

Project ENSURE

Cooperation between TUC & UK

Martina Heiermann (TUC), Dirk Kluge (TUC),
Fabian Fritsch (UK)

Structure

- ENSURE: general information and goals
- UK: uncertainties due to human factors
- TUC: uncertainties in (and caused by) technical factors
- Group work and discussion
- What's coming next?

ENSURE: Fabian Fritsch



- M. Sc. Industrial and Organizational Psychology
- B. Sc. in Psychology & Health Psychology
- Occupational Safety Specialist

ENSURE: Martina Heiermann



- Degree in Geophysics
- 20+ years experience in oil & gas industry
- PhD student: Visualization of uncertainties (TRANSENS)

ENSURE: Dirk Kluge



- MSc in computer science
- Supports TRANSENS and ENSURE projects

ENSURE: General Information

- Short: „Endlagersicherheit: Ungewissheiten und Regulatorische Aspekte“ („Repository Safety: Regulatory Aspects of Uncertainty and Robustness“)
- We consider human factors and scientific / technical factors
- Human factors → University of Kassel
- Scientific / technological factors → Clausthal University of Technology

ENSURE: Goals

- Analysis of possible influences of psychological aspects on the assessment process
- Making assessment processes more robust
- Derive holistic approaches and methodologies for the consideration of human factor uncertainties
- Literature review: Uncertainty management in national and international regulations and recommendations
- Development of guidelines for uncertainty management
- Use case: Uncertainty management during site comparison

Uncertainties due to Human Factors

- Psychological, cognitive and social influencing factors in socio-technical systems and man-machine systems, e.g.:
 - Groupthink
 - Conflict of objectives
 - Various heuristics and cognitive biases
 - Remember the article (provided by Fabian in March via Mattermost)

Uncertainties due to Human Factors

- What's the way forward...?)
- Self-assessment questionnaire to measure human reliability
- Aims to increase confidence in one's own work
- Provide recommendations to increase human reliability
- Bilateral meetings for the improvement of usability (30 minutes)

Uncertainties due to Technical Factors

- Parameter uncertainties
 - Parameter variability
 - Unknown parameters
- Scenario uncertainties
 - Probabilities
 - Completeness
- Model uncertainties
 - Simplification
 - Implementation

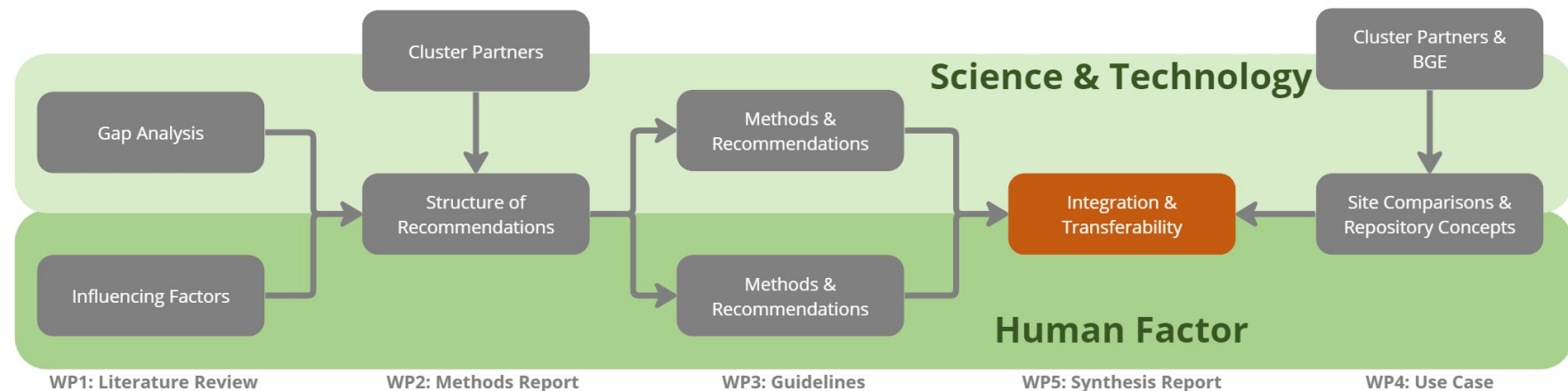
Uncertainties due to Technical Factors

- Collection of uncertainties encountered by cluster partners
- Template: Homework for you and your team 😊

Nummer:	1	Name:	Name
1-Satz-Beschreibung:	<i>Eine sehr kurze Beschreibung einer Ungewissheit</i>		
Änderungshistorie			
Datum	<i>Art der Änderung (inkl. ggf. Überführung in anderen Datensatz)</i>		
...	...		
Quellen:			
Literatur-Referenz	Name / Bezeichnung		
...	...		
Ausführliche Beschreibung / Bemerkungen:			
<i>Hier steht eine längere Beschreibung (bei Bedarf)</i>			

