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## Shared Mental Models in Virtual Teams

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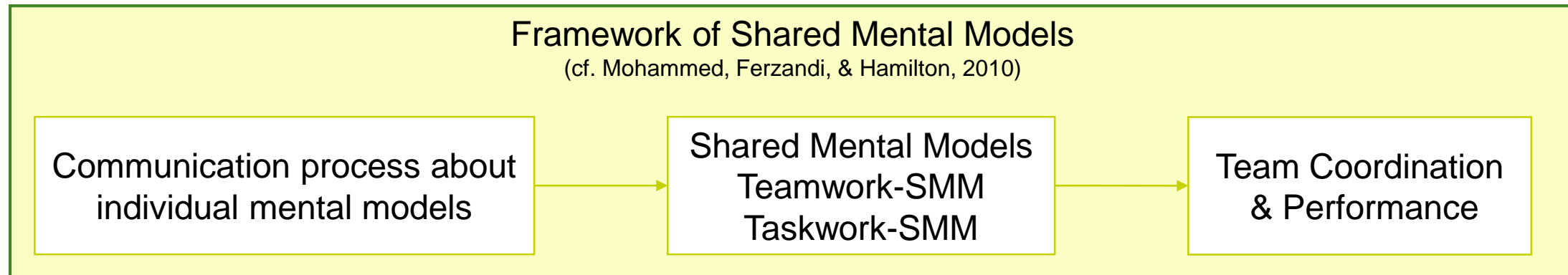
Das Vorhaben vLead wird im Rahmen des Programms „Innovationen für die Produktion, Dienstleistung und Arbeit von morgen“ vom Bundesministerium für Bildung und Forschung und dem Europäischen Sozialfonds der Europäischen Union gefördert.

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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)



- 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 & Luring, 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 & Luring, 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.

