Barriers to & Decision for Energy Efficiency

What do we know so far? A theoretical and empirical overview

Dipl.- Volksw. Stefan M. Buettner
Institute for Energy Efficiency in Production / EEP
University of Stuttgart

Werner Koenig, M.A.
Energy Center for Distributed Energy Systems and Energy Efficiency / REZ
Reutlingen University

prepared for
ECEEE Industrial Efficiency 2018 Conference, Berlin, 11-13 June, 2018
Panel 5 – Business models, finance and
investment in the age of digitalization

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Presentation outline

1   **Background & objective**

2   **Method**

3   **Results**

4   **Discussion and conclusion**

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The Energy-efficiency gap

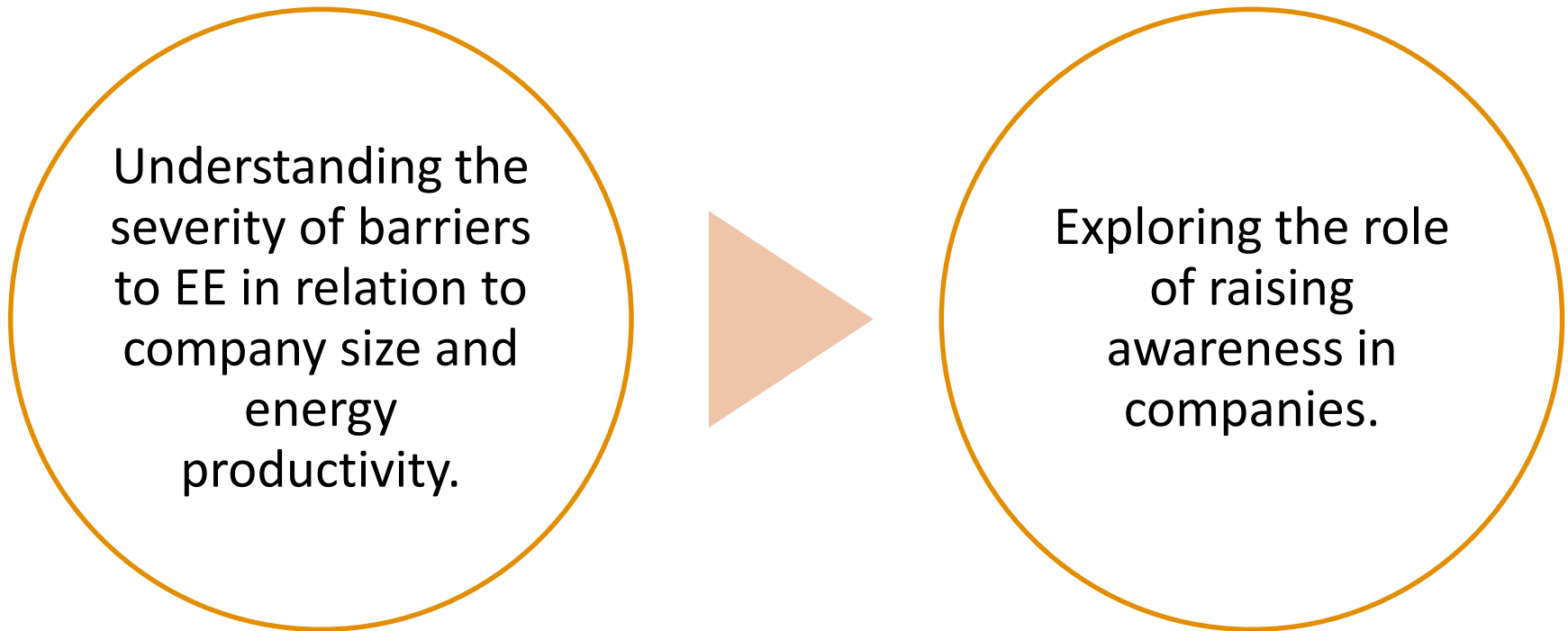Large saving potentials in the industry still remain untouched.

■ **Barrier research**, addresses the implementation of energy efficiency measures in industrial enterprises.

■ For this topic, **empirical evidence** is provided by the:

Energy Efficiency Index of the German Industry (#EEIndex)

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Purpose of the Present Study

A direct comparison between Germany and the Italian region of Lombardy in barriers for Energy Efficiency.

