

NRP 73 Policy Brief Nr. 10 / 2023

## How sludge impairs the effectiveness of policy programmes: A field experiment with SMEs

### Policy implications of research

---

Our study shows that the small obstacles that require additional work – known as “sludge” – reduce the effectiveness of environmental resource consumption programmes in small and medium-sized enterprises (SMEs) by up to 50 percent. Our analysis reveals that SMEs in particular lack the time needed to overcome such obstacles (for example in the form of unnecessarily complicated communication channels, application

procedures or ordering processes). Policy measures should therefore be screened for potential sludge both before and during implementation to ensure that they achieve their full potential. Our results are intended for political decision-makers who want to optimise the effectiveness of environmental programmes that target SMEs in particular.

## Research approach and results

### Field experiment in collaboration with an environmental programme for SMEs

Our field experiment was conducted in collaboration with a well established, state-funded environmental consulting programme for SMEs in Switzerland. Participating companies were contacted by phone and offered a free, voluntary, no-commitment environmental consulting session. The consultants visit the companies, analyse processes and suggest ways of operating in a resource-centred way. For the purpose of the field experiment, we also offered the companies (n = 173 from various sectors) free environmentally compatible resources (e.g. recycled paper, LED fluorescent tubes, etc.). Doing so enabled them to directly implement some of the consultants' proposals. To assess what impact sludge in the decision-making architecture and programme processes has on the effectiveness of this and similar state-funded environmental programmes, we adopted two different ordering processes for the resources. The resources were always presented by the consultants, who also noted which were of interest to the companies. In the first of two trial conditions (DIRECT), consultants ordered the resources for the companies, thus sparing the SMEs any additional work. In the second trial condition (SLUDGE), the SMEs were asked to place orders themselves on a simple website. This trial condition reflects the structure of many state funding programmes, under which even motivated companies have to invest a certain amount of time and effort in order to benefit from measures. The SMEs were randomly assigned to the trial conditions in such a way that ordering intentions and other characteristics of the SMEs were comparable in each group. Differing order rates are therefore entirely attributable to the fact that the SMEs in the SLUDGE group had to bear minor additional non-monetary costs in order to benefit in full from the measure. Figure 1 provides a diagrammatic presentation of the study processes.

### Minor obstacles (sludge) in the decision-making architecture of environmental programmes reduce programme efficiency by 50 percent

The 173 consulting sessions with SMEs took place in Lucerne, Zug and Zurich between April 2019 and April 2020. 87 sessions took place under the SLUDGE trial condition, 86 under the DIRECT condition. The participating SMEs employed an average of 15 people and the sector split was virtually identical in both trial conditions.

89.7 percent of SMEs in the SLUDGE group intended to place an order, whereas 91.9 percent of the DIRECT group were interested in ordering environmentally compatible resources. This is a small, statistically insignificant difference. However, the actual ordering rate was substantially lower in the SLUDGE group than in the DIRECT group, a difference that is statistically significant. The (extremely small) amount of additional work involved in placing an order meant that just 51.7 percent of SMEs in the SLUDGE group actually placed an order. If no additional work was involved, 91.7 percent of SMEs ordered environmentally compatible equipment that helped them conserve resources (see Figure 2).

It is therefore clear that sludge can have a major impact on SMEs' environmental behaviour. Although small, the non-monetary costs in the decision-making architecture of the ordering process reduced the ordering rate by approximately half. As a result, the number of SMEs who were able to take advantage of simple improvements in their environmental management practices was substantially reduced.

## Key messages

Effective public policy measures are key to solving social problems and actively combating climate change. Small and medium-sized enterprises (SMEs) are an important target group for state-funded environmental programmes, since they account for around 99.9 percent of all companies and for about 70–76 percent of industrial environmental pollution in industrialised countries.<sup>1</sup> Uncomplicated programme processes are key to optimising the success of environmental programmes for SMEs. It should be as straightforward as possible for target companies to apply for help and implement measures. Our study provides causal empirical evidence that sludge – i.e. minor frictions in decision-making architecture and programme processes – reduces the success of state environmental programmes for SMEs by up to 50 percent.<sup>2</sup>

Implementation of environment-friendly business practices by SMEs is frequently connected to the personal values and motivations of the decision makers; potential financial advantages are not a primary driver.<sup>3</sup> Drawing on two additional surveys of approximately 800 SMEs, we show that external factors such as the necessary administrative work and time input have an inhibiting effect on personal motivation of SMEs and become a relevant obstacle to implementing environment-friendly management practices. Publicly funded environmental programmes aimed at SMEs should therefore make access to funding or support for the implementation of environmental measures as simple as possible.

