Building basic competences for culturally diverse ICT professionals

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Outline

- Introduction
- Culture and educational practices
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Introduction

- Building basic competences and selecting appropriate teaching methods for international heterogeneous groups in HE is challenging.
- This paper describes cognitive and educational background differences in multinational study groups, and
- explores ways to overcome them by offering online programming courses as support to classroom teaching.

Culture and cognitive practices

- Western science is an extreme way of perceiving the world ("WEIRD" people [1])
- Western culture deviates in individuality, decision-making, perception, analytical thinking and spatial reasoning from most other cultures
- Example Africa:
  - collective responsibility, education based on rote learning, oral vs. written knowledge
  - no computers in schools
  - textbook contents based on life in industrialized countries
  - lack of qualified teachers

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1) Henrich,J., Heine, S.J. & Norenzayan, A. (2010).

Research setup: methods

- Aim: to see how wide the differences actually are in our current international student population
- Google forms survey
- 34 questions (multiple choice and open)
- Answering the survey was an optional task in a study module
- Two experiments with online programming practice: one for beginners and one for second-year students

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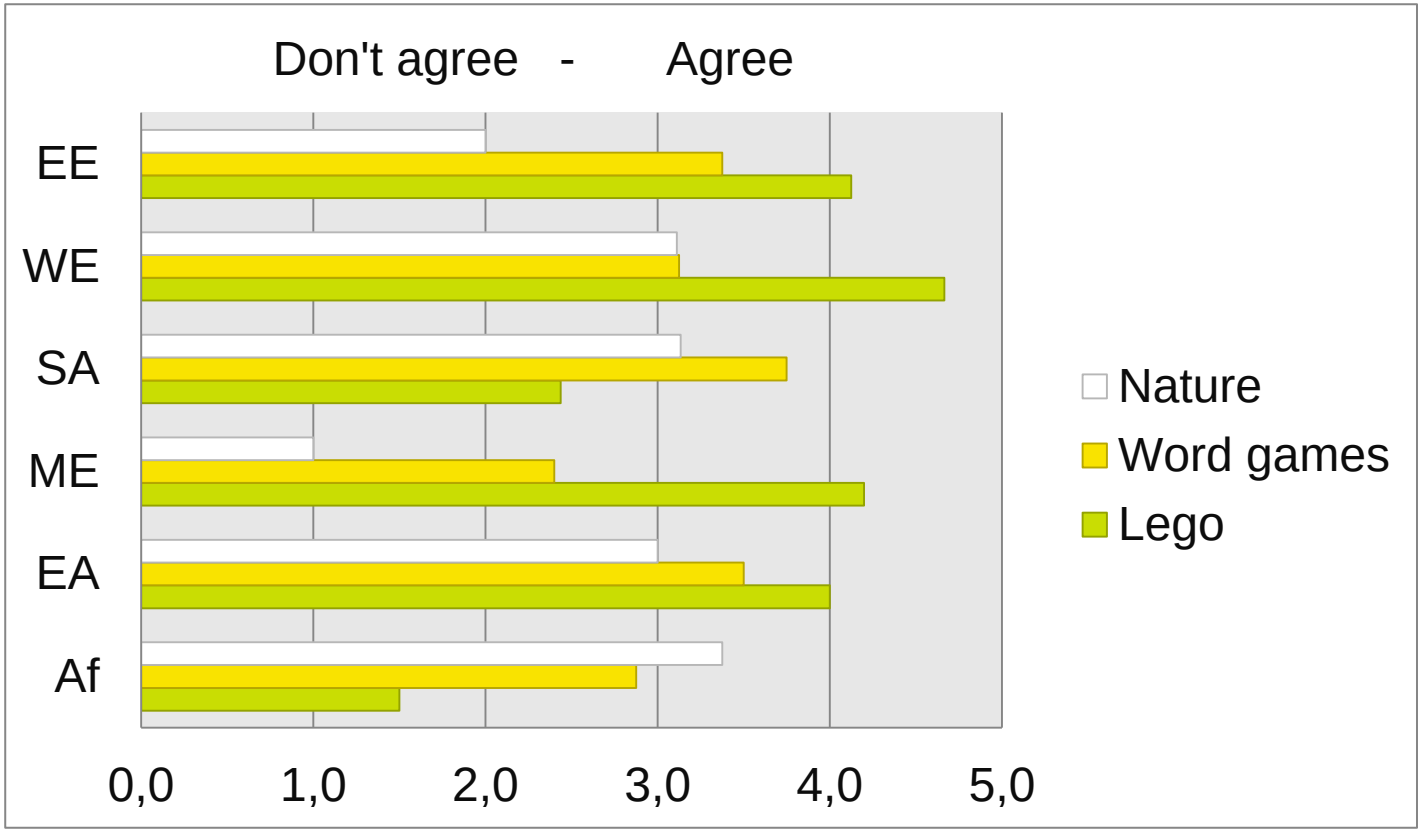
Study population

