Tampere University

Työsuojelurahasto
Arbetarskyddsfonden
The Finnish Work Environment Fund

Designing a Maturity Model for Analyzing Safety culture

Sari Tappura, Aki Jääskeläinen, Julius Pirhonen

Management and Business

Tampere University

Finland

Background

- Safety culture (climate) has been a hot topic in safety research for 40 years
- Studies show there is a strong link between safety culture and safety performance in many industries, for example
  - Nuclear (Lee 1998)
  - Chemical (Carder & Ragan 2003, Vinodkumar and Bhasi 2009)
  - Construction (Molenaar et al. 2009)
  - Mining (Stemn et al. 2019)
- However, safety culture is widely regarded as hard to measure
  - Maturity analysis is one of the most established ways to measure safety culture
  - There are plenty of maturity models for safety culture evaluation
  - Most of these models lack reliability and validity

Objectives

This study is a part of SafePotential (SAF€RA) project focusing on to create models and develop practices for materializing the potential of safety performance measurement.

We developed **SafePotential Toolbox** for measuring safety performance:

https://projects.tuni.fi/safepotential

The aim of this sub-study was to design a new maturity model for analysing safety culture

- ➥ There is a need for a model that synthesizes the previous models that have been tested for validity or reliability
- ➥ A transparent, objective and well validated model could decrease the need of third parties when evaluating the state of safety culture

Material and methods

- This study utilizes a design science approach in which the intention is to both develop scientific knowledge and solve practical problems
- This study follows the first three phases in developing a maturity model (De Bruin et al. 2005)

- This study is mostly based on literature review and analysis
- A literature review by Goncalves Filho and Waterson (2018) was used as a starting point

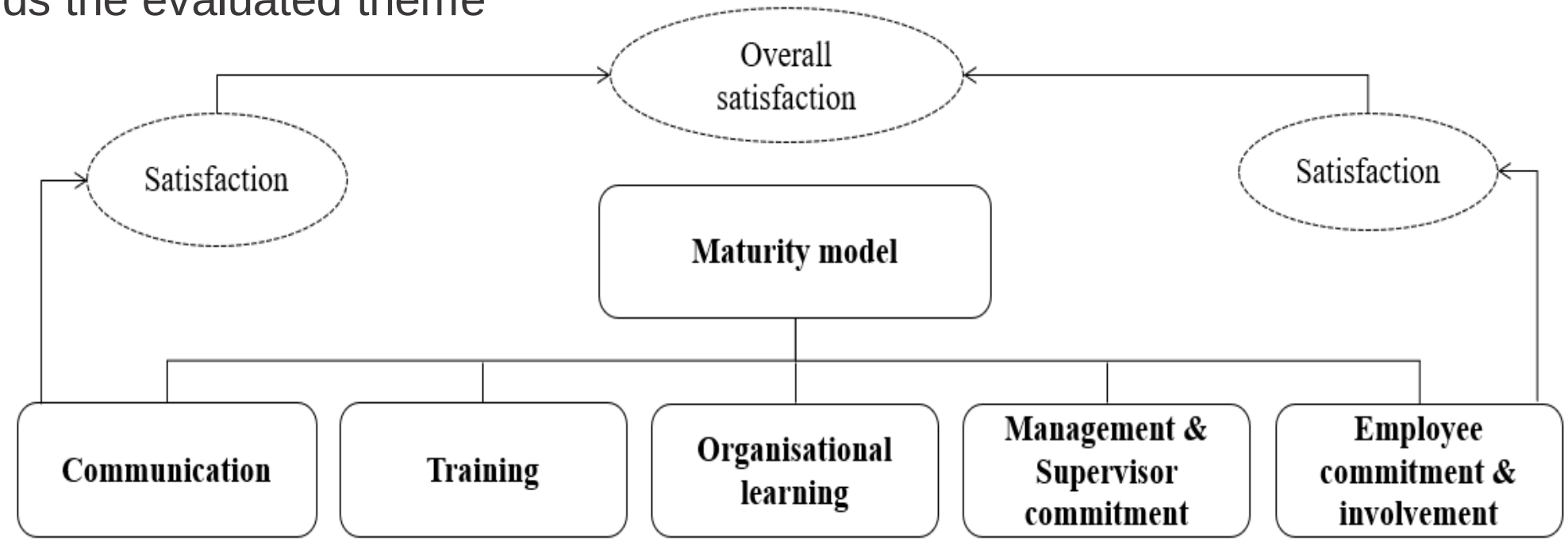
Material and methods

Development of new maturity model consisted of four steps:

1. 14 safety culture maturity models which had been assessed for validity or reliability were analyzed and compared
2. Most important themes regarding safety culture were formed
3. Most important evaluation criterion were picked for each theme
4. Maturity levels were established for each evaluation criterion, mostly adjusted from the literature

Maturity model framework

- The model framework was divided into five main themes: Communication, Training, Organisational learning, Management commitment and Employee commitment & involvement
- Each of these themes is also evaluated in terms of a respondent's satisfaction towards the evaluated theme



Evaluation instrument

The evaluation of the items in the model is carried out with four-step maturity levels representing the sophistication level in each item

Example item	Management's attitudes towards safety
Level 1	Managers consider safety as an employee responsibility. Lip service is paid by management to the importance of safety commitment.
Level 2	Managers are interested in participating in safety-related issues only when accidents occur.
Level 3	The majority of managers are interested in participating in safety-related issues.
Level 4	Managers clearly think safety is an important part of general management.

Written evaluation criteria and four maturity levels were chosen to be in-line with the previous maturity model and to achieve following benefits:

1) Written maturity levels provide clearer and more objective alternatives for the respondents in comparison to Likert scales
2) Presentation of written maturity levels raises awareness of best practices, generates discussion and facilitates the identification of development areas already during the completion of the survey
3) Written maturity levels decreases the need to use external consultants and knowledge on practices outside the own organization in the evaluation

Discussion

- The literature provides many models for safety culture measurement but too little evidence of the models' validity and reliability.
- The developed model responds to this challenge by synthesizing the previous models that have been tested for validity or reliability.
- **Researchers** may use the model in large-scale survey research (e.g., in identifying links between safety culture and the level of safety)
- **Practitioners** may utilize it as a checklist, or in auditing performance management practices, for example, through group interviews or workshops
  - Based on the results, improvement means can be generated and prioritized in order to reach higher maturity levels

Thank you!

Contact info: *sari.tappura@tuni.fi*