



From Consumer Insight to Circular Impact

Market Report of Circular Business Models in the
Electronics Market in Germany



Executive Summary

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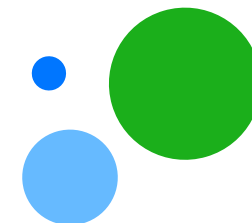
Circular business models can help increase the productive use of resources in electronics – how users handle devices along the life span plays a crucial role

Electronic devices are essential in daily life, but their widespread use has led to environmental challenges. Circular business models—such as second-hand sales and rental services—are key to mitigating these effects by extending the useful life of a product or intensifying the usage. Both of these levers may ultimately generate more value for the users with less physical devices, which may lead to a reduction in the need for new resources. However, the actual impact of such circular offerings hinges on how devices are used in practice, which is not well understood. This report examines B2C (business-to-consumer) and B2B (business-to-business) segments in Germany for smartphones, laptops, cameras, and gaming consoles to identify usage patterns and sustainability effects of circular business models.

Key results on personal use – B2C

- Adoption: 20% of consumers in Germany have purchased their current device second-hand, whereas only 1% rent electronic devices and adoption could increase eightfold for rental and double for second-hand, based on consumer intention
- Sustainability conscious individuals are the primary drivers of the second-hand market (30% adoption) - monthly income also has an effect
- Price, warranty, convenience, brand, and repairability dominate purchase decisions for electronic devices in general

- Cost savings and sustainability drive second-hand purchases, but many consumers still prefer having a new device. Warranty could be a critical enabler for second-hand adoption
- Consumers intent to use their second-hand devices for just as long as their new devices (e.g. 3.6 yrs for smartphones), underlining the potential for life span extension
- Second-hand offerings have an effect on consumption behavior, which may induce positive or negative environmental impact. 42% buy more often, 23% buy more devices due to the availability of second-hand
- The primary barrier to adopting rental models is the desire for ownership – however, offering financial incentives could serve as an enabler
- Rental users value flexibility, latest technology access and technical support (separate survey conducted)
- Rental offerings enable access to more devices (for >39%) and more frequent upgrades (for 41%) – the environmental rebound effect remains to be quantified
- Consumers in Germany are familiar with repair services, but concerns about financial attractiveness (for 52%) and ineffectiveness remain key barriers for increasing repair rates
- Selling second-hand is becoming a preferred option for unused devices (23%), overtaking storage as back-up (21%), which could spur recirculation



Executive Summary

(2/2)

Key results on business use – B2B

- In contrast to B2C, adoption of rental (11%) and second-hand-purchase (30%) already plays an important role in B2B markets.
- Companies use second-hand devices for as long as new ones, but for over a year longer than private consumers (e.g. 4.6 yrs for smartphones)
- Sustainability plays an important role for companies procuring IT. It is the most important purchase criterion for large companies (60%). Flexibility and convenience also dominate over price as common purchase criteria
- Sustainability and price are central for second-hand adoption, immediate availability, flexibility and data security being key enabler for additional adoption
- Services and flexibility are the key strengths of rental offerings for businesses (separate survey conducted)
- Quality concerns (54%) and limited flexibility (43%) hinder the adoption of second-hand devices, lack of awareness (32%) and financial reasons (32%) are the main barriers to rental offerings, highlighting the opportunity for providers to enhance the visibility of their services
- In companies, broken devices are often directly discarded (70%), highlighting the potential for extending device life spans through more repair

- Warranty (88%) and concern about high internal effort (79%) are key criteria for companies when deciding whether to repair broken smartphones or laptops
- Most companies (70%) recycle their unused devices, yet a substantial proportion (60%) keep smartphones and laptops in storage, indicating a substantial untapped potential in harvesting B2B second-hand devices for repair and reuse across both B2B and B2C

In summary, we observe significantly higher adoption rates for rental and second-hand offerings in B2B markets compared to B2C, although consumer intentions in B2C suggest considerable potential for future growth. Further uptake could be achieved by addressing key concerns - such as price, warranty, and flexibility in B2C, and quality, flexibility, price, availability, and data security in B2B. Additionally, increasing the visibility of these offerings would enhance adoption.

There are potential rebound effects on consumer behavior, particularly in the B2C market, that require further investigation. However, the findings indicate substantial potential for environmental benefits, such as extending the life span of products through second-hand use and recirculating unused business devices.

We will investigate this impact potential in more detail as part of the ongoing work. Stay tuned for more results from UNDRESS Circularity in 2025.



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Introduction & About the Study



Intro

Circular business models can help increase the productive use of resources in electronics – how users handle devices along the life span plays a crucial role

Consumer electronics play an integral part in our daily lives, but cause severe environmental problems

Electronic devices have become essential in both private and professional settings. Rapid technological advancements have revolutionized forms of communication, data processing, creativity, and entertainment. Germany's B2C market for entertainment electronics, mobile phones, and IT products accounts for around €30.3 billion (GFU, 2023). In the EU, individuals own an average of 9 connected devices (Statista, 2023). In Germany, there are approximately 96 million laptops and 104 million smartphones currently in use*.

However, this proliferation has caused severe environmental problems, e.g. from mining and the extraction of raw materials, complex waste generation, and the release of substantial greenhouse gas emissions, posing a significant global challenge (European Parliament, 2021). The United Nations predict that the annual amount of electronic waste, currently at 62 million tons p.a., will double by 2050, thus making it one of the fastest-growing waste streams worldwide (UNitar, 2022).