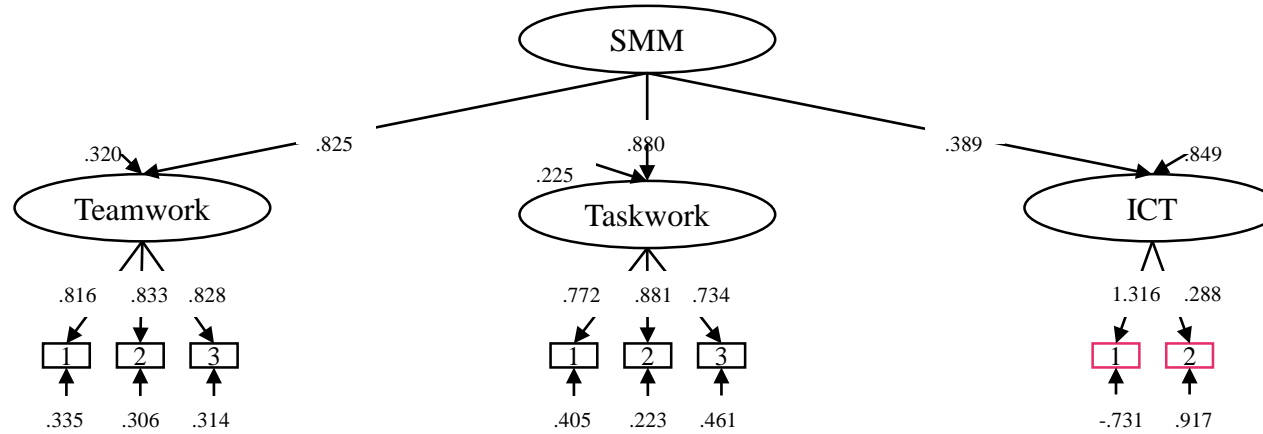
# Method

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

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

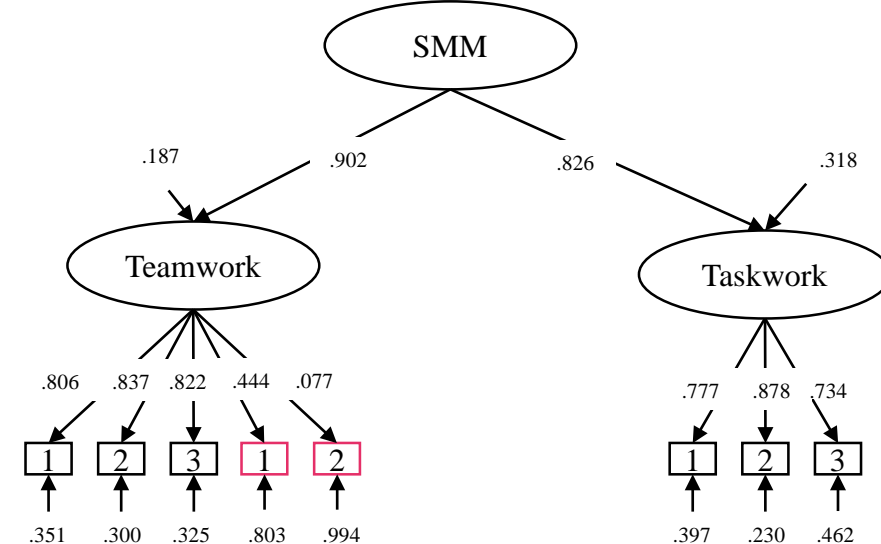
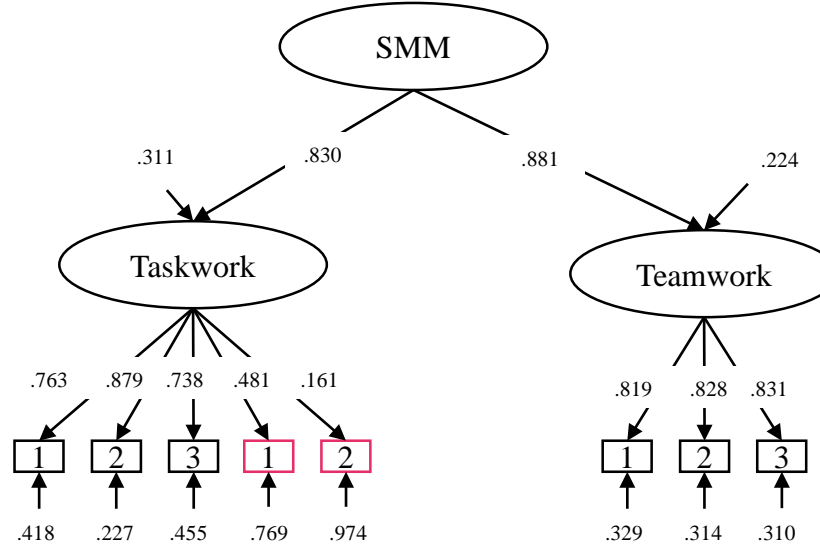
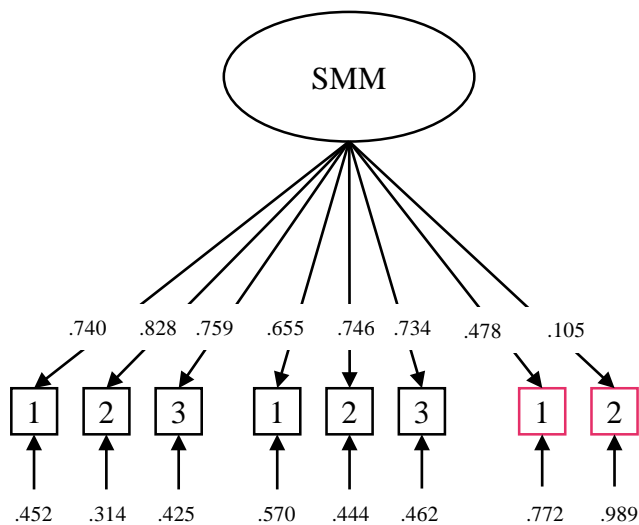
# Hypothesis 1: CFAs