Understanding the severity of barriers to EE in relation to company size and energy productivity.

Exploring the role of raising awareness in companies.

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Method

Theoretical work	Empirical work
An uniform barrier taxonomy	Data collection

- Individual barriers were categorized according:
  - 7 predefined categories. (Cagno et al. 2013)
  - 3 different levels of origin. (Sudhakara R., 2013)

- Quantitative approach
  - The Energy Efficiency Index 2017/1

- Qualitative approach
  - Trianni's study in northern Italy (2016).
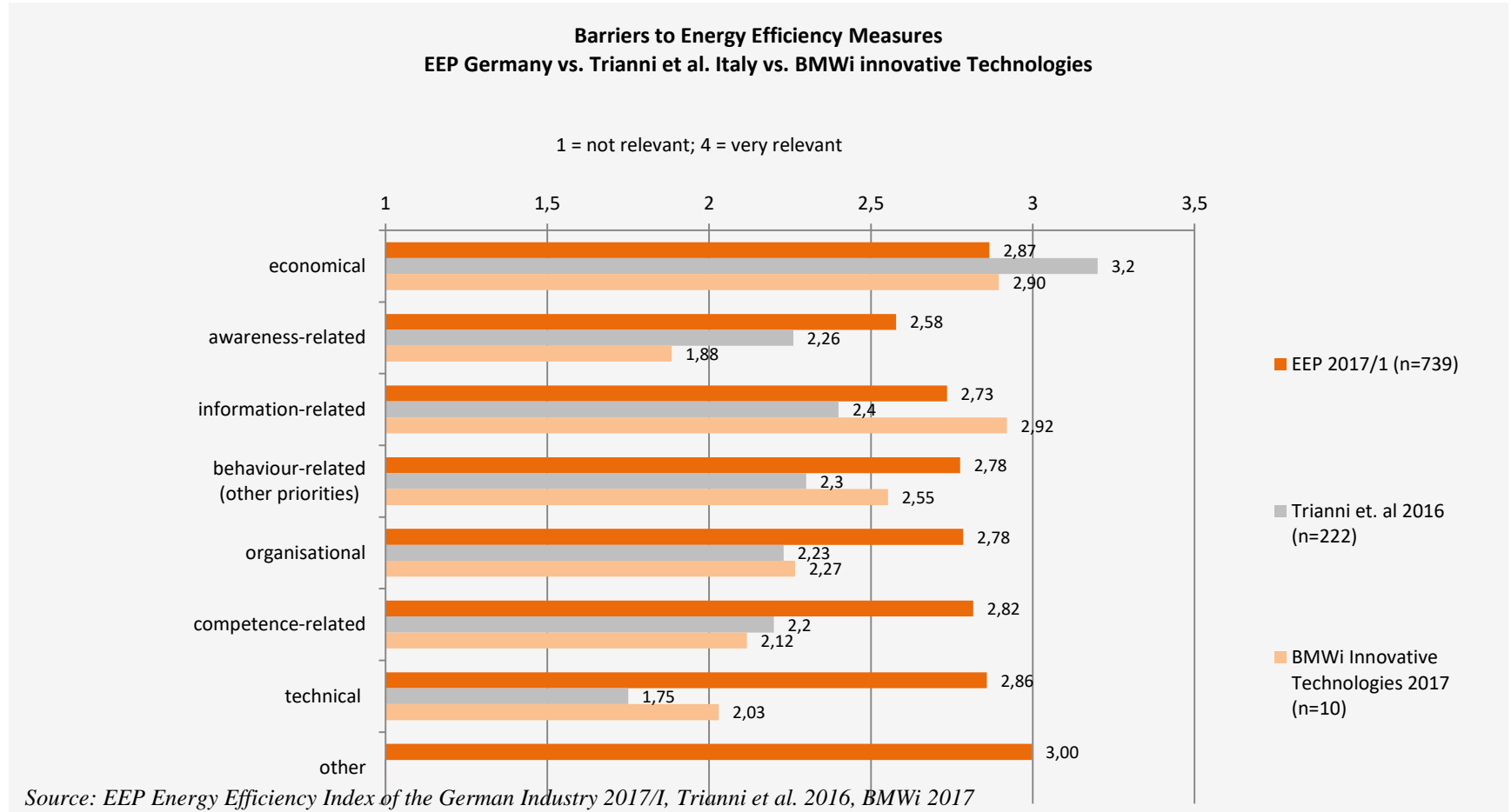 - BMWi study on Innovative Technologies (2017).