Circular business models can foster a more sustainable electronics industry by decoupling product use from resource consumption

Offerings such as second-hand and rental models aim to extend the life span of devices and to increase the utilization of devices that are only occasionally used. These business models have gained traction in both consumer (B2C) and business (B2B) markets. The potential of the B2B sector is especially attractive due to the market size (62% of laptops and 49% of smartphones in Germany are used by businesses*), order quantities, and professional management. However, the ultimate environmental impact of these offerings hinges on whether they positively change how devices are used in practice.

To assess the impact, we need to analyze how circular business models affect user choices and behavior

To optimize these models, it's essential to understand their effects on device use across a device's life span: Do they guarantee more intense or prolonged use? When do they provide the greatest benefits? How does their impact differ in B2B and B2C contexts?

Understanding consumer behavior and the rebound effects of second-hand and rental offerings is crucial for enhancing a device's life span and utilization. However, data on consumer behavior and the effects of these business models on it remains scarce.

Intro

This market research provides insights into consumer behavior regarding circular offerings for both private users (B2C) and business users (B2B)

To assess the user behavior in the context of circular business models, two representative surveys were conducted in the German B2C and B2B markets for electronic devices. The research was conducted with Verian (B2C) and the Institut der deutschen Wirtschaft (B2B).

Additionally, data was collected from actual rental service customers of two companies to gain deeper insights into this smaller user segment. This data is analyzed separately on highlighted pages.

The research focused on four key aspects of consumer behavior impacting the life span and utilization of electronic devices:

Adoption of rental and second-hand models

Analysis of user characteristics, choices, and motivations at the decision-making stage to gauge the potential of circular business models.

Behavior change and rebound effects

Assessment of changes in consumption behavior due to circular offerings, including potential increases in consumption.

Repair

Analysis of the handling of broken devices and consumer attitudes towards repair as critical factors, impacting the life span of the device.

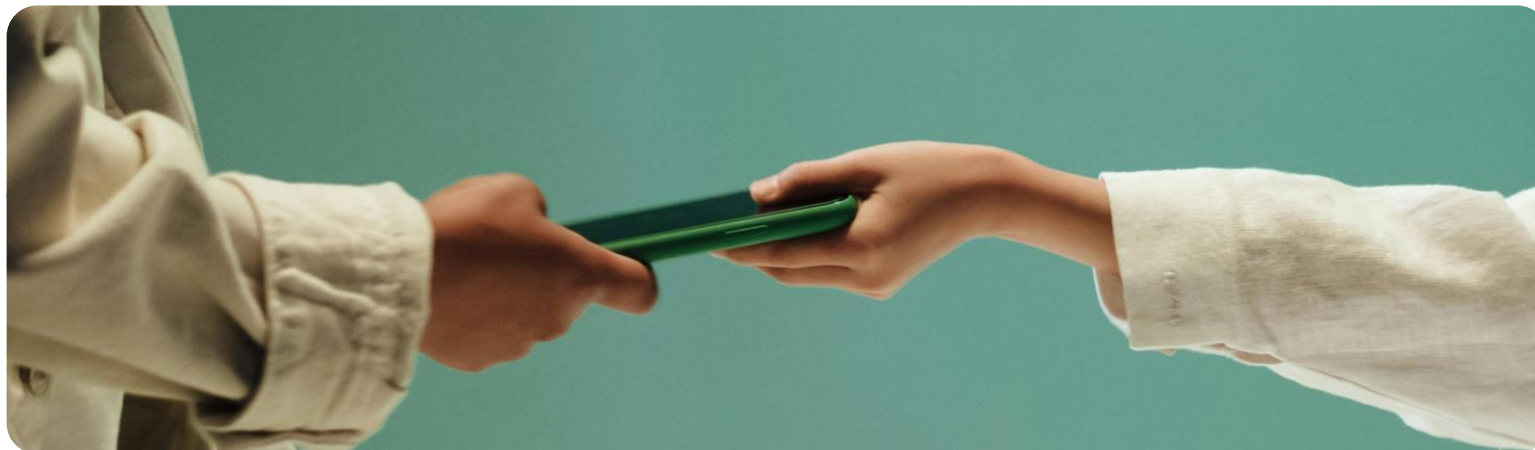
End-of-life treatment

Investigation of user behavior at the end of a lifecycle, which may impact on further lifecycles or adequate recycling.

The surveys focused on four device categories: smartphones, laptops, cameras, and gaming consoles, covering both frequently and infrequently used devices to analyze different usage patterns and their impact.

The results provide valuable insights into both the market penetration of circular business models in electronics, and consumer behavior throughout a device's lifecycle. This report outlines these findings, structured around the four key aspects of consumer behavior, first for the B2C and then the B2B segment.

The market research was conducted as part of the project UNDRESS Circularity, an industry initiative developed to assess the impact of circular business models, as detailed on the next page.



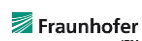
About

UNDRESS Circularity

UNDRESS Circularity is a collaborative industry project led by Circularity in collaboration with Fraunhofer IZM, Systemiq, and 12 industry partners (Assurant, circulee, everphone, fixfirst, Foxway, Grover, Ingram Micro, rebuy, Recommerce Group, Reverse Logistics Group, Deutsche Telekom, Vodafone), further supported by Deutsche Bundesstiftung Umwelt and Deloitte. Circularity is a circular economy do-tank and business consultancy. Leveraging data from this market report as well as industry data from the partners and experts, the consortium jointly develops a methodological framework and practical guide to outline the impact of business models on a device's life span and utilization.

This initiative offers a unique opportunity to make these impacts measurable, transparent and comparable. The methodology will be transferable to other industries beyond electronics, thus contributing to developing a truly resource-efficient circular economy.

The final results of the UNDRRESS Circularity project will be published in March 2025. More detailed information about the project can be found in section 05.