- 56 first-year ICT and media engineering students at Helsinki Metropolia University of Applied Sciences
- ages 18 – 34 years, average 23 years.
- 9 of the respondents were women
- Regions:
  - 8 from Africa (Af),
  - 9 from Eastern Europe (EE),
  - 9 from Western Europe (WE),
  - 15 from South Asia (mainly Nepal, SA),
  - 10 from East Asia (Vietnam, China, EA), and
  - 5 from Middle Eastern (ME) countries.
- They reported being fluent in 26 languages.

Childhood hobbies by nationality



Nature: “I enjoy learning the names of birds, trees, animals and plants”
Word games: "I enjoy word games"
Lego: "As a child I played with Lego blocks"

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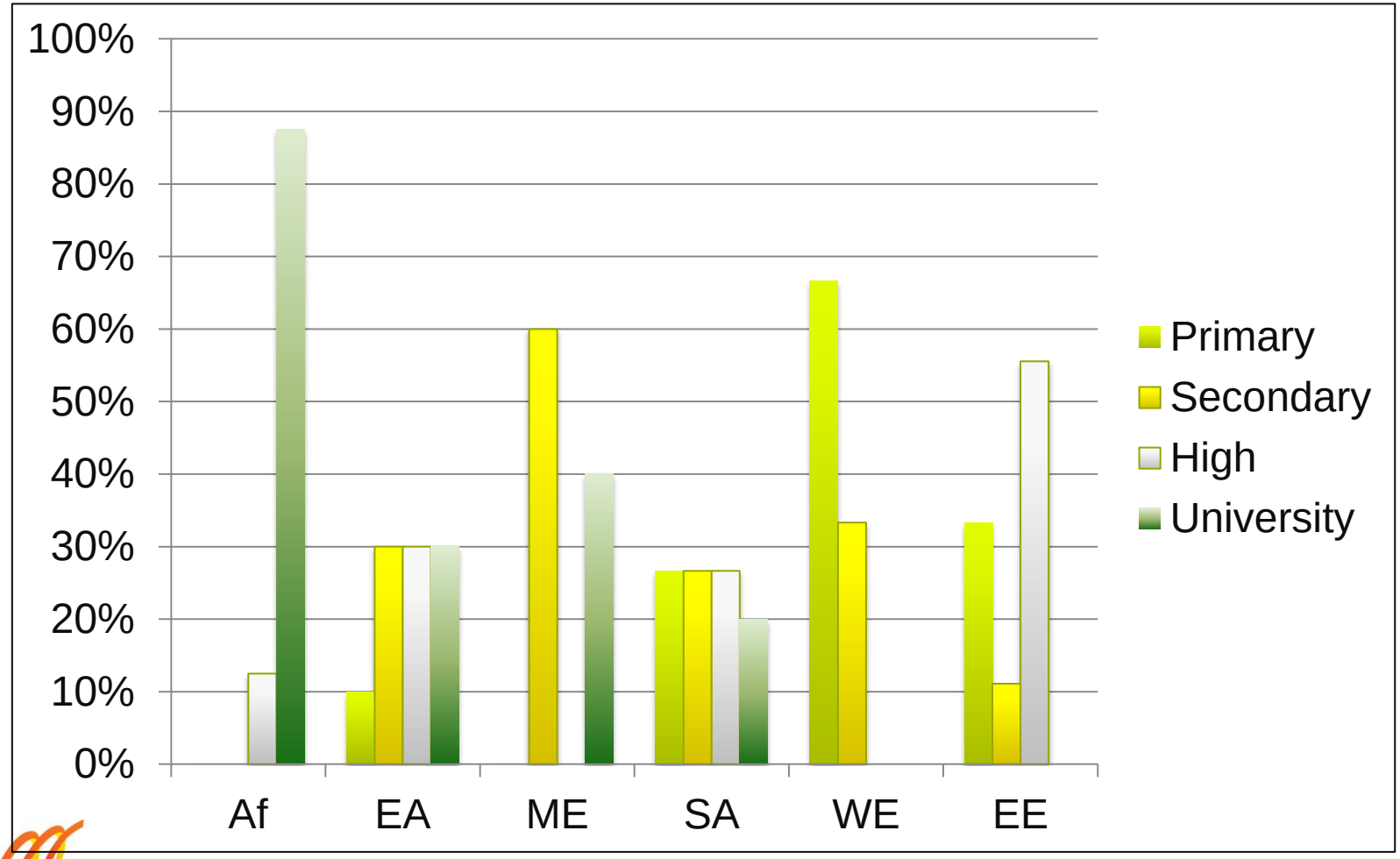
Use of computers in school



