Sharing is Caring - Even Digitally

Shared Mental Models in Virtual Teams

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Shared Mental Models (SMM)

- SMM = similar knowledge structures about relevant working aspects holding by team members (Cannon-Bowers, Salas, & Converse, 1993)

Framework of Shared Mental Models
(cf. Mohammed, Ferzandi, & Hamilton, 2010)

- Communication process about individual mental models
- Shared Mental Models
  - Teamwork-SMM
  - Taskwork-SMM
- Team Coordination & Performance

- Sample: mainly face-to-face teams → today mainly hybrid teams (ICT-use)

- Is there a difference between face-to-face and virtual teams regarding SMM?
- Which SMM-subtypes are relevant in VT?
Virtual Teams (VT)

- … use Information and Communication Technology (ICT) for collaboration (Breuer, Hüffmeier, & Hertel, 2016)
- … have to coordinate and consider more working aspects than face-to-face teams (e.g. ICT-use) (cf. Klitmøller & Lauring, 2013; Müller & Antoni, 2019)

Challenges of VT
- Differences in ICT-use
- Redundant ICT-documentation
- Ineffective ICT-communication

Effective communication via ICTs (Kock, 2004) =
ICT-SMM

- ICT-SMM: similar mental models about ICT-use (Müller & Antoni, 2019)

- Similar knowledge about ICT-functions and –usefulness increases teamwork quality (Thomas & Bostrom, 2007)

- Similar evaluations of ICT-richness increase knowledge transfer between communication partners (Hasty, Massey, & Brown, 2006)

- Different ideas of ICT-use (e.g. how an E-Mail should be written) leads to ineffective communication, misunderstandings and frustration (Klitmøller & Lauring, 2013)
Hypotheses

1. In VT, ICT-SMM are a distinct subtype of SMM next to teamwork- and taskwork-SMM.

2. ICT-SMM are positively associated with
   a. team coordination.
   b. team performance.

3. ICT-SMM are positively associated with
   a. team coordination beyond teamwork- and taskwork-SMM.
   b. team performance beyond teamwork- and taskwork-SMM.
**Method**

- Online-survey in two IT-organizations
- N = 141 employees in 31 teams
- Analysis on multilevel / HLM
- Instruments: self-report questionnaires

<table>
<thead>
<tr>
<th>Teamwork-SMM</th>
<th>“I know other team member’s talents and skills.” (Ellwart et al., 2014)</th>
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</thead>
<tbody>
<tr>
<td>Taskwork-SMM</td>
<td>“I know our team goals and know where we stand in achieving them.” (Ellwart et al., 2014)</td>
</tr>
<tr>
<td>ICT-SMM</td>
<td>“In our team, we agree which digital media are used for which purpose (e.g. e-mail, chat, telephone).”</td>
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<tr>
<td>Team Coordination (ICC₁ = .25)</td>
<td>“We accomplish the task smoothly and efficiently.” (Lewis, 2003)</td>
</tr>
<tr>
<td>Team Performance (ICC₁ = .27)</td>
<td>“The team achieves its goals to the full extent.” (Kearney, 2013)</td>
</tr>
</tbody>
</table>
Hypothesis 1: CFAs

\[ \chi^2 \text{ diff } = 77.031^{***} \]

\[ \chi^2 \text{ diff } = 18.464^{***} \]

\[ \chi^2 \text{ diff } = 22.941^{***} \]
Hypothesis 2: Linear Regressions

ICT-SMM are positively associated with team coordination and team performance

Nullmodel: Variance explanation by team membership for
Team Coordination: 22.1%
Team Performance: 26.5%

\[ \beta = 0.420^{***} \]

\[ \beta = 0.244^{**} \]
Hypothesis 3a: HLM

ICT-SMM are positively associated with team coordination beyond teamwork- and taskwork-SMM.

Hierarchical regression analysis.

<table>
<thead>
<tr>
<th></th>
<th>Model I</th>
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<th>Model II</th>
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<tbody>
<tr>
<td><strong>F</strong></td>
<td>5.19***</td>
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<td>5.18***</td>
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<tr>
<td><strong>R²</strong></td>
<td>.41 [0.30, 0.52]</td>
<td></td>
<td>.47 [0.36, 0.58]</td>
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<tr>
<td><strong>Variable</strong></td>
<td><strong>b</strong></td>
<td><strong>SE</strong></td>
<td><strong>β</strong></td>
<td><strong>b</strong></td>
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<tr>
<td><strong>Step 1</strong></td>
<td></td>
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</tr>
<tr>
<td>Teamwork-SMM</td>
<td>.14</td>
<td>.10</td>
<td>.124</td>
<td>.12</td>
</tr>
<tr>
<td>Taskwork-SMM</td>
<td>.60</td>
<td>.09</td>
<td>.660***</td>
<td>.55</td>
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<tr>
<td><strong>Step 2</strong></td>
<td></td>
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<tr>
<td>ICT-SMM</td>
<td>.25</td>
<td>.06</td>
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</tbody>
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Note. N = 141 in 31 teams. ***p < .001, **p < .01, *p < .05, †p < .10.
Hypothesis 3b: HLM

ICT-SMM are positively associated with team performance beyond teamwork- and taskwork-SMM.

Hierarchical regression analysis.

<table>
<thead>
<tr>
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<tr>
<td>Teamwork-SMM</td>
<td>.23</td>
<td>.09</td>
<td>.202*</td>
<td>.22</td>
<td>.09</td>
<td>.197*</td>
</tr>
<tr>
<td>Taskwork-SMM</td>
<td>.39</td>
<td>.08</td>
<td>.432***</td>
<td>.37</td>
<td>.08</td>
<td>.406***</td>
</tr>
<tr>
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<td>.141*</td>
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Note. N = 141 in 31 teams. ***p < .001, **p < .01, *p < .05, †p < .10.
**Discussion**

- ICT-SMM seem to be another subtype of SMM in VT
- ICT-SMM seem to have an incremental value for team coordination and performance beyond teamwork- and taskwork-SMM
- Organizations should promote ICT-SMM among their team members

**Limitations**
- Low reliability of measurement → Scale development of ICT-SMM
- Cross-sectional data → Validate these results in another sample using a longitudinal design

**Future Research**
- For which teams are ICT-SMM relevant (% of ICT-use)?
- Which aspects of ICTs are necessary to share?
- What are the mechanisms of ICT-SMM on team performance?
- Research on interventions for promoting ICT-SMM
Thank you for your attention!

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Literature