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The Italian and German perspectives

Barriers to Energy Efficiency Measures
EEP Germany vs. Trianni et al. Italy vs. BMWi innovative Technologies

1 = not relevant; 4 = very relevant

| | 1 | 1,5 | 2 | 2,5 | 3 | 3,5 |

economical
- 2,87
- 3,2
- 2,90

awareness-related
- 2,58
- 2,26
- 1,88

information-related
- 2,73
- 2,4
- 2,92

behaviour-related (other priorities)
- 2,78
- 2,3
- 2,55

organisational
- 2,78
- 2,23
- 2,27

competence-related
- 2,82
- 2,2
- 2,12

technical
- 2,86
- 1,75
- 2,03

other
- 3,00

Legend:
- ■ EEP 2017/1 (n=739)
- ■ Trianni et. al 2016 (n=222)
- ■ BMWi Innovative Technologies 2017 (n=10)

Source: EEP Energy Efficiency Index of the German Industry 2017/I, Trianni et al. 2016, BMWi 2017
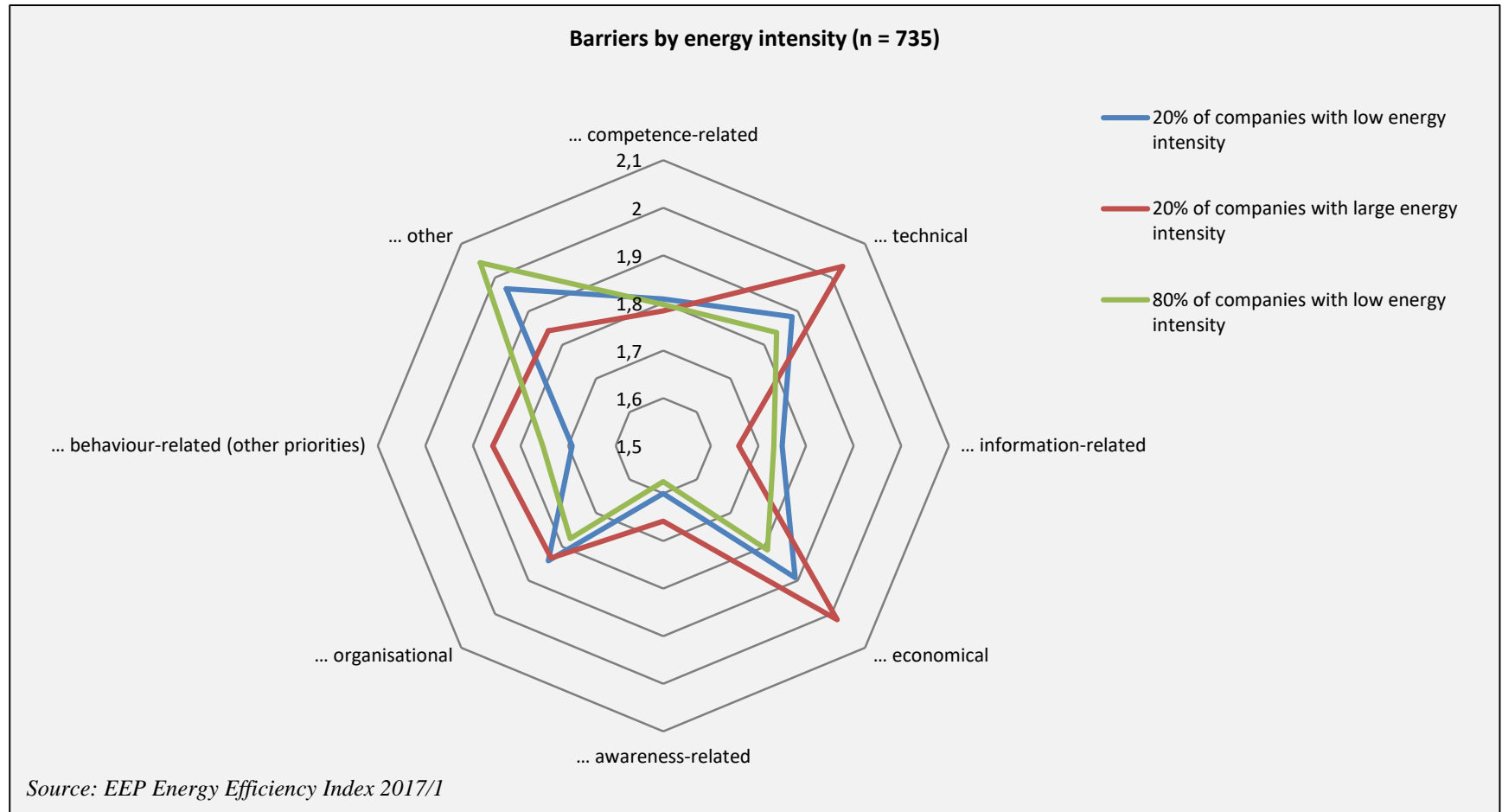
- Economic barries are the most severe in Italy and Germany.
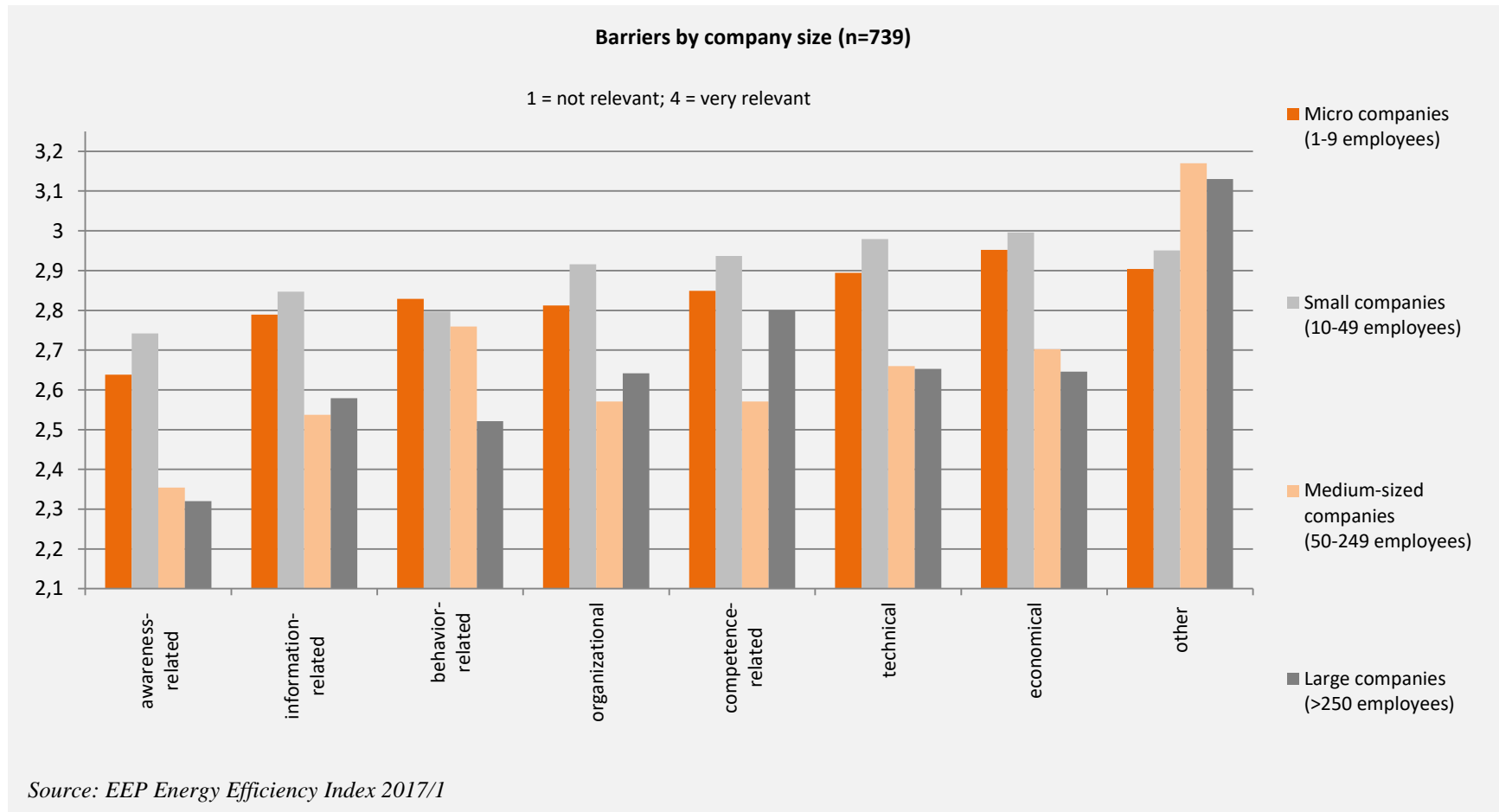- Acquisition of information is a problem for innovative technologies.