$\chi^2$  diff = 77.031\*\*\*

$\chi^2$  diff = 18.464\*\*\*

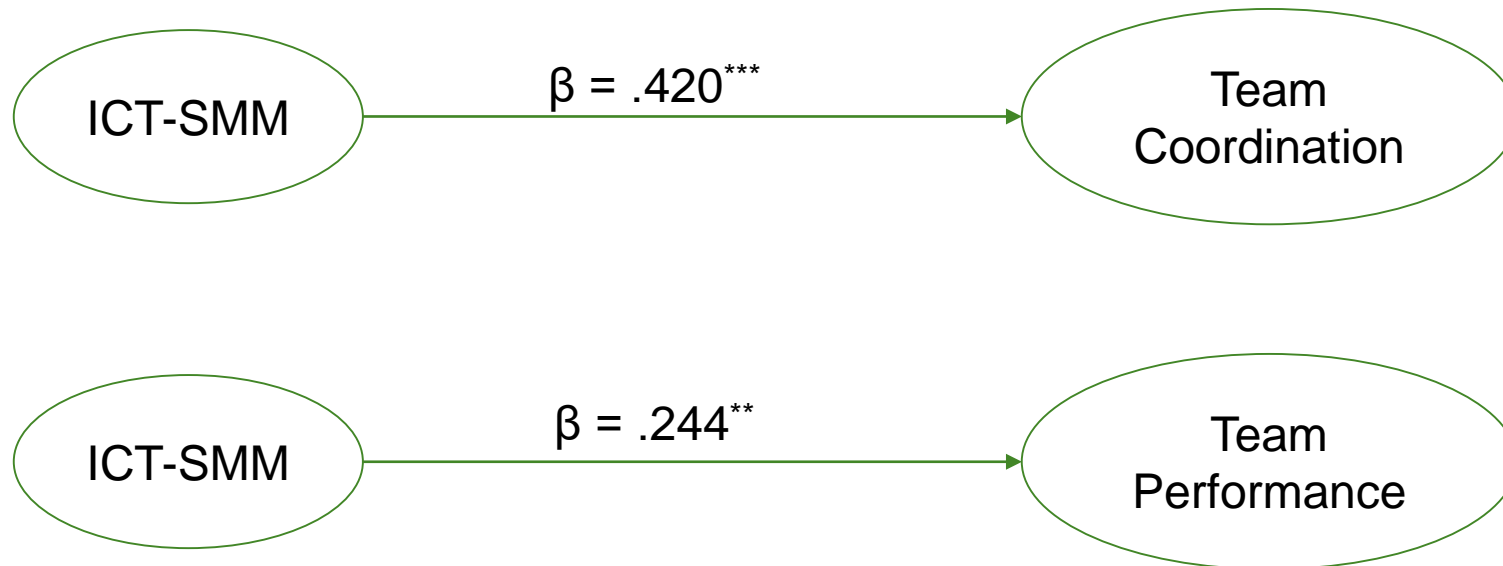
$\chi^2$  diff = 22,941\*\*\*



## 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%





## Hypothesis 3a: HLM

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

Hierarchical regression analysis.

	Model I			Model II		
<i>F</i>	5.19 <sup>***</sup>			5.18 <sup>***</sup>		
<i>R</i> <sup>2</sup>	.41 [0.30, 0.52]			.47 [0.36, 0.58]		
<i>Variable</i>	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
<i>Step 1</i>						
Teamwork-SMM	.14	.10	.124	.12	.10	.110
Taskwork-SMM	.60	.09	.660 <sup>***</sup>	.55	.09	.608 <sup>***</sup>
<i>Step 2</i>						
ICT-SMM				.25	.06	.286 <sup>***</sup>

Note. N = 141 in 31 teams. <sup>\*\*\*</sup>p < .001, <sup>\*\*</sup>p < .01, <sup>\*</sup>p < .05, <sup>†</sup>p < .10.

## Hypothesis 3b: HLM

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

Hierarchical regression analysis.

	Model I			Model II		
<i>F</i>	5.08***			5.07**		
<i>R</i> <sup>2</sup>	.35 [0.24, 0.47]			.37 [0.26, 0.49]		
<i>Variable</i>	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
<i>Step 1</i>						
Teamwork-SMM	.23	.09	.202*	.22	.09	.197*
Taskwork-SMM	.39	.08	.432***	.37	.08	.406***
<i>Step 2</i>						
ICT-SMM				.12	.06	.141*

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



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# Thank you for your attention!

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# Literature

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