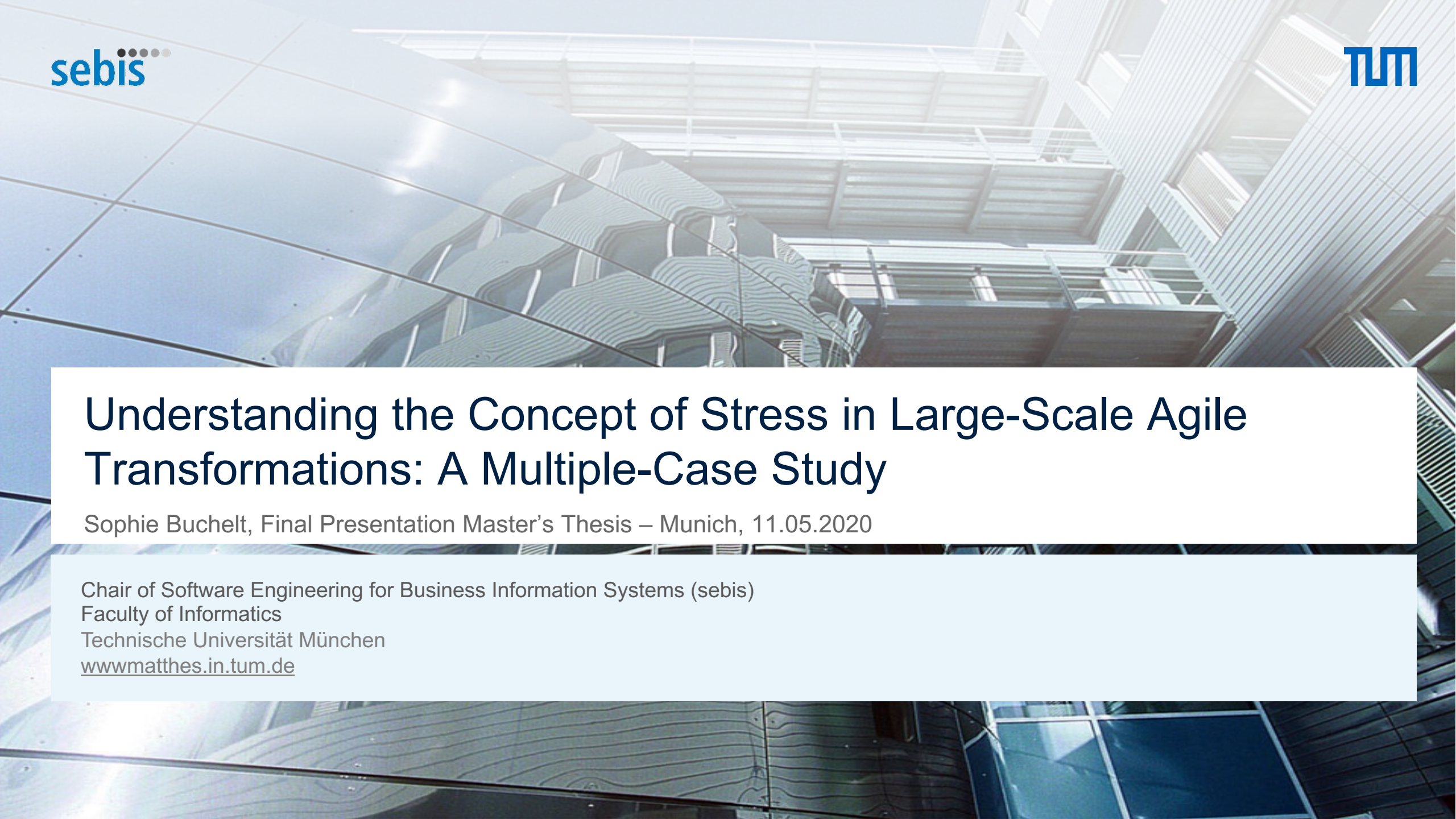


Understanding the Concept of Stress in Large-Scale Agile Transformations: A Multiple-Case Study