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Current technologies, evaluated as severe barrier by energy-intensive companies

Barriers by energy intensity (n = 735)

Categories: … competence-related (2,1 / 2 / 1,9 / 1,8 / 1,7 / 1,6 / 1,5), … technical, … information-related, … economical, … awareness-related, … organisational, … behaviour-related (other priorities), … other

Legend:
- 20% of companies with low energy intensity
- 20% of companies with large energy intensity
- 80% of companies with low energy intensity

Source: EEP Energy Efficiency Index 2017/1

- Low energy-intensive companies see economic and behavioural barriers less severe than more energy-intensive companies.

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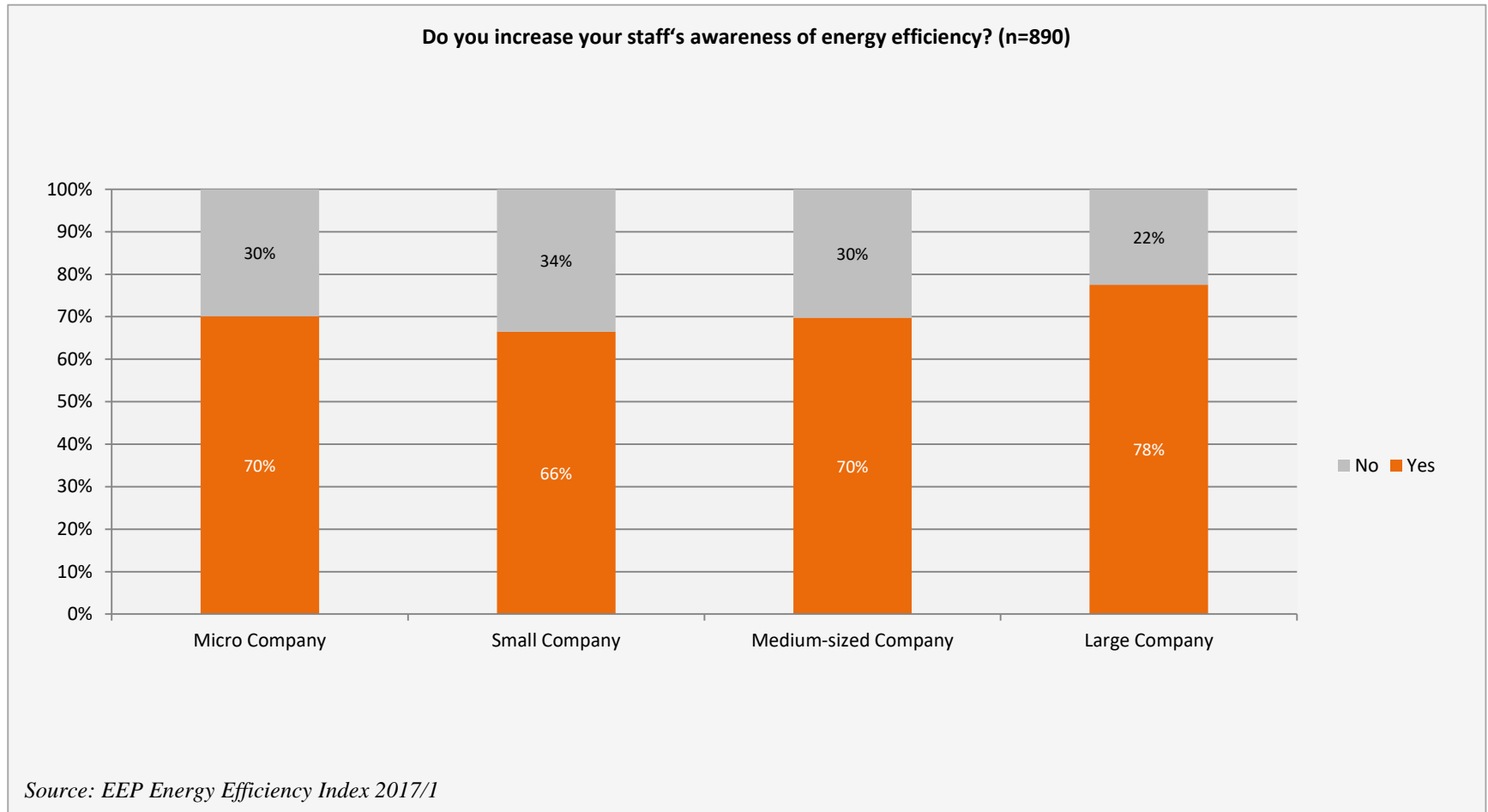Institute for Energy Efficiency
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Barriers, perceived more severe by micro and small companies.

