

Sustainability tensions on the way to greenhouse gas neutrality in the chemical industry

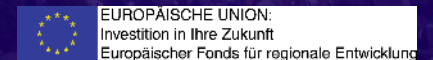
Janine Heck, ZIN/WWU Münster
13.05.2022



**Process⁴
Sustainability**

**Cluster for climate-neutral
process industries in Hesse**

Supported by:



Agenda

- Theoretical background -> Organizational paradox theory
- Method -> Case study approach
- Findings & Conclusions

Theoretical background - Organizational paradox theory

Organizational paradox theory emerged in the 1980s and sees contradictions as features of complex social systems. Researchers who influenced paradox theory are e.g. Wendy K. Smith, Marianne W. Lewis, Merriam Haffar, Tobias Hahn, Miguel Cunha and Linda Putnam. A good overview about paradox theory give Berti et al. (2021).

Paradox: “Contradictory yet interrelated elements that exist simultaneously and persist over time” (Smith & Lewis, 2011, p. 382)

Trade-off: Elements seen as independent

Example: Learning and performing

Example: Make or buy

Tensions underlie both concepts -> the term tension is often used as an umbrella term

Berti, M., Simpson, A., Cunha, M., & Clegg, S. (2021). *Elgar Introduction to Organizational Paradox Theory*. Edward Elgar Publishing. <https://doi.org/10.4337/9781839101144>

Theoretical background - Dynamic equilibrium model of organizing

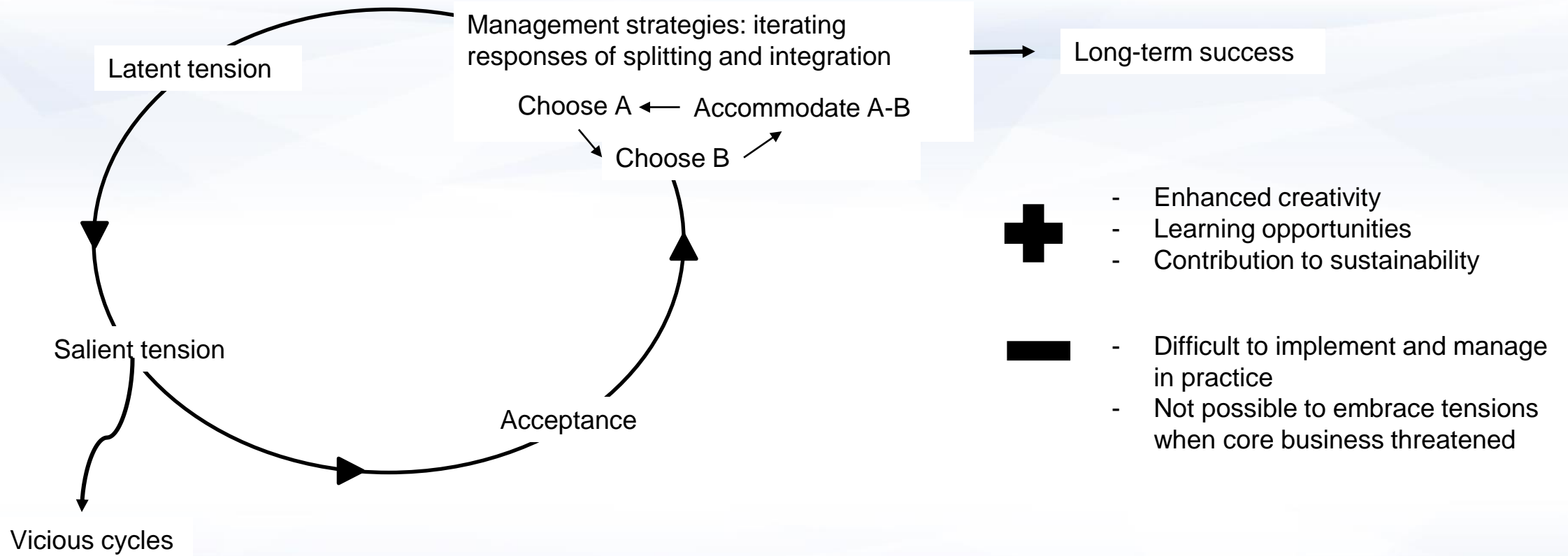


Figure 1: A dynamic equilibrium model of organizing (Smith and Lewis, 2011)