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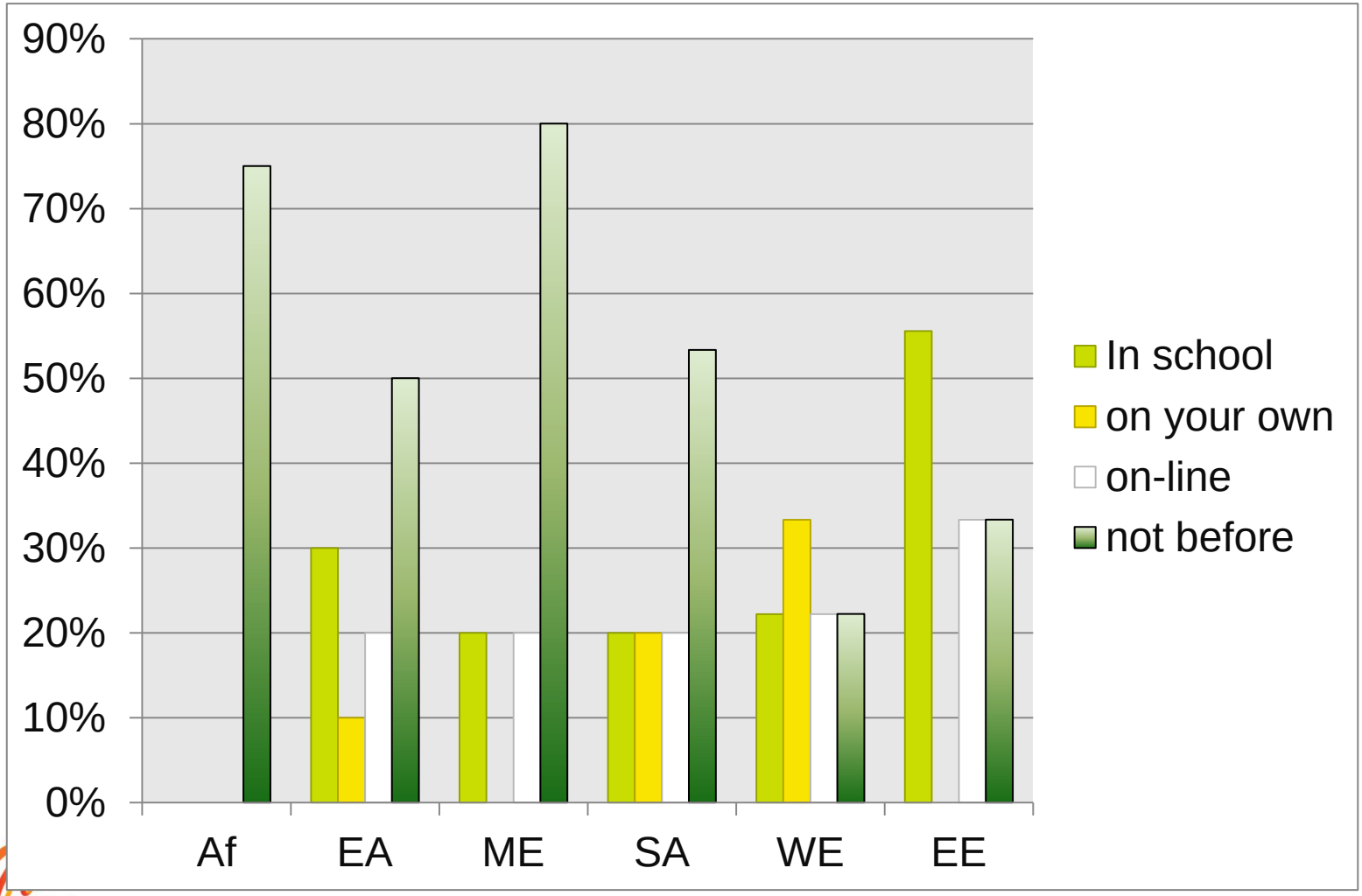
Previous programming study