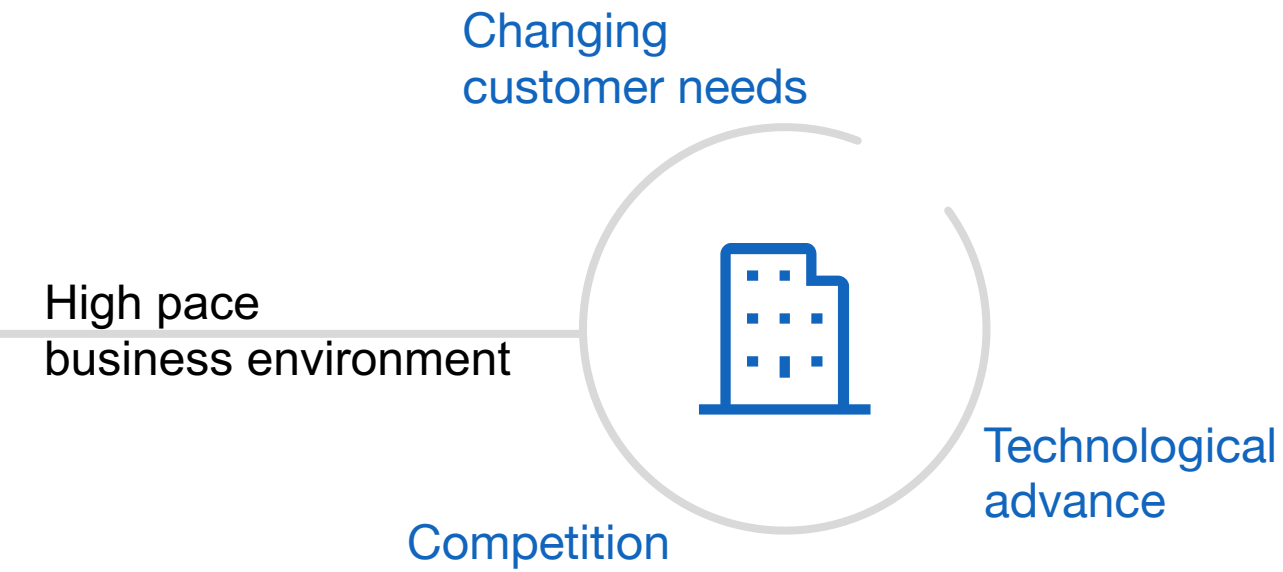
Sophie Buchelt, Final Presentation Master's Thesis – Munich, 11.05.2020

Chair of Software Engineering for Business Information Systems (sebis)
Faculty of Informatics
Technische Universität München
wwwmatthes.in.tum.de

Outline

1. Motivation
2. Research Methodology
3. Results
4. Key Findings
5. Conclusion

The research field of agile transformation is increasingly becoming relevant



- The increasing pace of business transformations requires organizations to adopt to new circumstances apace [1] [2].
- Agile methods empower organizations to respond to changes in a timely and effective manner [3] [4].
- In a business transformation context, organizational change can lead to challenges and stress [5] [6] [7].
- Organizations in this sense are comparable to humans who feel stress. Stress can have negative but also a positive effects on the progress of the transformation [7] [8] [9].

Large-scale agile transformations are a research field of high scientific and industry relevance [1] [3]. Stress situations during large-scale agile transformations is a topic, which has not yet been sufficiently investigated in research [5].

To investigate the stated issue, I formulate the following research questions

What are reasons for organizations to undergo agile transformations?	RQ 1
What are stress situations organizations undergo during large-scale agile transformations?	RQ 2
What are origins of stress situations in large-scale agile transformations?	RQ 3
How can stress situations in large-scale agile transformations be classified?	RQ 4
How do stress situations within large-scale agile transformations impact an organization?	RQ 5

The underlying research approach sets the methodical basis for this thesis

Research & Practice

- Scientific foundations on: agility, stress, change management
- Related work on: large-scale agile transformations, and their challenges
- Discussions with researchers in the field and industry experts

Input

Contribution

Multiple Case Study – Understanding the Concept of Stress in Large-Scale Agile Transformations

Development of a suitable interview guide

Evaluate

Refine

Conduction of 16 semi-structured interviews with industry experts

Evaluate

Refine

Development of clusters of stress situations during large-scale agile transformations

[10] [11]

This study is based on three streams of literature

Large-scale agile transformation

Large-scale: the adoption of agile methods and principles in established companies in a large project, multi-team, or overall organizational setting [12].

Agile: The working mode and culture of an organization, which is open to continuous change and improvement and able to respond quickly and flexibly to technical changes, new business opportunities and unexpected environmental changes [6] [13].

Transformation: The understanding of transformation, refers to the change from a different organizational working model, such as e.g., a waterfall model based on hierarchies, to agile methods, following common values and principles [5].

Stress

A stressor is an environmental event that distracts the process of the large-scale agile transformation away from the planned track. This situation can trigger a positive, as well as a negative perception, including combinations of both, depending on the individual or organization [7] [8] [9].