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We are excited to present the results of this market report as the first building block of our industry project UNDRESS Circularity. The detailed insights into user behavior are essential for our work on a practical guide to measure the impact of circular business models. We aim to make this a highly valuable outcome to industry practitioners, investors and policy makers alike to advance the uptake of truly sustainable circular solutions.

We would like to thank our project partners for their active involvement and contributions thus far and we look forward to continuing our collaborative work over the next months.



Dr. Marianne Kuhlmann & Dr. Paul Wöbkenberg
Founders of Circularity

Results of the Consumer Survey in the B2C Sector

Insights into the adoption and use of circular business
models amongst private customers


About the Survey


The results are representative of the German market.

This market research was conducted via an online survey by Verian in June 2024, involving **1,023 participants across Germany**. The survey ensured balanced representation of gender, age, and income, thus providing a robust foundation for analyzing trends and consumer preferences for smartphones, laptops, digital cameras, and gaming consoles — devices categorized based on their frequency of use.

Participants indicated which devices they generally use. If a respondent used multiple focus devices, questions targeted two randomly selected categories, resulting in a total of 1,774 devices considered. Completion rates of the survey were 75% for smartphones, 52% for laptops, and around 23% for cameras and gaming consoles.

For further analysis, participants were categorized into **two segments** based on their consistent focus in making purchasing decisions:

 **Sustainability conscious consumers (23%):** Prioritize sustainability and repairability, seeking products with environmentally-friendly manufacturing or suitable second-hand options.

 **Tech enthusiasts (15%):** Value the latest models, innovative features, and distinctive design and brand attributes.

Due to low rental model penetration, the sample did not yield enough respondents to draw reliable conclusions on user behavior in this segment. Therefore, a **separate survey** was conducted amongst customers of Grover, a rental service provider. As these findings are not representative of the general population or the provider's customers, they will be presented on separate pages.



What do consumers in Germany look for when buying electronics?

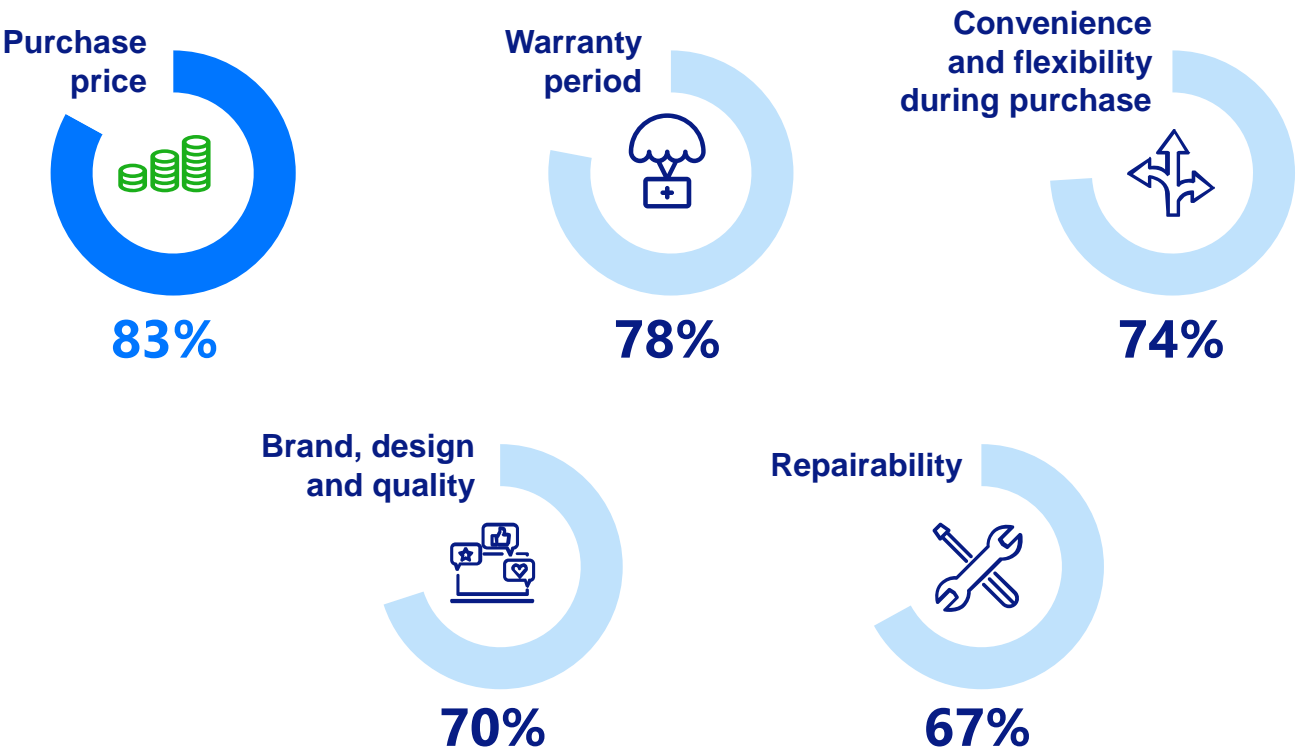
Price, warranty, convenience, brand, and repairability dominate purchase decisions for electronic devices

Comprehension of the general criteria for consumers making a purchasing decision is crucial to understanding their motivation for and against certain aspects of rental and second-hand business models.

Price is the most important purchase criterion

The top five criteria for choosing an offering for electronic devices are purchase price (83%), length of warranty period (78%), convenience of the purchase experience (74%), brand (70%), and repairability (67%). Interestingly, sustainability and model novelty are rated least important.

Fig. 1: Top 5 purchase criteria
Q.: In general, how important are the following criteria to you when selecting electronic devices?
(multiple choice, showing answers for important and very important)



Are circular business models used in practice?

