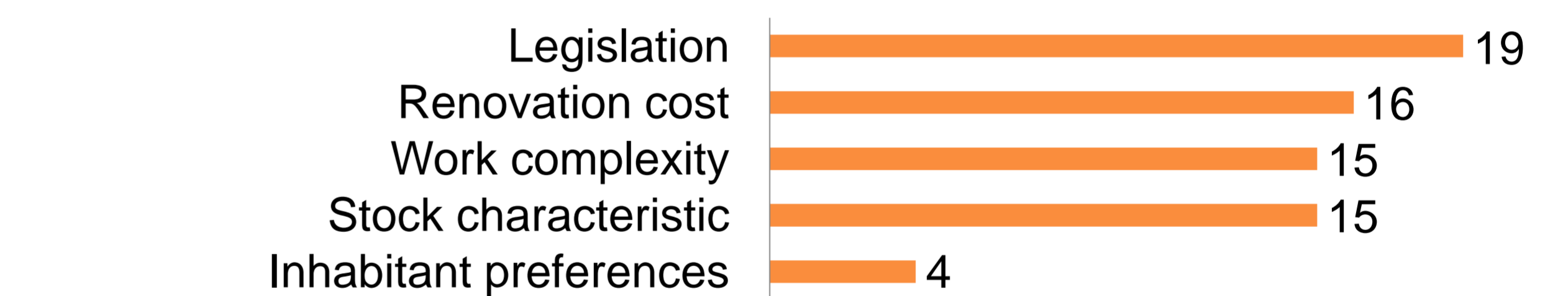
► Fig. 2: Questionnaire model (Ruellan, 2017)

Issues	Environmental benefits: 22
– Increase energy efficiency (1, 2, 3, 4, 5, 6, 9, 10)	
– Estimate consumptions and limit the rebound effect (3, 4, 5, 6, 9, 11)	
– Decrease the environmental impact (5, 6, 9, 10, 11)	
– Adapt to the energy transition (7, 10)	

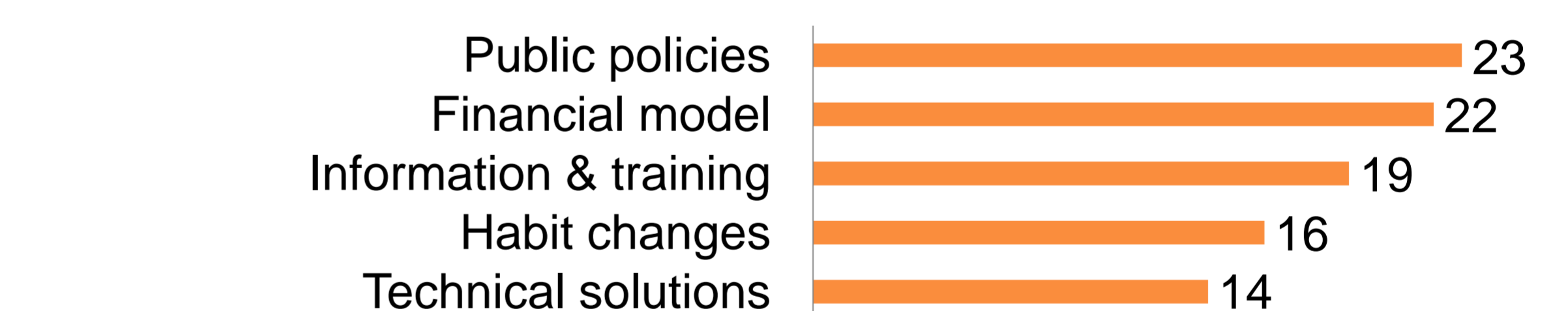
► Fig. 3: Transcription and exploitation example (Ruellan, 2017)



► Fig. 4: Renovation issues (Ruellan, 2017)



► Fig. 5: Renovation barriers (Ruellan, 2017)



► Fig. 6: Renovation strategies (Ruellan, 2017)

### MAIN RESULTS

#### ► ISSUES (FIG. 4)

The different stakeholders logically highlight environmental issues .

It should be noted that the need to maintain buildings is also highlighted. As well as the benefits in terms of comfort and health for the occupant.

On the other hand, the financial benefit of energy renovation is put at the second level.

#### ► BARRIERS (FIG. 5)

The mismatch between regulation and the issues meet the consensus.

The cost and relative complexity of the work are also in line with the literature review.

Finally, the physical and socio-economic characteristics of the Belgian built stock explain both its inefficiency and the difficulty to renovate it.

#### ► STRATEGIES (FIG. 6)

The proposed strategies respond to the barriers discussed hereinabove.

Priority is therefore given to the development of new regulations, incentives and more appropriate financial models.

Occupant information and training of professionals must be intensified. Some common habits have to evolve.

Finally, for specific cases (monitoring, standardization, heritage, ...) there is a need to develop new technical solutions.

### DISCUSSION

The interviews made it possible to highlight certain barriers that are sometimes underestimated:

- The specificities of the Belgian built stock compared to other European countries explain both its inefficiency and the difficulties to rectify it.
- To solve this, it is necessary to have an inclusive view of all the issues.
- User information appears to be the first change factor. In the short term to optimize building management and in the medium term to encourage physical interventions.

### ORIGINALITY

- The diversity of experts, scientific or not, brings an original vision of the residential renovation market in Belgium.
- Interviews give priority to global and contextual approaches.
- Questions on the Belgian context allow to target specific issues and barriers, and thus to study strategies specifically adapted.

### REFERENCES

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### LIMITATION

- Quantitative analysis of ideas favors those that are commonly accepted
- Representativeness of the federal scale, when part of the studies are carried out on a regional scale. Nevertheless a study at the federal level makes it possible to bring back both the similarities and the dissimilarities between the different regions of Belgium.
- The biases inherent in the choice of participants make it difficult to perform statistical analysis.

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