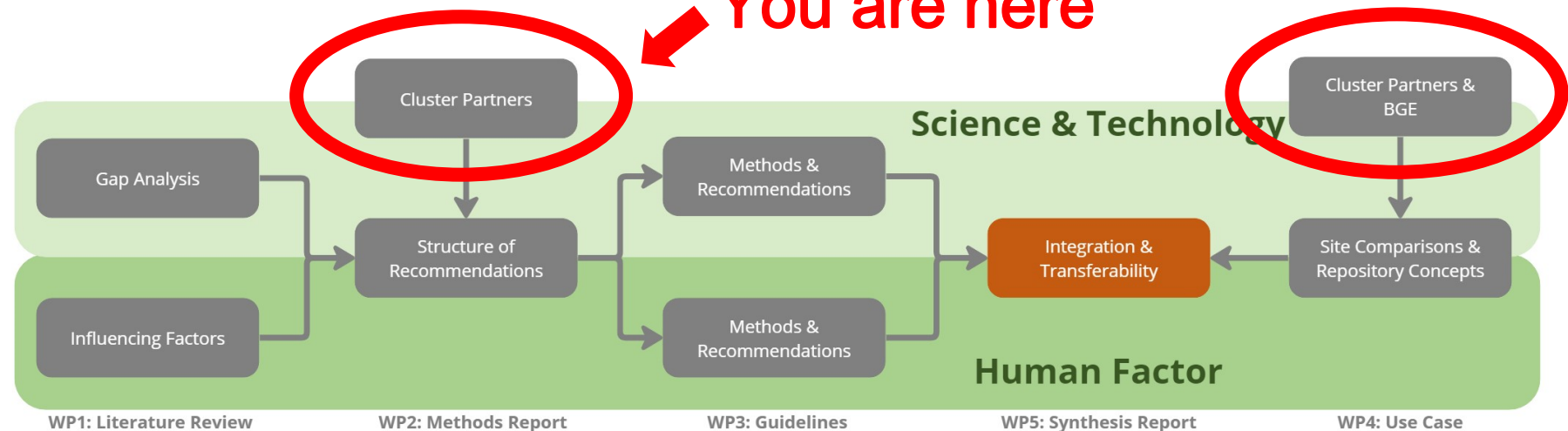
Index:	1	Name:	Name
Short description:	<i>A very short description of the uncertainty (max. 1 sentence)</i>		
Review <u>history</u>			
Date	<i>Type of change (e.g. merged with other data set)</i>		
...	...		
Sources:			
Reference source	Name		
...	...		
<u>Comprehensive description / remarks:</u>			
<i>Add a longer description here if required</i>			

ENSURE Structure



ENSURE Structure

You are here



Group Work and Discussion

- 2 groups: Please count through to 2!
 - Everybody with a “1” please stick to Fabian
 - Everybody with a “2” please stick to Dirk
- You will get further information in your break-out group

What's coming next?

- Participate in a meeting regarding the questionnaire (not everyone)
- Complete the uncertainty-template(s) for “your” uncertainties

Thank you for your Input!

BACK-UP FOLIEN

Human Factors - example

- **Groupthink** in individual research teams (e.g. ENSURE)
- The desire for conformity and agreement takes primacy over critical thinking and correct evaluation.
- Alternative actions are not (realistically) evaluated
- 3 out of 4 persons in the group are of the opinion that an insufficient measurement result x has no influence on a safety-relevant statement (e.g. final storage container fulfils all product requirements). The 4th person adjusts his/her opinion to the group in order to maintain consistency in the group.

Human Factors - example

- **Conflict of Objectives**
- Several decision alternatives are available and suitable, but only one can be chosen (e.g. assessment procedure A or B, method A,B,C,..)
- High knowledge of assessment procedure A or good experience with assessment procedure A leads to the use of this procedure, although other procedures may be more suitable.
- People often do the things they are used to doing.

Human factors influencing modelling

- Human beings are information processors
- Not all information can be consciously processed (bounded rationality)
- → leads to the use of heuristics
- = simple problem-solving mechanisms or mental shortcuts



<https://www.deutschlandfunk.de/regierungschef-mitsotakis-zugunglueck-auf-menschliches-fehlverhalten-zurueckzufuehren-102.html>

<https://www.manager-magazin.de/unternehmen/international/germanwings-absturz-wichtigste-reaktionen-im-ueberblick-a-1025451.html>

Speakers: Martina Heiermann, Dirk Kluge, Fabian Fritsch

Project ENSURE

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Human factors influencing modelling

- Cost less time and mental effort
- Can lead to distortions of judgement in decision-making situations → wrong decisions or assessments
- Heuristics are just only one example

- Article → mattermost?