One in five consumers in Germany has purchased their current device second-hand, whereas only 1% rent electronic devices

Circular business models in the consumer electronics sector are seen as pivotal for a resource-efficient sustainability transition, but for their potential impact to materialize, they need to reach relevant market share.

Consumers were surveyed regarding the uptake of second-hand and rental devices in general:

21% of the German population own at least one second-hand electronic device

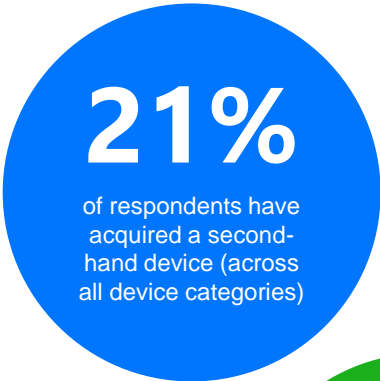
The findings indicate a slight increase in adoption rates compared to 19% in 2023 (Verbraucherzentrale, 2023). Currently, 14% of all devices in use are second-hand, with gaming consoles leading at 17%, followed by smartphones (14%), laptops (13%), and digital cameras (9%).

Market penetration of rental models remains low

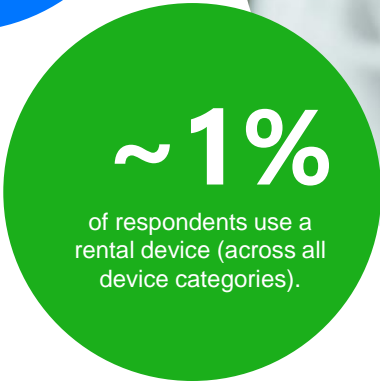
Albeit the increasing public debate about rental being a key circular business model, actual market penetration is still very limited. With only 1% of consumers renting electronic devices, the results of this survey align with prior consumer reports.

Fig. 2: Adoption of second-hand and rental concepts

Q.: When you think about your current primary device: Was this device new or used when you acquired it?



Q.: How did you acquire the new device?



Will adoption increase in the future?

Traction of second-hand and rental offerings is expected to increase substantially, if consumers act according to their intentions

Consumers currently using a new device were surveyed about their future intention to acquire second-hand or rental devices to gauge potential market trends. 67% of consumers in Germany who are currently using a new device do not plan to use second-hand or rental options in the future.

The number of second-hand devices could double

However, 22% of these new potential customers intend to buy second-hand devices in the future. Amongst sustainability conscious consumers currently using new devices, this percentage is even at 25%.

Fig. 3: Procurement methods in the future

Q.: Can you imagine using rental or second-hand offerings in the future?

(Results only represent participants who have currently bought new devices, multiple choice possible for second-hand and rental)

This highlights a significant market potential for growth beyond the 21% of current second-hand users (see previous page). When considering the number of devices, the share of second-hand devices could more than double if projected second-hand purchases are added to the existing second-hand devices (data not shown).

Starting low, rental devices would increase eightfold

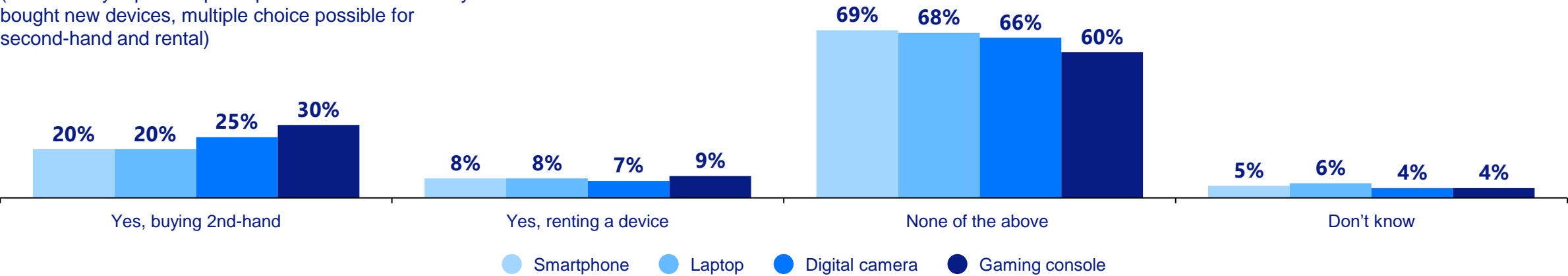
8% of consumers currently using a new device can imagine renting a device in the future, irrespective of whether they are sustainability conscious or not (data not shown).

Considering that only 1% of the general population has experience with renting an electronic device, this indicates a substantial gain in market traction. The number of rented electronic devices would increase eightfold if consumers acted according to their rental intentions (data not shown).



Intention-action gap

Consumers reported the intention to use significantly more second-hand and rental offerings. While the projections for adoption based on their intentions look very promising, it is important to consider that a person's stated intentions and what they actually do might differ, a phenomenon often referred to as „intention action gap.



Who is buying second-hand devices?

Sustainability conscious individuals are the primary drivers of the second-hand market – monthly income also has an effect



To better understand the current second-hand market for electronics and to derive useful insights to enhance the second-hand market's impact on devices' life spans, various analyses of user demographics were conducted.

Sustainability conscious consumers put their money where their mouth is

Among those prioritizing sustainability in device purchases, 30% own second-hand devices, which is 9% higher than amongst the general population. In contrast, only 8% of tech enthusiasts own second-hand devices.