Smith, W. K., & Lewis, M. W. (2011). Toward a Theory of Paradox: a Dynamic Equilibrium Model of Organizing. *Academy of Management Review*, 36(2), 381–403. <https://doi.org/10.5465/amr.2011.59330958>

Method – Case study

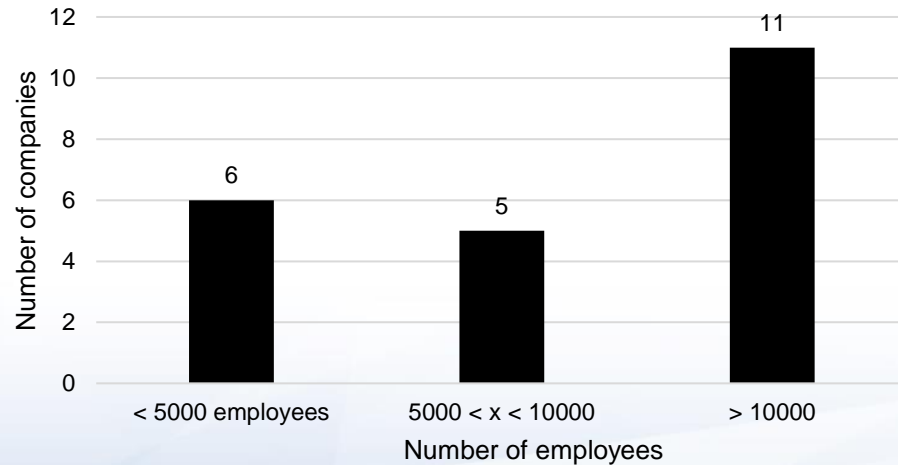
Research questions

1. Which tensions do companies in the chemical industry experience on their way to GHG neutrality?
2. How do they deal with those tensions?

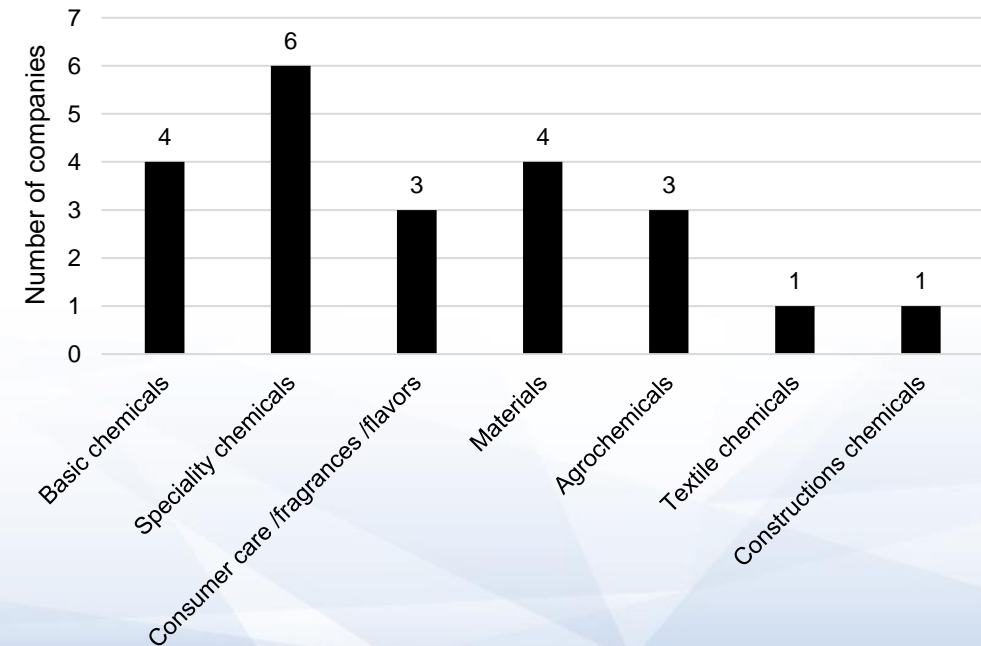


22 Chemical companies with sites in Germany

Examined companies - number of employees



Examined companies - products



Method – Case study



27 Semi-structured interviews



22 Sustainability reports



Qualitative content analysis (Mayring, 2015)

Categories derived deductively from Wannags and Gold (2020) for the tensions and from Putnam et al. (2016) for the responses to tensions.