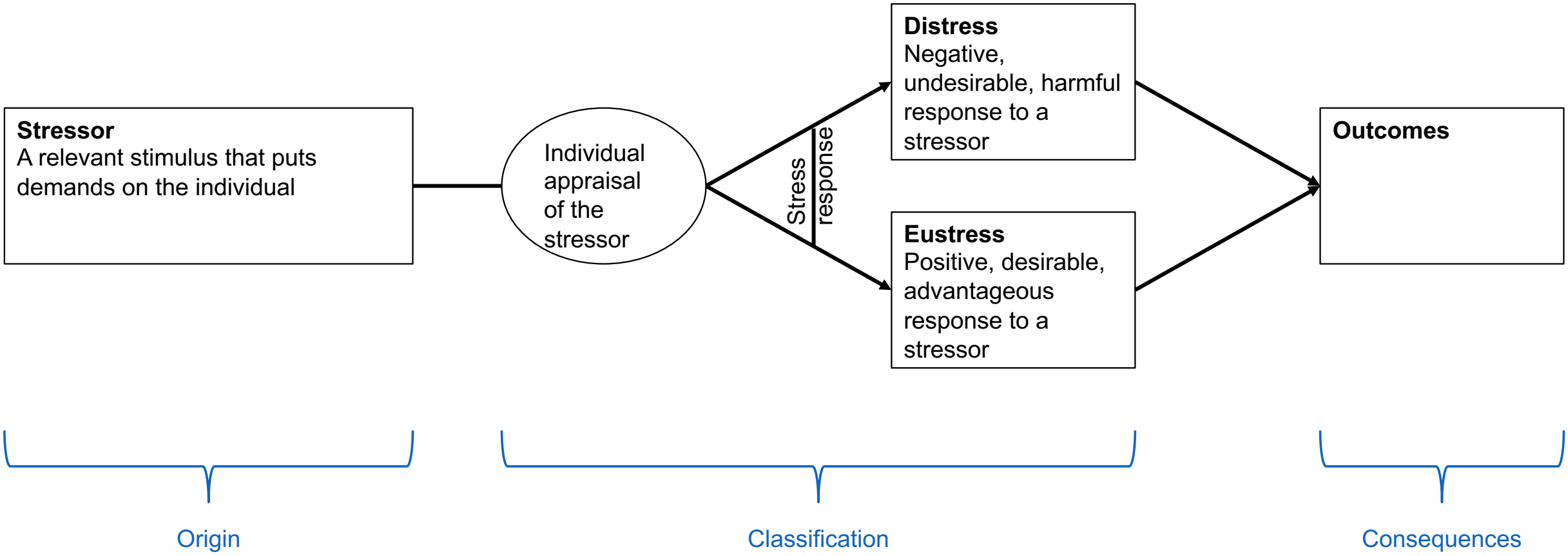
Change management

Concepts in change management offer approaches to handle and classify stress situations which might occur during large-scale agile transformations. It guides the goal-oriented, comprehensive and oftentimes cross-departmental redesign of structures, processes, business units or entire companies [14] [15].

Models used in this thesis provided a structure for the later analysis of cases

Overarching model of the stress process [16]

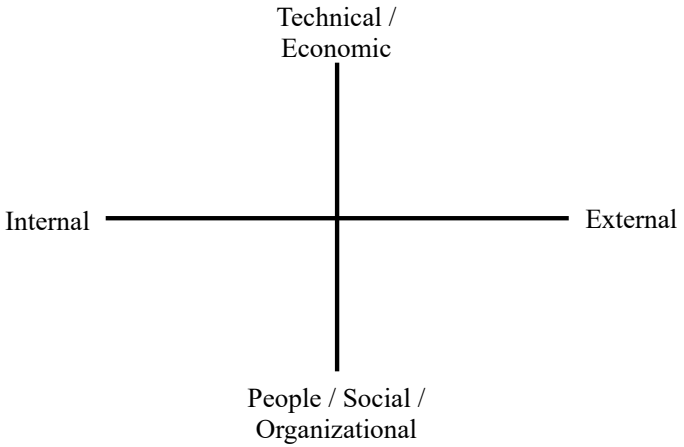
Used for RQ 2-5



Models used in this thesis provided a structure for the later analysis of cases

Origin - Causes and sources of organizational crises [17]

Used for RQ 2



Internal and external view of the company considering the stressor

Classification - Crisis classification matrix [18]