In the light of these findings, we propose conducting regular “sludge audits”.<sup>4</sup> Such audits should be designed to identify sludge in relevant funding programmes, determine the cost of sludge and find out how to remove even minor obstacles.<sup>5</sup> In addition to auditing existing programmes, we also recommend introducing extensive tests in the form of randomised evaluation studies prior to the introduction of new programmes.

<sup>1</sup> Caligorou et al. (2014), Lamoureux et al. (2019)

<sup>2</sup> See Grieder et al., 2023a

<sup>3</sup> Grieder et al., 2023b

<sup>4</sup> See also Sunstein, 2020

<sup>5</sup> See also Cowen et al., 2021, Soman et al., 2019

## What is meant by ...?

**Decision-making architecture:** The (conscious) creation of certain conditions under which people or companies make their decisions, for example in state programmes in which participants or beneficiaries have to take certain decision-making steps so that further (possibly more important) measures can follow.

**Sludge:** Small, frequently unconscious or unnecessary frictions in the decision-making

architecture of state programmes (e.g. in the form of unnecessarily complicated communication channels, application procedures or ordering processes) that could impair the success and effectiveness of such programmes.

**Nudge:** Consciously chosen changes in the physical, social and psychological context of decisions that are intended to impact decisions in a predictable way.

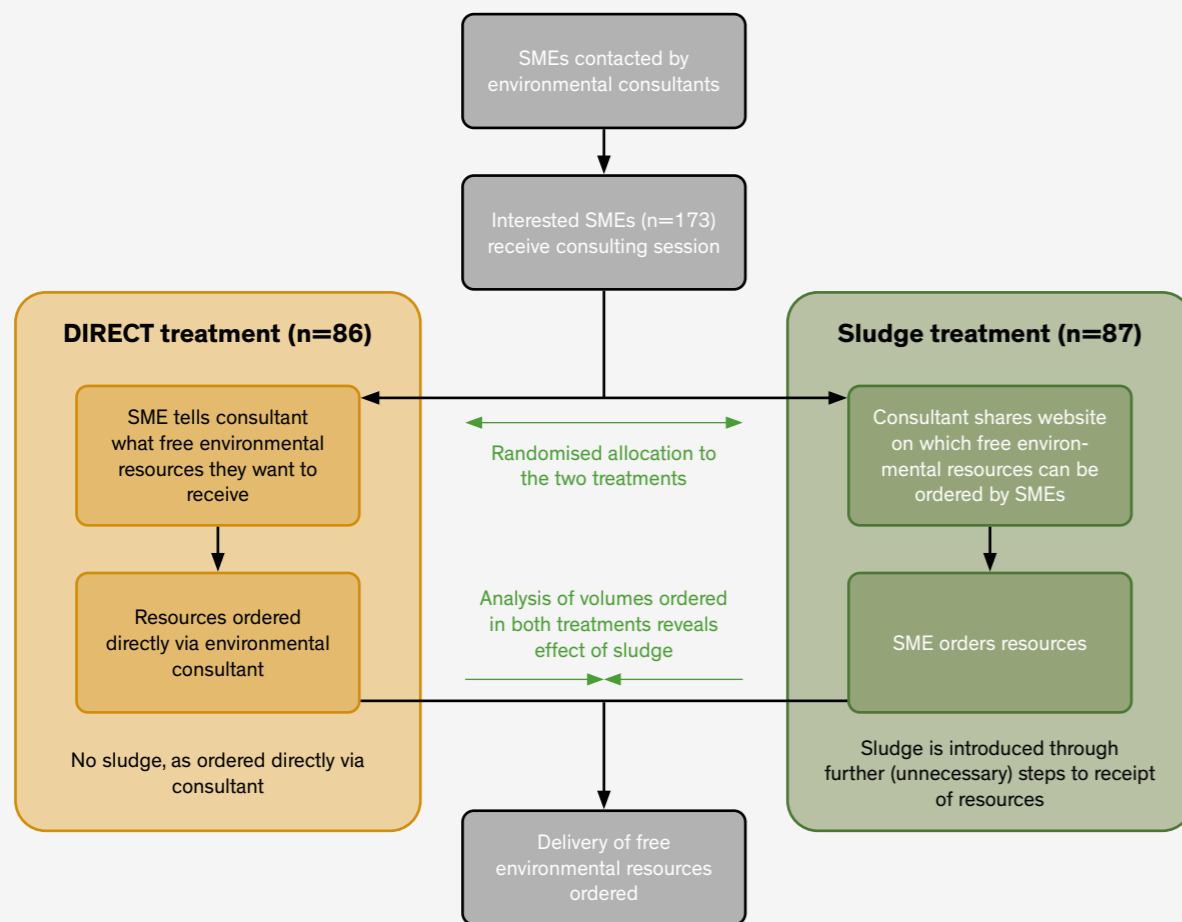
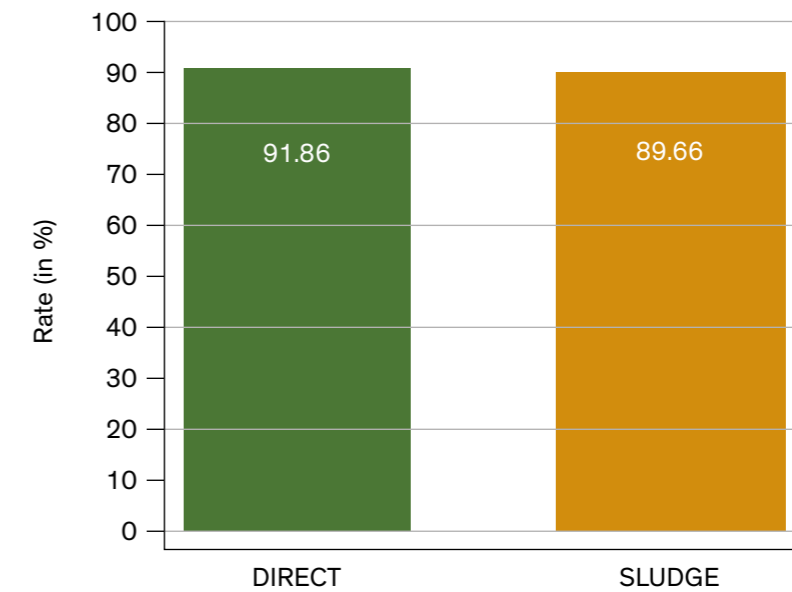