Barriers by company size (n=739)

1 = not relevant; 4 = very relevant

Legend:
- Micro companies (1-9 employees)
- Small companies (10-49 employees)
- Medium-sized companies (50-249 employees)
- Large companies (>250 employees)

Categories: awareness-related, information-related, behavior-related, organizational, competence-related, technical, economical, other

Source: EEP Energy Efficiency Index 2017/1

- Large companies rate competence-related barriers relative severe.
- Awareness raising presents the most deviating results.

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Raising awareness - a relevant issue

Do you increase your staff's awareness of energy efficiency? (n=890)

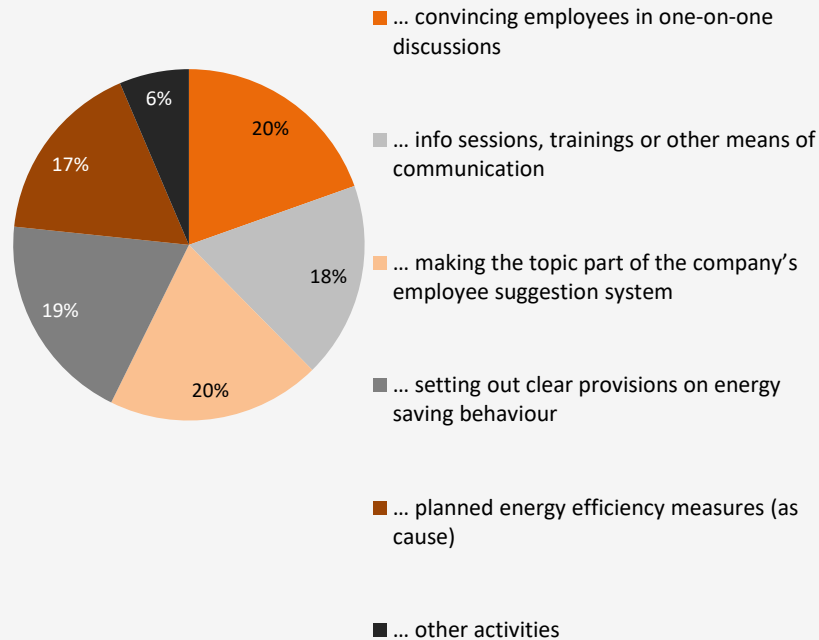|	Micro Company	Small Company	Medium-sized Company	Large Company
No	30%	34%	30%	22%
Yes	70%	66%	70%	78%

Source: EEP Energy Efficiency Index 2017/1

- Differences in the share of companies raising staff awareness are much smaller across different company sizes than between sectors.

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Staff awareness - what do companies do so far?