The use of second-hand devices is nearly consistent across age groups

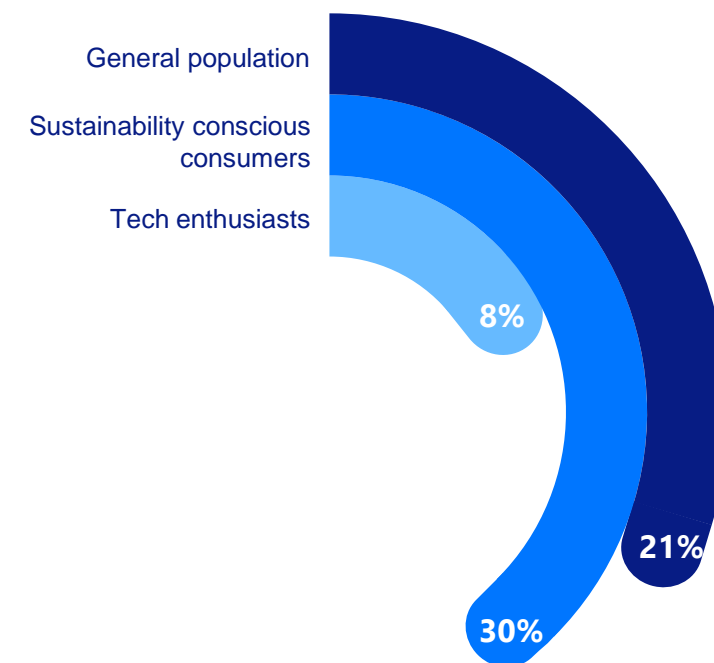
Approximately 30% of consumers aged 16–25 own second-hand devices, while ownership in other age groups hovers around 20% (data not shown).

Income has a mild effect on second-hand adoption

Individuals with a monthly income of less than €1,500 are the most frequent buyers of second-hand devices (26%), but one in five individuals with higher incomes (€2,500-4,500/ month) also buys second-hand (data not shown).

Fig. 4: Share of second-hand owners in different customer segments

Q.: Was your primary device new or used when you acquired it? (single choice)



Why do consumers choose second-hand devices – and why don't they?

Cost savings and sustainability drive second-hand purchases, but many consumers still prefer having a new device

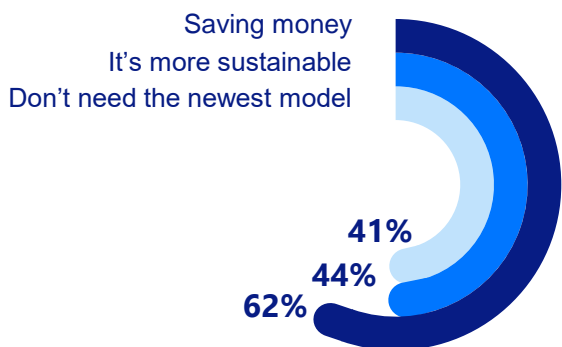
The adoption of second-hand products depends on consumer motivations and perceived barriers to acquire used devices. To understand these factors, consumers were surveyed about their reasons for choosing or avoiding second-hand devices.

The main reason for buying second-hand devices is price, followed by sustainability

The primary reason mentioned is cost savings, cited by 62% of consumers, followed by sustainability, chosen by 44%. The price attractiveness correlates with the higher proportion of lower-income buyers for second-hand devices shown previously.

Fig. 5: Reasons for buying second-hand

Q.: Why did you decide to buy a second-hand device? (multiple choice)

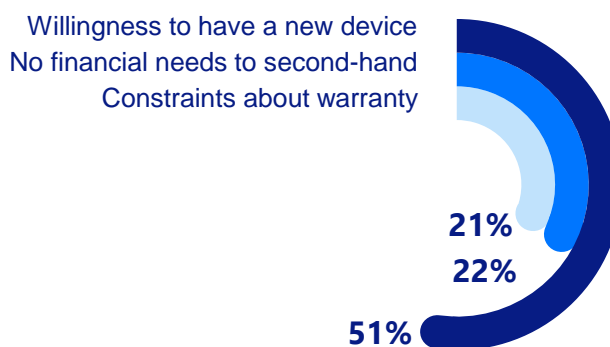


The allure of new devices remains strong for the majority of consumers

A preference for new devices remains strong, with 51% of respondents favoring new over second-hand. While 22% state they can afford buying new devices as a reason against second-hand, 21% are deterred by the lack of warranties. The legal minimum warranty for second-hand devices is one year, which is below the legal warranty for new devices (two years), although some providers offer longer warranties for second-hand. However, it is unclear whether consumers find this insufficient or are simply unaware. These concerns are consistent among both sustainability conscious and tech-savvy consumers, although the preference for new devices is slightly lower among the former group (37%).

Fig. 6: Reasons for not buying second-hand

Q.: For what reasons did you not obtain a second-hand device for this purchase? (multiple choice)



Warranty could be a critical enabler for second-hand

The significance of warranties, cited as a top purchase criterion and a major reason against buying second-hand, highlights an opportunity for second-hand service providers to attract consumers with warranty offerings. Some professional second-hand platforms already offer superior warranty compared to new devices (e.g. three years). Making consumers more aware of these may lead to increasing their market share.

Consumers need to be convinced

Clearly buyers are anywhere between prudent and skeptical when buying second-hand. A first positive second-hand experience may lead to further purchases of other devices– putting topics like customer experience and relationship management on the top of the supplier's agenda.

Are second-hand devices used for shorter periods than new devices?

Consumers intent to use their second-hand devices for just as long as their new devices

To assess the potential of circular offerings to prolong the life span of devices, consumers were asked about the (expected) duration of use for both new and second-hand devices.