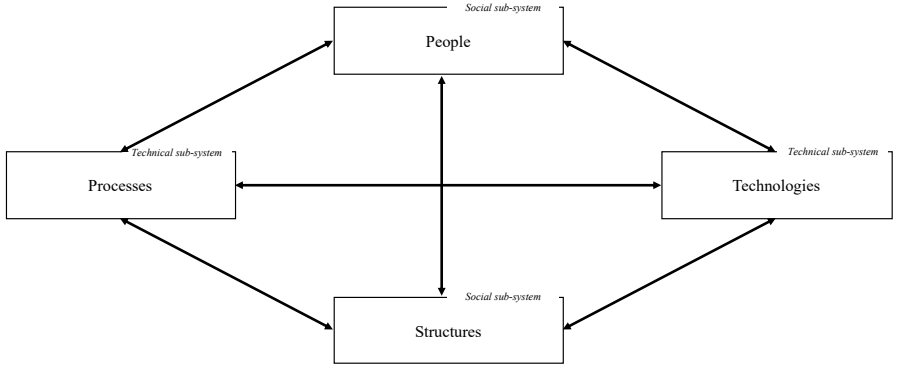
Used for RQ 4

Thread level	Time pressure / Degree of control: Response options	Intense		Minimal	
		Low	High	Low	High
Low	Many	Level 2	Level 1	Level 1	Level 0
	Few	Level 3	Level 2	Level 2	Level 1
High	Many	Level 3	Level 2	Level 2	Level 1
	Few	Level 4	Level 3	Level 3	Level 2

Internal view of the company considering the severity of the stress situation

Consequences - STS [19] [20] [21]

Used for RQ 5



Internal view of the company considering the impact of the stress situation

The multiple case study gathered insights from experts in the field

ID	Company	Role	Agile Experience Level	Date	Duration	Setting
I1	Automotive Co. A	Transformation Agent UX	Advanced / Expert	20.11.19	01:06 h	in person
I2		Technology Product Owner	Advanced	22.11.19	01:45 h	in person
I3		IT Specialist	Advanced	26.11.19	01:39 h	in person
I4		Project management EA-3, Agile-Coach / Scrum-Master	Expert	06.02.20	01:14 h	phone
I5		Change Transformation Manager	Advanced	27.02.20	02:01 h	in person
I6	Tech Co. A	Platform Software Architect	Advanced	23.12.19	01:26 h	phone
I7		Business unit head of agile transformation	Advanced / Expert	14.01.20	01:38 h	phone
I8		Head of Software Development	Expert	31.01.20	01:25 h	phone
I9	Automotive Co. B	Team Director Vehicle Engineering; Agile Change Leader	Advanced	21.11.19	02:02 h	phone
I10		Management Vehicle Engineering	Expert	08.01.20	01:37 h	phone
I11	Retail Co.	Chapter Lead Data Engineering	Expert	08.01.20	02:00 h	phone
I12		Senior Agile Coach	Advanced / Expert	16.01.20	01:46 h	in person
I13	Insurance Co.	Agile Master	Advanced	12.12.19	01:31 h	in person
I14		Head of Customer Processes Digital Services	Expert	30.01.20	02:22 h	phone
I15	Tech Co. B	Agile Master	Advanced / Expert	09.01.20	01:49 h	phone
I16		Agile Coach	Expert	26.02.20	01:46 h	phone

What are reasons for organizations to undergo agile transformations?

RQ 1

Goals for adapting agility in established organizations

Time to market
- Responding to changing market conditions and customer expectations and new requirements
- Short planning horizons
- Incorporating feedback in an early project stage

Customer centricity
- Customer satisfaction
- High quality

Organizational benefits
- High employee commitment
- Flat hierarchies / agile culture

Efficiency

Handling Complexity

Triggers for adapting agility in established organizations

Competition

Clear responsibilities

Legislation

What are stress situations organizations undergo during large-scale agile transformations?

RQ 2

Automotive Co. A, Tech Co. A, Automotive Co. B, Insurance Co.

- Project management complications
- Communication complications

Automotive Co. A, Tech Co. A, Automotive Co. B, Retail Co.