Mayring, P. (2015). *Qualitative Inhaltsanalyse Grundlagen und Techniken* (12th ed.). Beltz Verlag.

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Findings - tensions

Different understandings of sustainability (4)

Business success vs. GHG saving (22)

Missing availability (20)

Regulations which stabilize the current situation (7)

Personal vs. organizational sustainability agenda (1)

Findings - tensions

„ If I now look at what causes the largest contribution to emissions when I talk about chemical processes, it is the production of basic chemicals such as olefins or ammonia. But now what we have there is a commodity- you're competing on a global scale, and if you want to be competitive with these large-scale products, it's all about price. We know we have the biggest levers there, and also that if we operate them, it involves extra costs. How can we now operate these levers without worsening the competitive situation? It's no use if we produce green olefins and are no longer viable on the market.” C10

Business success vs. GHG saving

- Tension between achieving business success and GHG saving
- Rising costs and limited possibilities to pass them on to their customers
- Especially relevant for companies producing basic chemicals
- Perceived by all 22 companies

Findings - tensions

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GHG saving vs. other ecological aspects (17)

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Findings - tensions

“When I optimize to have less waste or waste water, also toxic waste water, what do I do? I evaporate the water and then only have the residual materials, which I dispose of accordingly, but how do I evaporate? With energy and so I then have the CO2 emissions. So there are still many topics that do not go in the same direction.” C5

GHG saving vs. other ecological aspects

- Various environmental aspects can also be in a conflicting relationship
- Perceived by 17 companies

Findings - tensions

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Personal vs. organizational sustainability agenda (1)

Findings - tensions

„In many cases, natural gas is simply used but it's not a good energy source in the long term, and of course we would like to switch to electricity, perhaps biogas, or even green hydrogen - which is not yet technologically possible. Accordingly, colleagues at the sites sometimes find themselves in the conflict of wanting to make the switch very quickly, but not yet seeing any technological possibilities. Think of green hydrogen: A lot is happening there at the moment, but realistically I think it will be more likely to be available in the 2030s than in the 2020s.“ C19

Missing availability

- Sustainable alternatives not yet available
- Companies refer mainly to technologies for energy generation, insufficient quantities of renewable energy and feedstock
- Perceived by 20 companies

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GHG saving vs. other ecological aspect (17)

Desire for sustainability vs. actual behavior (17)

Regulations which stabilize the current situation (7)

Personal vs. organizational sustainability agenda (1)

Findings - tensions

„If you fly to Mallorca, that's far more harmful to the climate than using a plastic product made from so little petroleum. Many people have not understood the relations here, what plays what role for their own footprint.“ C15

Desire for sustainability vs. actual behaviour

- Disconnection of belief/conviction/wish and actual behavior
- Often described in relation to end consumers
- Perceived by 17 companies

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Findings - tensions

„If you look at Germany, many chemical companies supply their own electricity. Because of this constellation, it is extremely difficult for such companies to make PPAs at all, because it simply becomes incredibly expensive, because the entire EEG surcharge is added to it. At the end of the day, these are crazy electricity costs.“ C16

Regulations which stabilize the current situation

- Need for change but framework conditions stabilize situation
- Mainly related to EEG surcharge -> “Solved” as EEG surcharge will be abolished in July 2022 in Germany
- Perceived by 7 companies

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Findings - tensions

„And if I'm getting the green energy from France, but we've already said in 2025 we're going to completely phase out nuclear energy, I don't understand why we're then supporting others in that regard“ (C7)

Different understandings of sustainability

- Different understandings of what is actually sustainable can lead to tensions
- A prominent example is nuclear energy
- Perceived by 4 companies