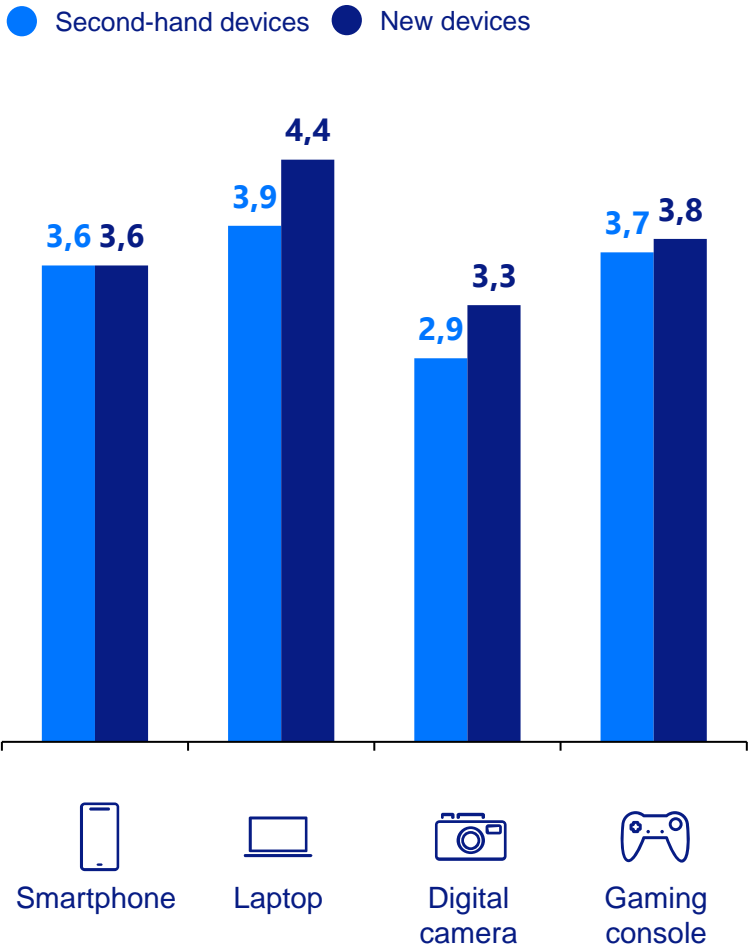
(Expected) duration of use of second-hand devices is similar to that of new devices

New devices have an average "first life" of 3.9 years, with digital cameras averaging 3.3 years and laptops 4.4 years. For some second-hand devices, the "second life" duration is as long as the "first life," such as for smartphones and gaming consoles, while it is slightly shorter for laptops and digital cameras, by approximately 10%.

When analyzing second-hand smartphones, it was found that 56% of them are Apple devices and 28% are Samsung devices. The average usage duration remains consistent, regardless of the brand (data not shown).

Fig. 7: Average duration of use for new and second-hand devices (in years)

Q.: Combination of questions "How long have you already used your current device?" and "How long are you still planning on using your current device?"



The crux of total lifetime estimation

The comparable durations of "first" and "second" lives in devices do not necessarily imply that second-hand sales double a device's total life span. It remains unclear for how long a particular second-hand device was used prior to the purchase, or whether a particular new smartphone is resold in practice.

However, these similar durations indicate a significant potential for extending useful device life through second-hand sales. More detailed lifetime data at the device level will be provided in the next publication in March 2025.

Can second-hand offerings have unintended rebound effects?

Second-hand offerings can affect consumption behavior, which may induce positive or negative environmental impact

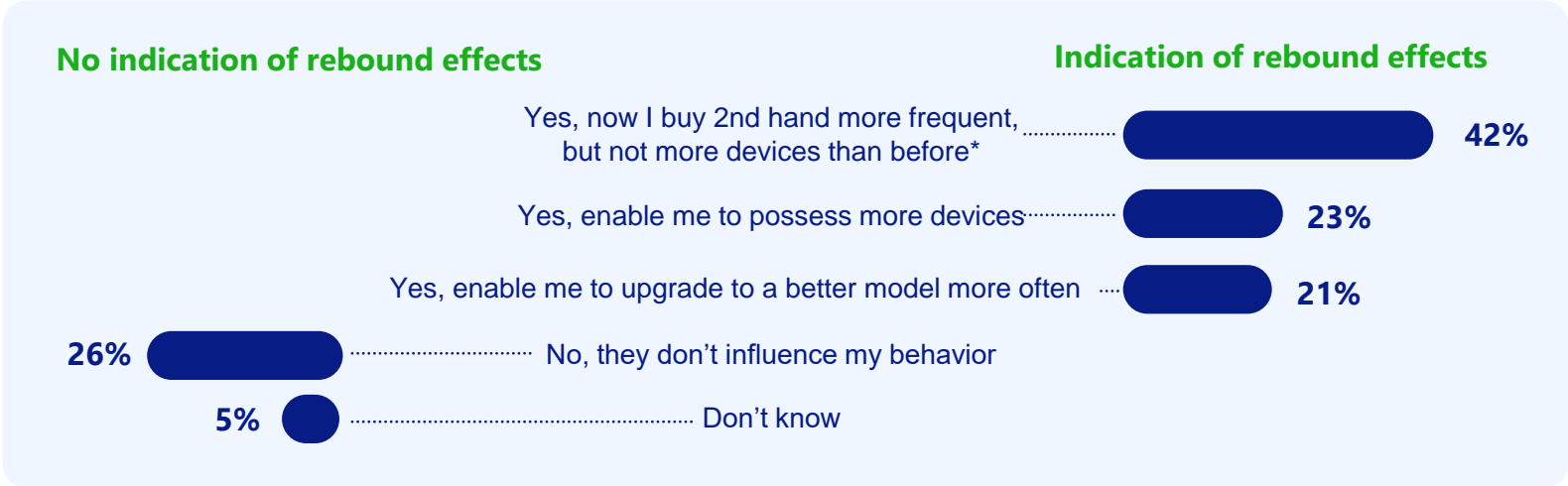
To fully understand the environmental impact of circular offerings, consumers were asked how the availability of second-hand options has influenced their consumption behavior.

