

The categories and underlying organizational resources depicted in Table 3 are directly or indirectly affected by changes in IT, e.g., resulting from a possible cloud sourcing decision, and are therefore subject to potential RECC. For example, one expert states that migrating to the cloud would “save maintenance workload and costs”. The major resource that is expected by the experts to be directly affected is money (“outsourcing to the cloud is way cheaper in comparison to an in-house solution”). If the expectation or intention regarding an organizational resource, in this case, to save money or maintenance, cannot or only partially be realized by an adoption of cloud services, this would lead to a rebound effect. Furthermore, depending on the organizational goals, resource saving potentials might be evaluated negatively from an organizational point of view. For example, the saving potential of workforce or rather employees contradicts the overall social goal of NOZ Medien to provide stability for employees and to safeguard jobs. Therefore, the experts at NOZ Medien explain that affected employees would be entrusted with other responsibilities in order to retain jobs and to prevent the loss of valuable IT know-how.

On the foundation of the organizational resources presented in Table 3 and specifically for the present case study at NOZ Medien, expected effects on organizational resources and goals resulting from a cloud sourcing decision were identified. In the case study, the existing email system is to be replaced by a user- or better to say mailbox-based service from a CC provider (SaaS). Therefore, the expected effects have only been derived and evaluated a priori. First, the corporate objectives at NOZ Medien were identified in an interview with the management and mapped against the organizational resources (e.g., the economic factor “the highest profit possible” is connected to the general organizational resource “money”). Second, expected effects on organizational resources were identified and evaluated together with the experts in workshops. The resulting analysis can be found in Table 4. As a result of the case study, effects have to be assessed depending on the organizational goal, as elucidated by the resource “employees”.

Table 4. Expected effects of cloud sourcing on organizational resources at NOZ Medien

organizational goals	organizational resource (goal/expected effect)
“highest profit possible”	<ul style="list-style-type: none"> • money (+/+)
“continued growth of the company” & “provide a perspective and future for Employees” & “provide stability for employees and safeguard jobs”	<ul style="list-style-type: none"> • employees (+/-)
“efficiency and sensible use of resources”	<ul style="list-style-type: none"> • hardware & systems (-/-) • server software (-/-) • employees (-/-) • space (+/+) • energy (-/-) • maintenance (-/-) • money (+/+) • IT know-how (0/-)

5 Discussion and Conclusion

Potential RECC can arise in any area of an organization in which outsourcing into the cloud results in resource saving potentials. In contrast to the traditional view on rebound effects, which generally focuses on a narrow energy saving perspective [7–9], we expanded the focus and added an organizational perspective [41], in which the adoption process of a cloud service takes place. In this context, the intentions or expectations of organizations can lead to different assessments of rebound effects from a mathematical (compensation of the savings) in comparison to an organizational (compliance with the corporate objectives) perspective. Furthermore, rebound effects in CC do not necessarily arise from energy savings. Rather, the effects can be the results of savings of any organizational resource, which is subject to expected efficiency improvements in a cloudsourcing scenario (cf. RQ2).

The framework consisting of a REGE/RECC definition, a conceptual model, and a morphological analysis of RECC provides a foundation to identify, categorize and understand potential rebound effects in cloud computing (cf. RQ1). Furthermore, our results confirm the complex dependencies that are not always identifiable at first glance, which can involve many possible causes and manifestations of RECC. Consequently, there is an urgent need to research the existence and impact of RECC. In line with Gossart (2014), we argue that future research should focus on rebound effects in the ICT context in order to understand and mitigate the underlying causalities [4]. This broadened understanding can be very helpful when exploring the decision-making process as well as the involved influencing and influenced factors. Consequently, future research should also comprise the investigation of RECC in the short- as well as long-term. In order to accomplish this requirement, we provided a fundamental framework. For practice, the awareness of RECC can facilitate to (at least approximately) assess the impact of rebound effects even prior to outsourcing, since various organizational resources are significantly affected by a cloudsourcing decision. The awareness of factors surrounding such a decision is vital for making a sustainable judgement.

As any research endeavor, our findings also need to be viewed in the light of some limitations. First and foremost, the decision process for resource allocation underlying a rebound effect in an organization differs – at least to some extent – from other research areas of rebound effects cited. Unlike what is the case in, e.g., natural sciences, the decisions in organizations cannot always be fully predicted and do not necessarily follow general principles. Organizational decisions are mostly based on individual or community decisions and are limited by given budgets [6]. To consider this, these organizational goals were taken into account when developing the framework in accordance to Hilty (2008), who further differentiates between rebound effect perspectives of private households, enterprises and states [41].

The overall target of the paper is to present the results obtained from the systematic literature review as well as the case study.¹ Although case studies are considered to be an appropriate method to capture the richness of organizational contexts – in this case

¹ The case documentation file (cf. Figure 1) will be provided to interested readers.

of a German media company – the conclusions drawn cannot be unreservedly generalized [23]. Neither do we assert that the understanding of RECC would substitute a decision-making process for any given “cloudsourcing” project. Instead, the intention of our research is to arouse awareness that unintended rebound effects potentially exist in CC, which can affect organizational resources. By generalizing our results in the forms of definitions, a conceptual model as well as a morphological analysis of RECC, we already mitigate this limitation to some extent. Moreover, since the focus of the single case study was put on outsourcing an email system, further results may arise when investigating the outsourcing of other systems into the cloud. Therefore, rebound effects in different systems, application areas and organizations in the context of cloud computing or else in other ICT contexts are subject to future research. Especially regarding the various cloud service or deployment models, potential differences and unique characteristics concerning rebound effects need to be investigated.

Moreover, since NOZ Medien at the point of transition or abortion decided not to outsource the email system into the cloud, we have not been able to verify potential rebound effects by means of direct observation. Our study rather presents implications of RECC, however, they have only been derived a priori. Hence, our conceptual framework requires further validation and evaluation, for example via a multi case setting, to measure occurring RECC. Multiple case study setups allow for the testing of theories, whereas single case setups are preferable to identify and describe previously unchallenged or emerging phenomena, as executed in this study [22]. Furthermore, potential single case biases could be eliminated and multiple CC service models and the variety of factors influencing RECC could be investigated. To this point, our work provides the basis for future quantitative measurement of RECC. All in all, in order to improve the understanding of CC and all surrounding factors, we encourage researchers to extend the focus on technical advancements to take other influencing and influenced factors into account.

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