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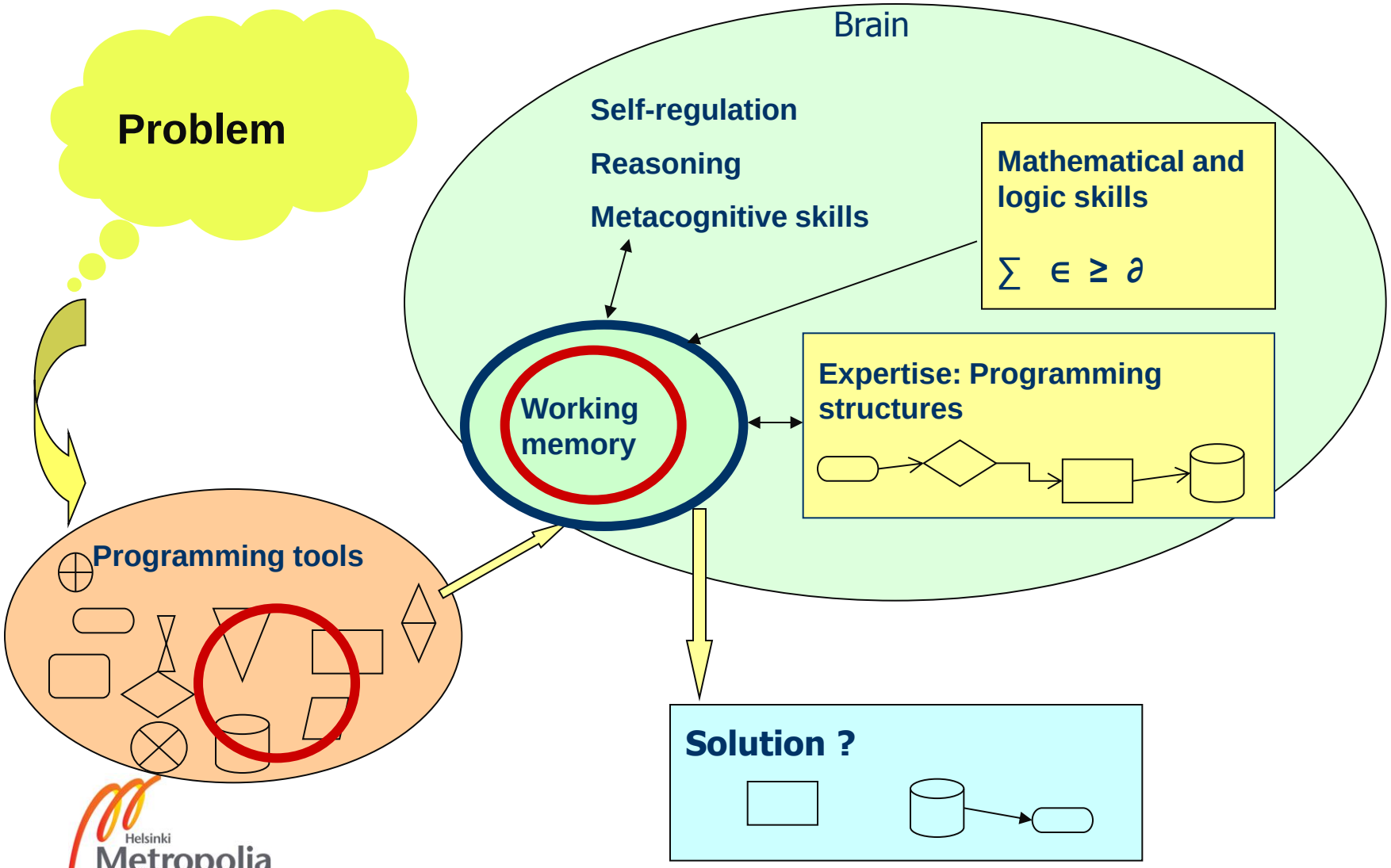
Programming problems in IT students