The option to buy second-hand devices significantly impacts consumption patterns

42% of respondents who purchase second-hand devices report increased purchasing frequency, and 23% state that second-hand options enable them to own more devices overall. This trend is also evident among sustainability conscious consumers (data not shown).

Fig. 8: Change of consumer behavior due to second-hand offers

Q.: Have second-hand offerings changed your general purchase behavior?
(multiple choice)



**Note: The overall environmental impact depends on whether second-hand benefits outweigh the resource consumption from more frequent purchases and how second-hand offerings affect the complete lifecycle of devices. The results indicate potential rebound effects but cannot confirm them, as these factors are not captured by the data.*



The impact of rebound effects of second-hand models

Circular business models can have a positive environmental impact by extending device life spans and intensifying usage, thereby offering more value to consumers while reducing the overall demand for new devices. However, these models may also lead to unintended rebound effects, such as increased consumption. Our data indicates that consumers report higher purchase frequency and an uptick in the number of devices owned, even among sustainability-conscious individuals. More frequent purchases may yield a negative impact in some cases (e.g. additional effort through refurbishment and transportation) but may also be a positive indication of higher utilization of otherwise unused devices. The exact impact of this consumer behavior on the demand for new, virgin products will be explored in our next report, to be published in March 2025.

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These new insights from assessing consumer behaviour are very interesting to us. They align with our strong focus on setting the standard when it comes to product and service quality.



Clare Egan, Head of Sustainability
rebuy

Why do consumers use rental models – and why don't they?

The primary barrier to adopting rental models is the desire for ownership – however, offering financial incentives could serve as an enabler

Given the very low adoption rate (1%) of rental offerings, consumers were asked about their motivations to use or not use rental services. However, the number of respondents currently renting electronic devices in Germany was too low for a representative demographic and motivational analysis. To address this issue more thoroughly, a separate survey was conducted among customers of a rental service provider, with the results summarized on the following page. Meanwhile, insights were gathered from non-renters on why they avoid renting:

Most consumers in Germany still prioritize ownership over access

51% of respondents prefer owning devices over renting, showing a notable decrease from previously 77% (as found in the study conducted by Consors Finanz BNP Paribas, 2022), indicating a potential shift in attitudes towards rental models. This preference is equally strong across age groups (data not shown). Additionally, 35% of all respondents prefer ownership over renting because they intend to use devices long-term.

Perceived financial attractiveness could be an enabler for rental

34% of respondents find rental options financially unattractive. When asked about changes that would make them more likely to consider renting, 55% cited price as the decisive criterion (data not shown). These findings suggest that while resistance to rental models is declining, financial competitiveness remains a critical factor for broader adoption.

Fig. 9: Top 3 reasons for not using rentals

Q.: Which were the reasons for deciding not to rent this device?

(multiple choice, 3 most frequently mentioned, across all device categories)



What do people say who rent devices?

Rental users value flexibility, latest technology access and technical support

An additional survey was conducted among a randomly selected group of customers from Grover, a rental service provider, to gain insights into the characteristics and preferences of rental users. This data was analyzed separately from the main survey. Although it is not representative of the general population, it yields valuable insights into consumer experience with rental offerings*.

Adoption of rental offerings is similar across age groups

The data shows no significant variation in adoption rates across different age groups between 16 and 65 years (data not shown).

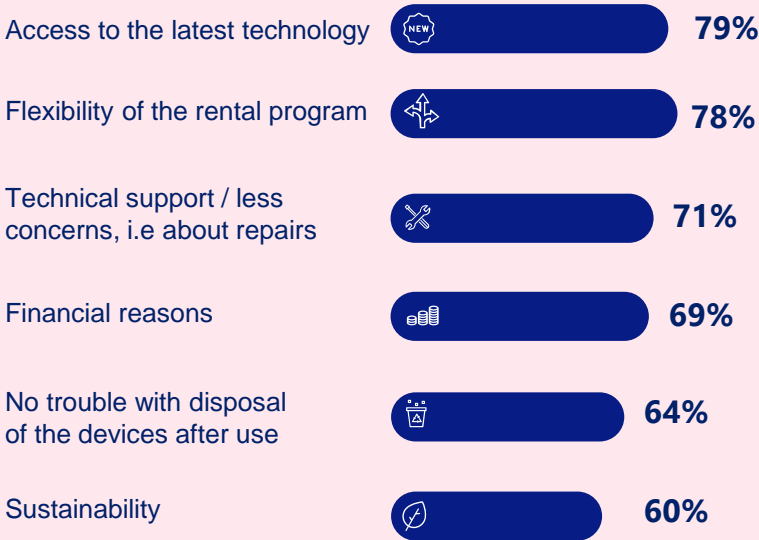
Flexibility, technology access and support are the USPs for B2C rental

Most rental customers in this group prioritize access to the latest technology (79%), flexibility (78%) and technical support (71%). Financial reasons are ranked fourth (69%), followed by increased convenience at the end-of-life of a device (64%) and sustainability (60%).

Fig. 10: Top 5 reasons for using rental devices

Q.: Why did you decide to rent the device?

(multiple choice, answers showed for most / fully agreed with)



Survey conducted with partner Grover :



Rental: financially attractive – or not?