Figure 1:  
Schematic representation of the study process and design

## A. Intention to Order



## B. Actual Order Rate

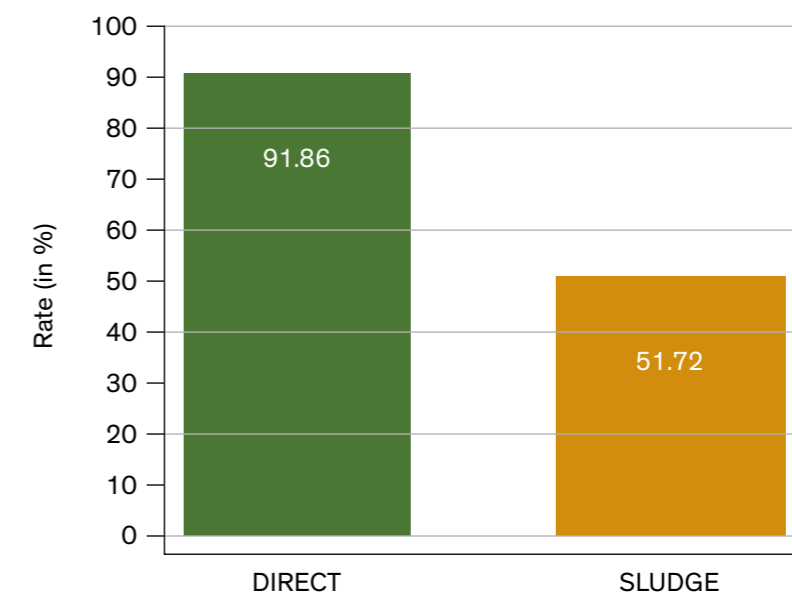


Figure 2:  
Results of the field experiment

## Discussion

---

The results above are based on a random sample of SMEs who took part voluntarily in the environmental consulting programme. This is not generally an ideal starting point for a study of this kind because it means the results are not representative of all SMEs. However, it is remarkable that we can identify the substantial effect of sludge in a population of SMEs

that is already highly motivated to introduce or expand their environment-friendly business practices. This would probably indicate that the negative impact of sludge identified by us is a lower limit and that the effects of sludge would be even greater if environmental programmes are directed at companies with low levels of motivation.