- Previous research (2010)
- Many students dislike programming, want to avoid it; and find it hard to learn
- They get stuck with the complexities of languages such as C or Java

Novice programmer



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Scratch experiment

- One assignment with the online version of MIT's Scratch, at http://scratch.mit.edu/.
- Scratch is a tool that has been developed for children and it teaches programming structures in an entertaining visual way
- When student perceptions of Scratch were inquired, they were almost exclusively positive.
- However, approximately 10% failed to grasp the idea and develop anything functional
- Scratch was an appropriate tool for beginners also on this level of study, and for a diverse group of students

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Student comments on Scratch

- I think it is an easy way to start exploring the power of programming, and prototype. Maybe, just have some fun.
- It was quite fun. New way of learning programming. :-)
- I've never used Scratch before and I think this program is perfect for those who just doing their first steps in programming. It is clear, funny and easy, I wish I could study it at school.
- The use of Scratch in Introduction to computing class brings me a lot of fun. First of all, I feel relax after other classes. Second, it is easier to remember the lesson comparing with theoretical computing course i have had before in my home country.
- I think it is useful but I am not being able to use it
- It feels too simplistic to me and and the graphical approach seems to limit productivity.

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Javascript with Ville-system experiment

- Ville environment by University of Turku, at http://ville.utu.fi
- Tasks can be edited and created by instructors
- A repository of existing tasks to choose from
- Visual, intuitive interface; no guidance needed
- Collecting points (max 570) creates game-like challenge
- 70 students completed the required practice that included 60 tasks and took 8 to 20 hours to complete.
- 15 students failed to reach required 320 points.

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Conclusions

- Higher education has to take into account previous working models and practices
- Current online programming courses are suitable even on university level
  - good quality
  - large amount of tasks; little teacher intervention needed
  - allow individual pace and repetition
  - drilling can become boring, but then it is not needed anymore!