- C-level change
- Problematic c-level behavior

Automotive Co. A, Tech Co. A

- Uncertainty

Tech Co. B

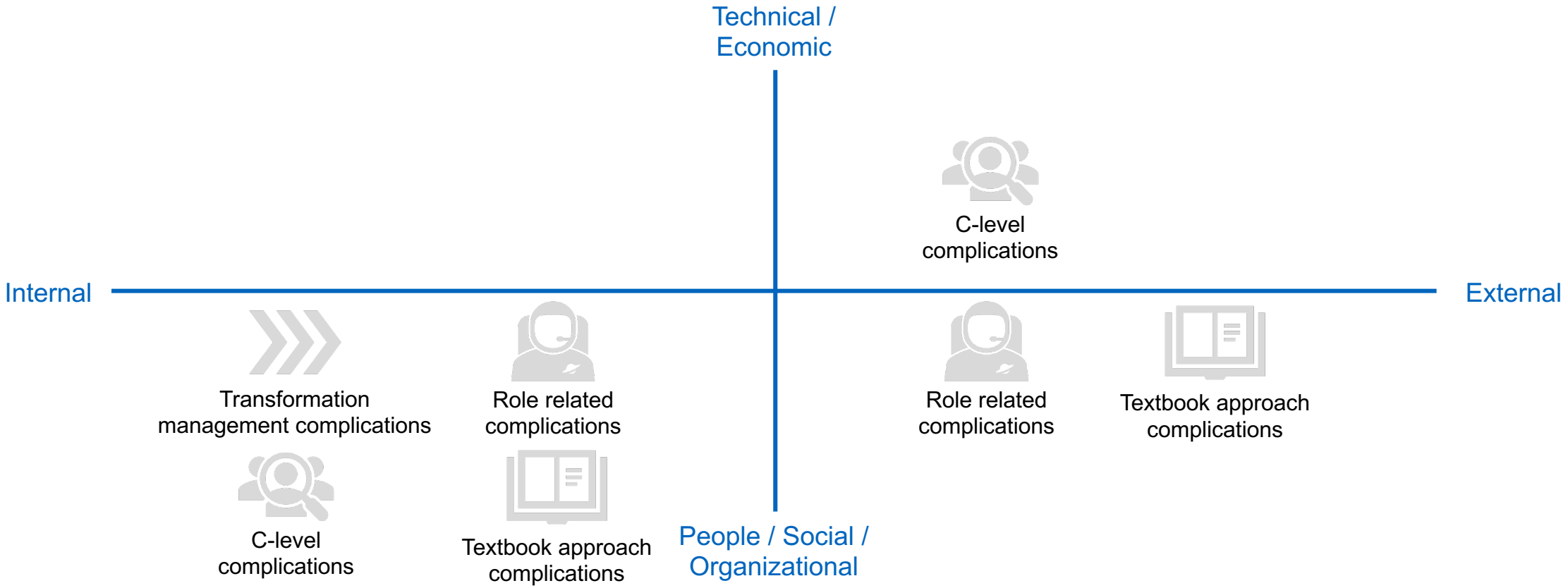
- Missing adaption of external concept

What are origins of stress situations in large-scale agile transformations?

RQ 3

Internal stressors include: communication and collaboration (I1, I2, I6, I10, I13, I14), management (I2, I3, I6, I8, I11, I12, I15), agile mindset (I7, I9, I16).

External stressors include: political events (I4), shareholder pressure (I12), external guidelines (I2, I5, I16).



[17]

How can stress situations in large-scale agile transformations be classified?

RQ 4

The classification of clusters according to their severity was based on Burnett et. al. [18].The model is defined by four dimensions: threat level, time pressure, response options and degree of control. Clusters are displayed in the model according to their average perceived severity along the dimensions.

Threat level	Time pressure / Degree of control / Response options	Intense		Minimal	
Low	Many			Role related complications	
	Few				
High	Many	Transformation management complications			
	Few	C-level complications	Textbook approach complications		

On average, c-level complications showed the highest level of severity followed by transformation management complications, textbook approach complications, and role related complications.

How do stress situations within large-scale agile transformations impact an organization?

RQ 5

Social sub-system

People

C-level complications

Role related complications

Social sub-system

Work structures

C-level complications

Transformation management complications

Technical sub-system

Technologies

C-level complications

Textbook approach complications

Technical sub-system

Organizational structures / Processes

C-level complications

The defined stress situations had an impact on all dimensions of the STS model, for visual reasons, the graphic displays only the highest impacts in terms of mentioned frequency.

[19] [20] [21]

How do stress situations within large-scale agile transformations impact an organization?

RQ 5

Social sub-system

People

- More communication
- Lower motivation
- Confusion
- Frustration
- Empowerment of employees
- Knowledge loss

Social sub-system

Work structures

- New ways of communication
- Reorganization
- Lean decision making
- Rearrangement of teams
- New ways of interaction

Technical sub-system

Technologies

- Tools for optimization of code reviews
- Technologies to create business value
- Data driven technologies
- Introduction of Jira, Confluence and Slack

Technical sub-system

Organizational structures / Processes

- Reorganization
- Changes in roles
- Implementation of an agile team setup

[19] [20] [21]

This thesis describes four key findings

Reasons for organizations to undergo large-scale agile transformations

Reasons for large-scale agile transformations are twofold, including goals and triggers. Goals are improving time to market, customer centricity, organizational benefits, efficiency, and handling complexity. Triggers are competition, clear responsibilities, and legislation. Identified goals align with findings in previous literature, identified triggers add a new perspective, which has not been evaluated to a large extend by previous literature.