Findings - tensions

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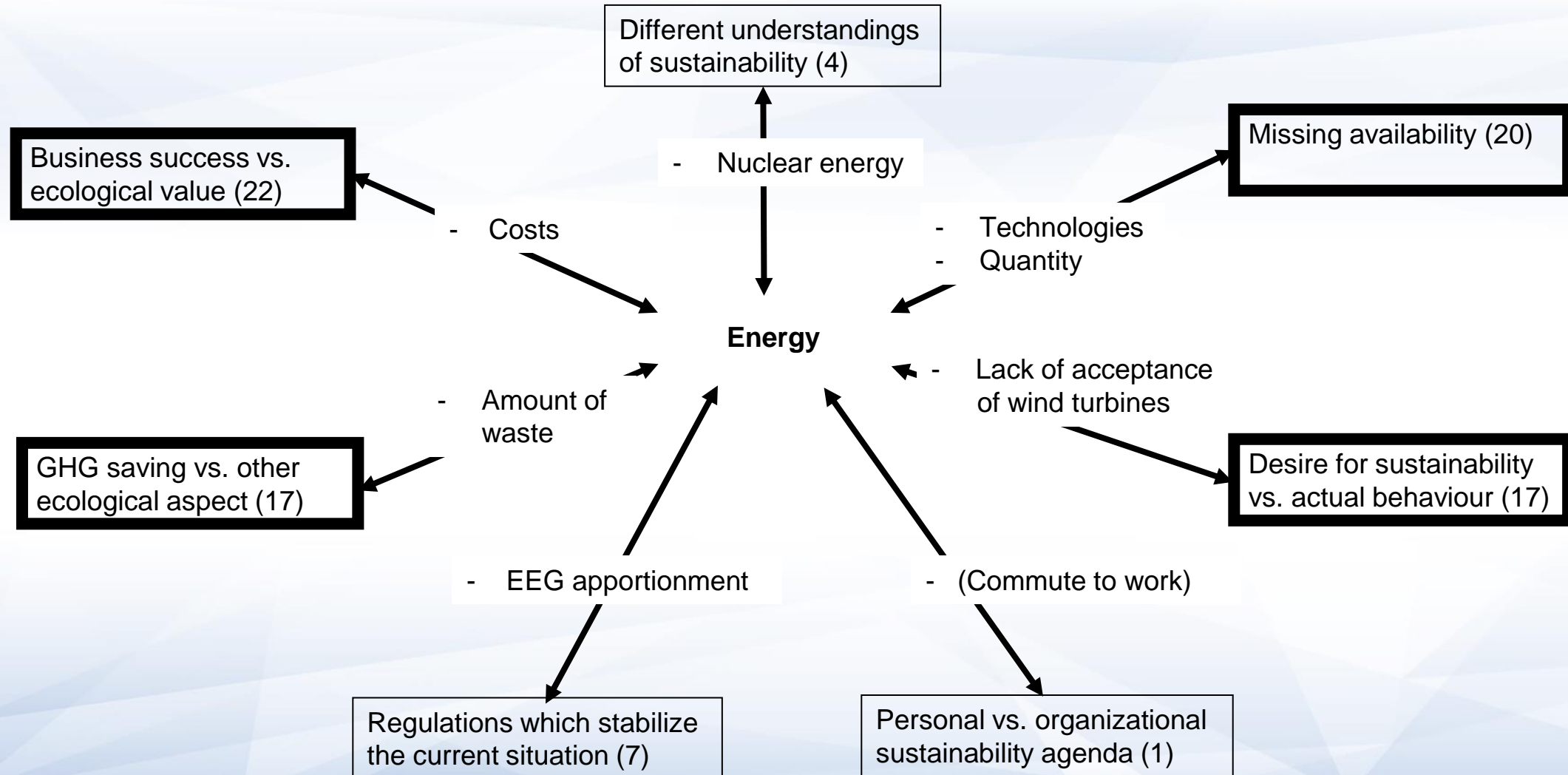
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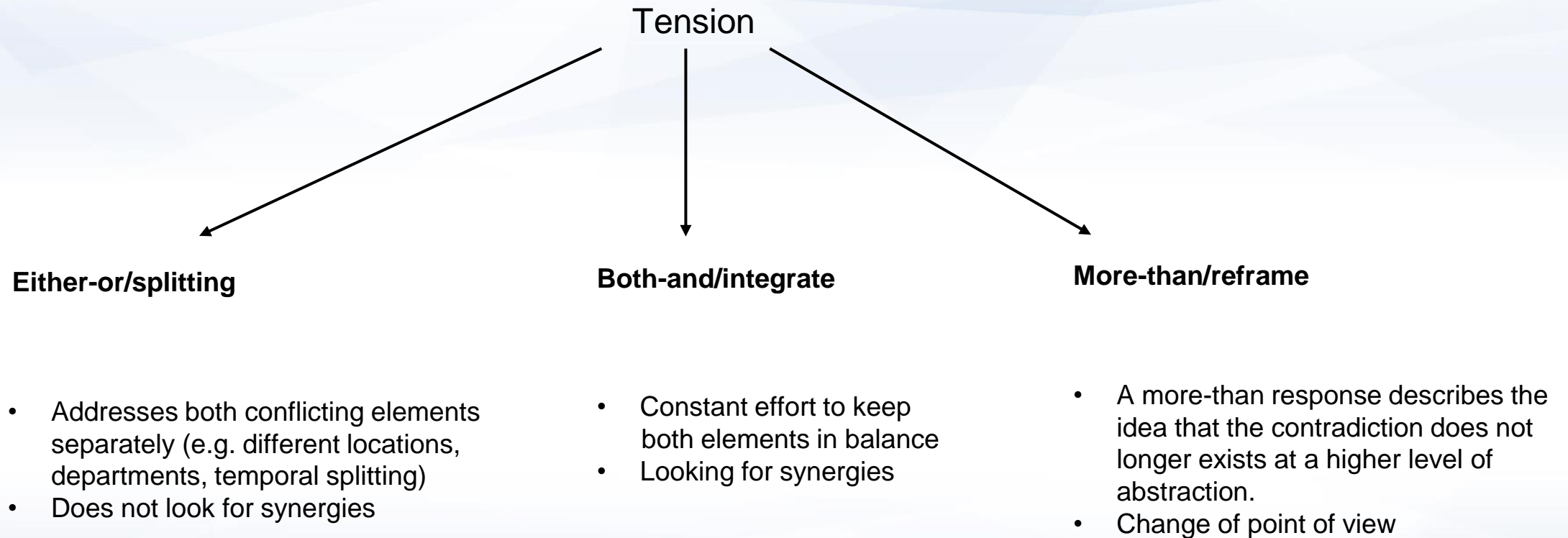
“But it's also good when people get involved and want to advance the issue of climate protection through nutrition. (...) It opens up such side issues. For the overall climate balance of *Company*, these issues are irrelevant. We assess that once a year and in comparison to our production facilities. Or the discussion of whether the subsidy for train tickets that we have for our employees is sufficient or whether we need to increase that. These are the issues that create tension. These issues have to be managed well, because they generate a lot of satisfaction or dissatisfaction, which is not really the core of a climate project.”C3

Personal vs. organizational sustainability agenda

- Tensions situated between an organizational and personal level
- Perceived by one company

Findings - tensions





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Findings - responses

„We look to tailor the offering so that we have a sustainable offering for those customers who work in an industry where that's relevant. To all the others, we can say we offer that and as soon as it's interesting for you, you can buy it from us.“ C4

„Ultimately, it's always mindset, that's what it boils down to. In the short term, it's always this supposed conflict of either I'm sustainable or I'm economically successful. I had also just mentioned this, although as soon as you look at it in the medium term, I no longer see this conflict at all.“ C2

„At the company, the members of the Board of Management, especially our CEO, also include the emissions reduction target in their personal targets and he wants to get his bonus at the end of the day. The CFO and the division heads, i.e. the other presidents, also have precisely these goals, but with different weightings, so that they can implement the goals we have.“ C17

Conclusions

Tensions

- Highlight topics that require special attention
- Chemical companies perceive and accept tensions
- Tensions can be assigned to seven categories, four of these are of high relevance
- In the short-term business success vs. GHG saving is described as the greatest challenge
- High relevance of the topic energy

Responses

- Responses can be assigned to three categories
- The chemical industry mainly addresses sustainability tensions by trying to integrate both conflicting elements and finding synergies

References

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