

Are digital locks really an environmental burden?

By Rebecca Grenthe & Madeleine Andersson (June 2023)

Digital locks have multiple benefits for users. They increase the transparency and safety of facilities, increase efficiency and eliminate issues of lost keys. However, these locks bring an added environmental burden because of the inclusion of electronics. As we stand in front of great challenges with limiting the impact of climate change – are the benefits of smart locks worth their added environmental burden?

Companies are accelerating their digitalization journey to be competitive in a changing environment. Digitalization is key to creating new smart solutions in line with emerging customer expectations. In addition, companies are expected to operate sustainably and responsibly with a minimized negative environmental impact. Digital products are today characterized by a heavy carbon footprint in raw materials and complex supply chains, and in this study, the digital locks investigated have proven to have a higher environmental burden compared to mechanical, conventional locks.

Furthermore, smart, and digital access solutions have the potential to enable downstream customers to accelerate their operations to become more sustainable. The reduction of indirect emissions and surrounding benefits are for example optimized transport delivery for products or services, less transportation connected to physical key management, and an overall more flexible operation.

So how does this influence the operations of companies today? Firstly, in order to reach sustainable benefits with digital locks, the operation must contain significant transportation connected to key management. Secondly, there must be a possibility for digital locks to generate behavioral changes that minimize this transportation.

Taking a school facility management company as an example, they have reduced their operational emissions by approximately 25 000 kg CO₂-eq annually due to eliminating the trips to the head office. This annual reduction of

emissions has also shown to be higher than the emissions from acquiring the system, meaning that the environmental break-even point is reached in less than a year. Similarly, a study on home care services also shows a break-even point in around two years when transitioning.

So, can the added environmental burden of electronics be justified in digital locks? The answer from the cases in the study is yes, the avoided emissions exceed the direct environmental impact during the lifetime of the locks.

Avoided emissions have therefore proven to be of a significant size compared to the emissions for producing the products. This is great, but it still leaves questions such as if, how, and by whom these can be accounted for?

Companies are struggling with reaching high-target sustainability goals. Accounting for emissions like these can be a way to reach net-zero emissions and create incentives to develop more sustainable products. Even if the discussion of avoided emissions is only starting, it is an important dimension of the sustainability perspective on digital transformation.

Knowing how the products affect the end users are crucial when developing new products. As the digital transformation continues, more smart access solutions will appear on the market. Time will tell where digital locks find their optimal place in smart city development, but it is most certain that they will have an important role.

This popular scientific article is derived from the master thesis: *Smart Locks – A case study for comparing digital and mechanical locks from a sustainable perspective*, written by Rebecca Grenthe and Madeleine Andersson (2023).