Clusters of stress situations during large-scale agile transformations

Clusters of stress situations, were defined according to similarities in their characteristics and comprise of transformation management complications, role complications, c-level complications, and textbook approach complications. The single categories are comparable to findings in previous work, especially concerning the themes project management, understanding of roles, resistance and understanding of guidelines. However it should be noted that the specific case studies show differences which cannot be identified by overall categories, but rather from in-depth analysis, as displayed in further findings.

In depth description of stress situations during large-scale agile transformations

The in-depth description of clusters of stress situations provided insights on their origin, classification and impact. Previous work lacks such detailed description and focus on single components.

A key factor for successful large-scale agile transformations is mindset change

It is easier to execute agile practices as it is to understand why practices have changed and what the value behind the change is. Key players for mindset change are management and involved employees. Since the mindset portrayed by management oftentimes also affects the team level, management support is crucial, however not the sole factor of successful company mindset. Involved employees also need to take ownership in order to push the agile transformation.

This thesis faces several limitations

Construct validity:

- Multiple companies and roles within each company were interviewed
- Only one researcher analyzed the results of the case study, which leaves the possible threat that constructs discussed in the interview questions are not interpreted in the same way by the researcher and the interviewed persons.

Internal validity:

- Not applicable, as the research was neither explanatory nor causal

External validity:

- As this thesis investigated 16 different organizations undergoing large-scale agile transformations, generalizable implications are profound, however not holistic

Reliability:

- A case study protocol was used, which defined the process of data collection and provided a guideline for later analysis
- Audio recordings for every interview were saved, interviewers took notes on important observations during the interviews, and all interviews were fully transcribed for later analysis

[10]

A conclusion and summary of this work can be drawn according to investigated research questions

RQ 1

Goals for large-scale agile transformation:

- Time to market
- Customer centricity
- Organizational benefits
- Efficiency
- Handling complexity

Triggers for large-scale agile transformation:

- Competition
- Clear responsibilities
- Legislation

RQ 2

Clusters of stress situations during large-scale agile transformations:

- Transformation management complications
- Role complications
- C-level complications,
- Textbook approach complications.

RQ 3

Origins of of stress situations during large-scale agile transformations include:

Internal stressors:

- communication and collaboration
- management
- agile mindset

and external stressors:

- political events,
- shareholder pressure
- use of external guidelines.

RQ 4

In the classification of stress situations,

1. c-level complications

showed the highest level of severity followed by

2. transformation management complications
3. textbook approach complications, and
4. role related complications.

RQ 5

Consequences were examined in two subsystems according to STS.

Consequences in the social sub-system were mainly based on loss of motivation on team- and c-level, and measures to improve communication.

Consequences in the technical sub-system were mainly based on tools to improve business value creation and internal communication.

The limited timeframe and scope of this master thesis leave possibilities for future research

Future research can benefit from further investigations on:

A second iteration of interviews at a later point in to draw additional conclusions on further development and severity of identified stress situations.

Including additional companies to the scope of the multiple case study to provide further valuable insights and enable a higher generalizability of results.

Further insights into possibilities to resolve the experienced stress situations

Thank you!

Questions / Feedback

Sources

[1]] Ömer Uludag, Martin Kleehaus, Xu, and Florian Matthes. (2017). “Investigating the Role of Architects in Scaling Agile Frameworks.” 10.1109/EDOC. (2017).

[2] Peter Weill and Stephanie Woerner, “Thriving in an Increasingly Digital Ecosystem,” *MIT Sloan Manag. Rev.*, (2015), pp. 27–34.

[3] T Torgeir Dingsøyr, Sridhar Nerur, VenuGopal Balijepally, and Nils Brede Moe. “A decade of agile methodologies: Towards explaining agile software development”. In: *Journal of Systems and Software* 85.6 (2012), pp. 1213–1221.

[4] Ömer Uludag, Matheus Hauder, Martin Kleehaus, Christina Schimpfle, and Florian Matthes. “Supporting large-scale agile development with domain-driven design”. In: *International Conference on Agile Software Development*. Springer. (2018), pp. 232– 247.

[5] Christoph Fuchs and Thomas Hess. “Becoming Agile in the Digital Transformation: The Process of a Large-Scale Agile Transformation”. In: *Thirty Ninth International Conference on Information Systems,* (2018).

[6] Daniel Gerster, Christian Dremel, and Prashant Kelker. “"Agile Meets Non-Agile": Implications of Adopting Agile Practices at Enterprises”, (2018).

[7] Blake Hargrove, James Quick, Debra Nelson, and Jonathan Quick. „The theory of preventive stress management: a 33-year review and evaluation.“ *Stress and Health,* (2011), 182-193.