## Conclusions

---

We conducted a field experiment to investigate the effect of sludge on the effectiveness of a state-funded environmental consulting programme for SMEs in Switzerland. The SMEs taking part in the experiment had the opportunity to obtain a range of free environmentally compatible resources that would reduce their resource or energy consumption. Sludge in the form of minor hurdles in the decision-making architecture reduced the effectiveness of the programme by nearly half. Our results show that small and apparently innocuous non-monetary factors can have a

substantial impact on implementation rates for measures intended to encourage positive action. Programmes intended to promote environmentally compatible business practices (and other similar political measures) should therefore be regularly audited for sludge. Furthermore, before new programmes are rolled out, they should be exhaustively tested to identify and eliminate unwanted obstacles. This is the only way to ensure that state funding programmes achieve high levels of efficiency.

## References

---

Calogirou, C., Sorensen, S. Y., Larsen, P. B., Pedersen, K., Rovsing Kristiansen, K., Mogensen, J., Alexopoulou, S., and Papageorgiou, M. (2014). SMEs and the environment in the European Union. PLANET SA and Danish Technological Institute Technical Report.

Cowen, D., Kannan, N., and Soman, D. (2021). Seeing sludge. In Soman, D. and Yeung, C., editors, *The Behaviourally Informed Organization*, pages 73–95. University of Toronto Press.

Grieder, M., Kistler, D., and Schmitz, J. (2023a). How Sludge Impairs the Effectiveness of Policy Programs: A Field Experiment with SMEs. Working Paper available at SSRN: <https://ssrn.com/abstract=4249095>

Grieder, M., Kistler, D., Schlüter, F., and Schmitz, J. (2023b). Not only for the money: Nudging SMEs to promote environmental sustainability. Working Paper available at SSRN: <https://ssrn.com/abstract=4351587>

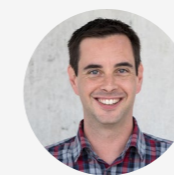
Lamoureux, S. M., Movassaghi, H., and Kasiri, N. (2019). The role of government support in SMEs' adoption of sustainability. *IEEE Engineering Management Review*, 47(1):110–114.

Soman, D., Cowen, D., Kannan, N., and Feng, B. (2019). Seeing sludge: Towards a dashboard to help organizations recognize impedance to end-user decisions and action.

Sunstein, C. R. (2020). Sludge audits. *Behavioural Public Policy*, pages 1 – 20.

### Authors

---



**Manuel Grieder**  
UniDistance Suisse  
Faculty of Economics and  
Zurich University of Applied  
Sciences (ZHAW)  
Center for Energy and the  
Environment  
[manuel.grieder@fernuni.ch](mailto:manuel.grieder@fernuni.ch)



**Deborah Kistler**  
ETH Zürich  
Department of Humanities  
Social and Political Sciences  
Chair of Economics  
[deborah.kistler@econ.gess.ethz.ch](mailto:deborah.kistler@econ.gess.ethz.ch)



**Jan Schmitz**  
Radboud University  
Nijmegen  
Institute for Management  
Research  
Department of Economics  
[jan.schmitz@ru.nl](mailto:jan.schmitz@ru.nl)

## About NRP 73

---



[www.nrp73.ch](http://www.nrp73.ch)

The National Research Programme “Sustainable Economy” (NRP 73) was launched by the federal council with a global budget of CHF 20 million for five years of research starting mid-2016. It funded 29 research projects in different thematic areas such as Circular Economy, Finance, Building & Construction, Cities & Mobility, Forestry, Agriculture & Food, Supply chain, Sustainable Behaviour and Governance. NRP 73 aims at generating scientific knowledge about a sustainable economy that uses natural resources sparingly, creates welfare and increases the competitiveness of the Swiss economy.

## Publisher

---

**National Research Programme  
“Sustainable Economy” NRP 73**  
Swiss National Science Foundation SNSF  
Wildhainweg 3  
3001 Bern

May 2023

## Contact

---

**Irina Sille**  
Programme Manager NRP 73  
SNSF, Wildhainweg 3  
3001 Bern

T: + 41 (0)31 308 22 20

E: [nrp73@snf.ch](mailto:nrp73@snf.ch)

**Disclaimer:** This Policy Brief was funded by the National Research Programme “Sustainable Economy” (NRP 73) of the Swiss National Science Foundation. Responsibility for the content rests with the authors.