Sources

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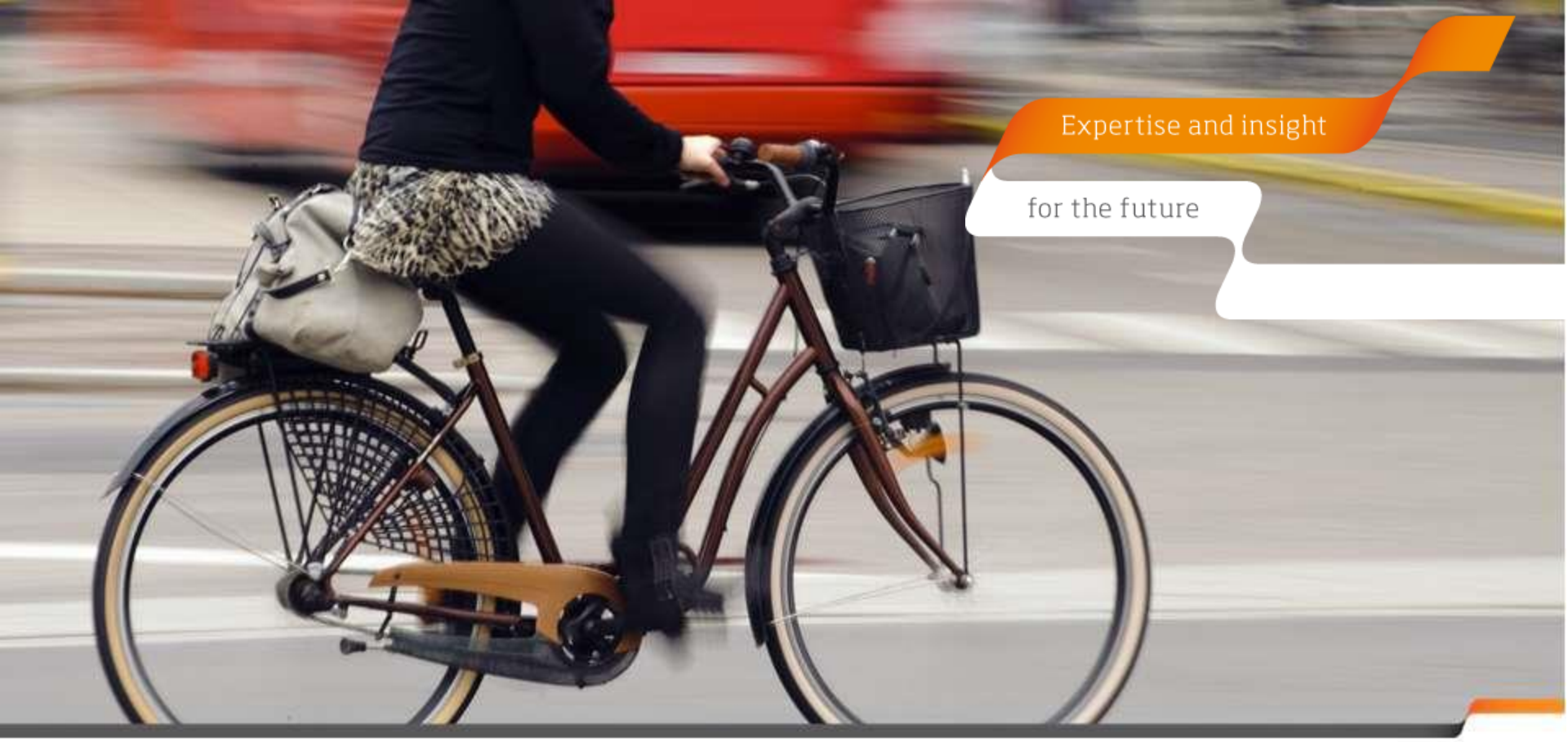

Thank you!

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