[8] Fremont Kast, James Rosenzweig. „General Systems Theory: Applications for Organization and Management.“ *The Academy of Management Journal,* (1972) pp. 447-465.

[9] Barry Oken, Irina Chamine, and Wayne Wakeland, “A systems approach to stress, stressors and resilience in humans,” *Behav. Brain Res.*, (2015), pp. 144–154.

[10] Per Runeson and Martin Höst. “Guidelines for conducting and reporting case study research in software engineering”. In: *Empirical software engineering* 14.2 (2009), pp. 131

[11] Robert K. Yin. *Case study research and applications: Design and methods*. Sixth edition. Los Angeles et al.: SAGE, 2018.

[12] Torgeir Dingsøyr and Nils Brede Moe, “Towards principles of large-scale agile development: A summary of the workshop at XP2014 and a revised research Agenda,” *Lect. Notes Bus. Inf. Process.*, (2014), pp. 1–8.

[13] Leonor Barroca, Torgeir Dingsøyr, Marius Mikalsen. “Agile Transformation: A Summary and Research Agenda from the First International Workshop.” *Agile Processes in Software Engineering and Extreme Programming – Workshops,* (2019), pp. 364.

[14] John Paul Kotter, “Leading Change: Why Transformation Efforts Fail Harvard Business Review,” *Harv. Bus. Rev.*, (1995) pp. 59–67.

[15] Steven Dichter, Chris Gagnon, and Ashok Alexander, “Memo to a CEO: leading organizational transformations,” *The McKinsey Quarterly*, (1993).

[16] Victoria Branson, Matthew Dry, Edward Palmer, and Deborah Turnbull, “The Adolescent Distress-Eustress Scale: Development and Validation,” *SAGE Open*, (2019).

[17] Ian Mitroff, Terry Pauchant, and Paul Shrivastava, “The structure of man-made organizational crises,” *Technological Forecasting and Social Change*, (1988) pp. 83–107.

[18] John Burnett, “A Strategic Approach to Managing Crises.” *Public Relations Review,* (1998), pp. 475-488.

[19] Harold Leavitt and James March, “Applied Organisational Change in industry: Structural, Technological and Humanistic Approaches, Carnegie Institute of Technology,” *Graduate School of Industrial Administration*. (1965).

[20] Robert Bostrom and Stephen Heinen. “MIS Problems and Failures: A Socio- Technical Perspective: Part II: The Application of Socio-Technical Theory”. In: *MIS Quarterly* 12/1977.Vol.1(4) (1977), pp. 11–28.

[21] Robert Bostrom, Saurabh Gupta, and Dominic Thomas, “A meta-theory for understanding information systems within sociotechnical systems,” *J. Manag. Inf. Syst.*, (2009), pp. 17–48.

B.Sc.

Sophie Buchelt

Technische Universität München
Faculty of Informatics
Chair of Software Engineering for Business Information Systems

Boltzmannstraße 3
85748 Garching bei München

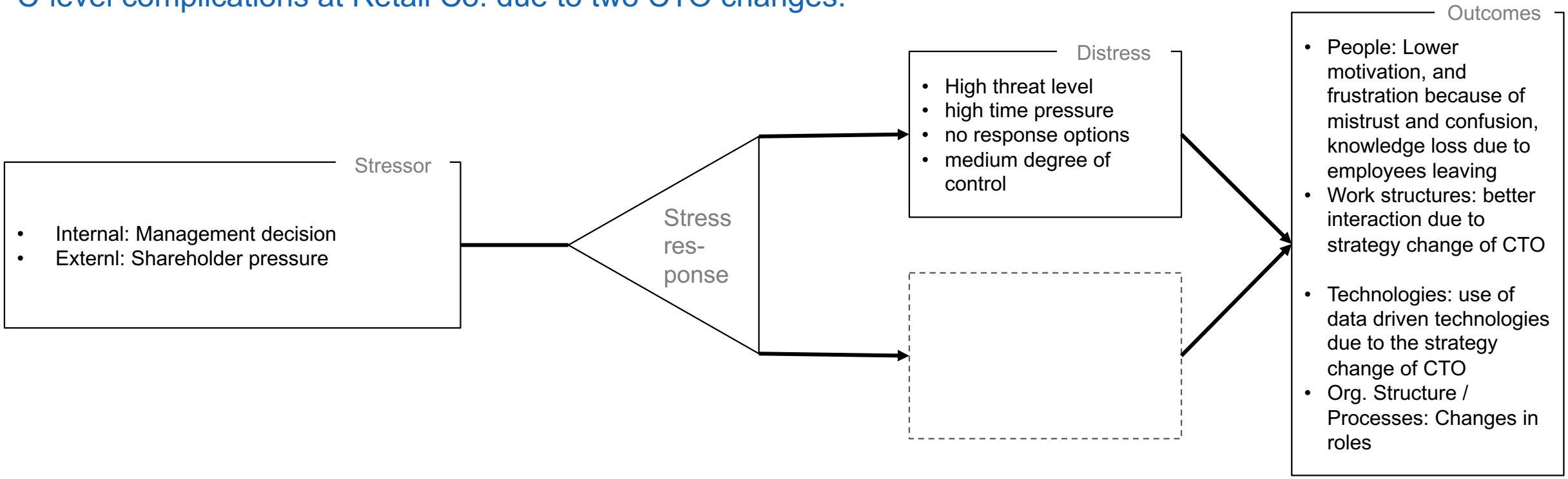
Tel +49.89.289. 17132
Fax +49.89.289.17136