Do you increase your staff's awareness of energy efficiency?
Yes, by.. (Multiple choice) (n=632, n'=2510)

- 20% … convincing employees in one-on-one discussions
- 18% … info sessions, trainings or other means of communication
- 20% … making the topic part of the company's employee suggestion system
- 19% … setting out clear provisions on energy saving behaviour
- 17% … planned energy efficiency measures (as cause)
- 6% … other activities

Source: EEP Energy Efficiency Index 2017/1

Do you increase your staff's awareness of energy efficiency?
No, because … (Multiple choice) (n=185, n'=267)

- 56% … the steps to be taken are not clear
- 21% … this is not of interest
- 23% … of other reasons
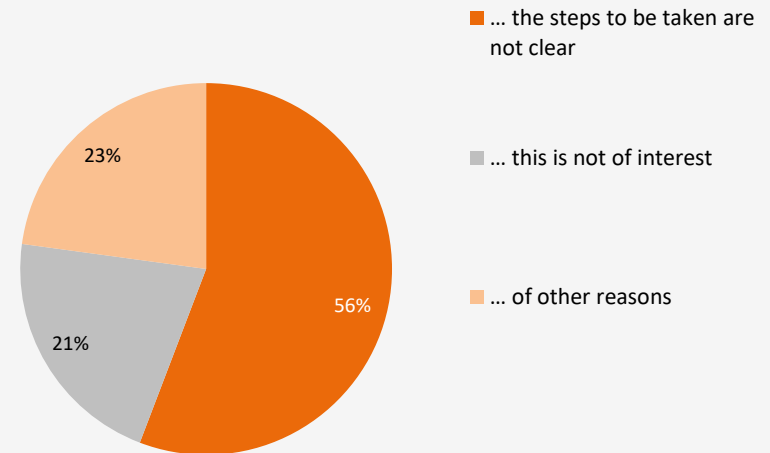
Source: EEP Energy Efficiency Index 2017/1

- ■ 25% of micro companies make their staff aware mainly through other activities.
- ■ Most of the companies do not increase their staff awareness due to the lack of knowledge.

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Raising awareness in SMEs, pays off!

Checklist ✓

Distribution of attention and awareness.

Sensitization for the internal legitimation of energy efficiency measures.

Raising awareness for changing practices and behaviour.

Raising awareness for technical and energy-related information.

Sensitization for the existence and use of internal information and establishment of self-initiative.

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Barrier research

Enhancing its approach

- Applying **same taxonomy** and empirical method is advantageous.

- A taxonomy equipped with **specific sub-categories** would enable a more detailed understanding of individual barriers.

- Barrier research can be extended by **drivers** which support EEM.

- A **combination of quantitative and qualitative survey** could make the results more concrete.

- As **barriers perceived by SMEs are consistently higher**, efforts to trigger decisions for energy efficiency should be strengthened.

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Underlying research

Further steps

How do SMEs decide about energy efficiency and what drives these decisions?

How do the determinants for energy efficiency vary across different countries?

"Decision for Energy Efficiency in Manufacturing SMEs in Baden Wuerttemberg" (2018)

https://www.reutlingen-university.de/fileadmin/user_upload/REZ_-_EntschEff.pdf

https://www.eep.uni-stuttgart.de/forschung/projekte

The Energy Efficiency Barometer of Industry (#EEBarometer)

https://www.eep.uni-stuttgart.de/eei/

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Thank you!

Any Questions?

Dipl.-Volkswirt
Stefan M. Buettner

Head of International Affairs & Strategy
Institute for Energy Efficiency in Production
Nobelstraße 12 │ 70569 Stuttgart | Germany
Tel. +49 711 970-1156

stefan.buettner@ipa.fraunhofer.de
stefan.buettner@eep.uni-stuttgart.de

www.ipa.fraunhofer.de
www.eep.uni-stuttgart.de

Werner König, M.A.

Research associate
REZ Reutlinger Energiezentrum für Dezentrale
Energiesysteme und Energieeffizienz
Alteburgstrasse 150 │ 72762 Reutlingen | Germany
Tel. +49 7121 271-7136

Werner.Koenig@Reutlingen-University.de

www.reutlingen-university.de/forschung/lehr-und-
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