wwwmatthes.in.tum.de

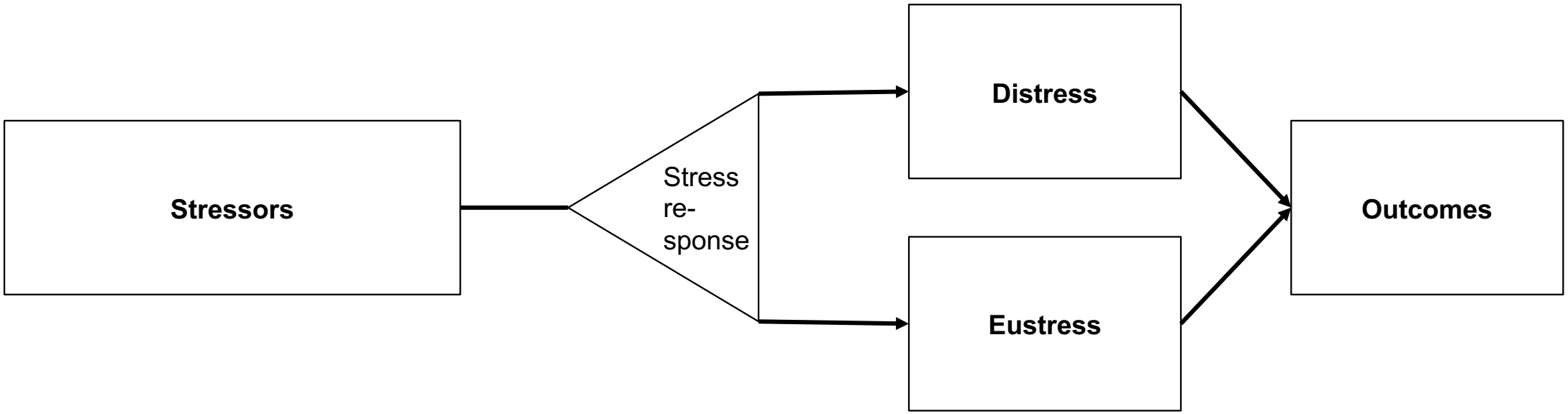
Backup

Example based on one single stress situation

C-level complications at Retail Co. due to two CTO changes:



Preventive stress management model in organizational stress



The model of Hargrove et. al. is used for the description of stress in organizations and shows major similarities to the one by Branson [16]

M. B. Hargrove, J. C. Quick, D. L. Nelson, and J. D. Quick, “The theory of preventive stress management: a 33-year review and evaluation,” Stress Heal., vol. 27, no. 3, pp. 182–193, 2011.

Stress Situation Clusters

ID	Company	Stress Situation	Cluster
I1	Automotive Co. A	Project management and product definition	Transformation management complications
I8	Tech Co. A	Missing change management	Transformation management complications
I10	Automotive Co. B	Unclear communication / Broken information flow	Transformation management complications
I13	Insurance Co.	Unclear communication	Transformation management complications
I14	Insurance Co.	Collaboration issues between agile and traditional working model	Transformation management complications
I2	Automotive Co. A	Understanding of roles	Role related complications
I5	Automotive Co. A	Understanding of roles	Role related complications
I6	Tech Co. A	Role definition of product owners and scrum masters	Role related complications
I3	Automotive Co. A	C-level change	C -level complications
I4	Automotive Co. A	C-level change	C -level complications
I7	Tech Co. A	Fear of failure on the management level	C-level complications
I9	Automotive Co. B	Middle management blocking the transformation	C -level complications
I11	Retail Co.	C-level change	C -level complications
I12	Retail Co.	C-level change	C -level complications
I15	Tech Co. B	Textbook approach not applicable in company specific situation	Textbook approach complications
I16	Tech Co. B	Textbook approach not applicable in company specific situation	Textbook approach complications