Interestingly, customers of the rental service provider find rental financially appealing and appreciate the flexibility it offers. This seems contradictory to the general population's perception of the rental's low financial attractiveness in the main survey. A possible explanation is that for these customers, the financial appeal lies in the flexibility of monthly payments and the freedom to stop paying at any time, rather than comparing the overall cost of rental to ownership. Clearer communication of the economic advantages may be able to boost the adoption of rental offerings.

- **Survey Format:** Online survey
- **Respondent Recruitment:** Invitations were sent via email to Grover's existing customer base
- **Sample Size:** N = 807 valid responses
- **Renters:** 540 respondents (67%) are currently renting at least one device category

*Responses may be influenced by the specific offerings of Grover.

Can rental offerings have unintended rebound effects?

Rental offerings enable access to more devices and more frequent upgrades – the environmental impact remains to be quantified

Rental users keep their devices for short periods

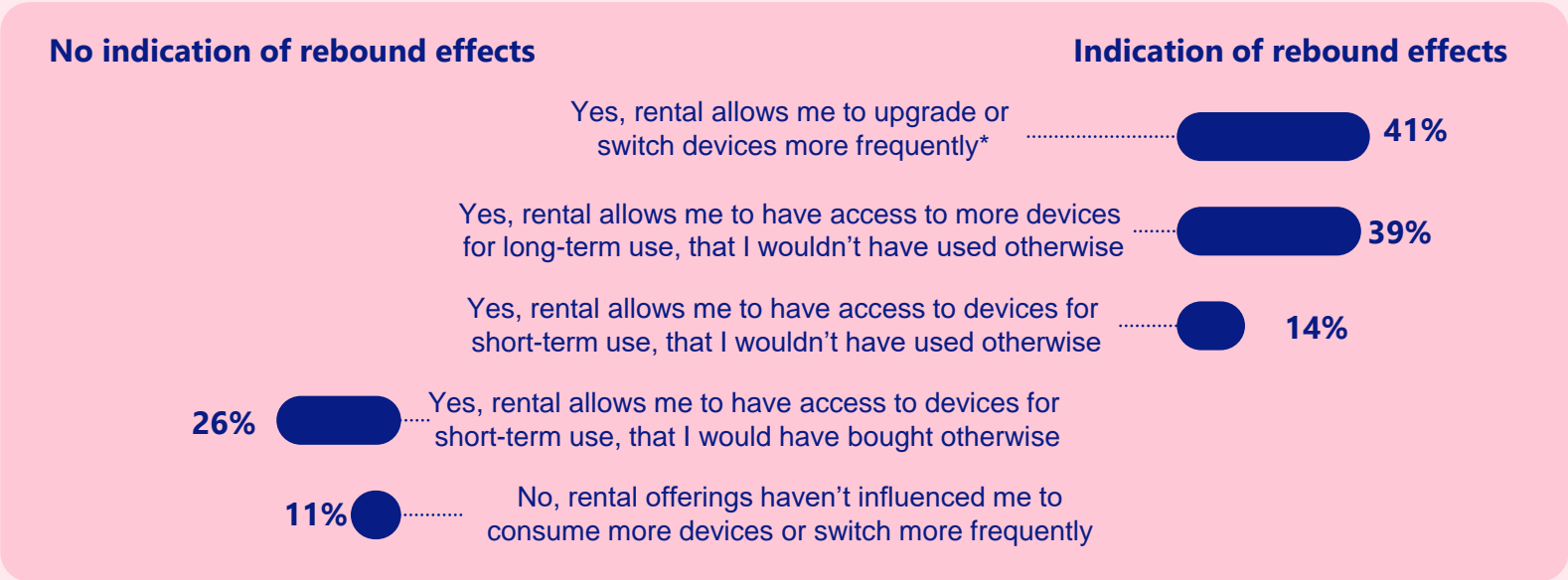
The majority of respondents from this group have used their current device for less than a year. Additionally, most customers plan to use their current device for only the next two years (data not shown).

Fig. 11: Change of consumer behavior due to rental offers

Q.: Have rentals changed your general purchase behavior? (multiple choice)

Rental offerings may increase the number of devices used

Rental offerings have resulted in greater device access among respondents. 41% state that renting allows them to upgrade their devices more frequently. 39% confirm that they are now renting devices they would not have used otherwise. However, more importantly, 26% mention that rental enables access to devices only for the needed period without purchasing them. 11% report that rental options have not led to increased device usage or upgrades.



*Note: The overall environmental impact depends on whether rental benefits (e.g. higher utilization) outweigh the resource consumption from more frequent device changes and how rental offerings affect the complete lifecycle of devices. The results indicate potential rebound effects but cannot confirm them, as these factors are not captured by the data.



Shorter usage – more or less impact?

The answer is nuanced. For frequently used devices like smartphones and laptops, shorter usage cycles and more frequent upgrades could lead to increased refurbishment and logistics efforts, possibly driving up resource consumption. Conversely, for infrequently used devices, frequent short-term use cycles may increase utilization, resulting in less negative environmental impact. This aspect will be explored further in the ongoing project.

More devices – more consumption?

Current data suggests that rental models may increase overall device consumption. However, to accurately assess the impact of this consumer behavior, it is essential to consider the data within the broader market context of new, second-hand, and rental devices. A holistic analysis will be presented in our next report in March 2025.

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We see that customers appreciate the many advantages of rental, especially the flexibility and peace of mind. Through UNDRESS Circularity, we aim to enhance the environmental benefits of our business model and enable a more robust and consistent way to measure its impact.



**Lisa Steffenhagen, Senior Sustainability Manager
Grover**

Are electronic devices being repaired to extend their lifetime?

Consumers are familiar with repair services, but concerns about financial attractiveness and ineffectiveness remain key barriers for increasing repair rates

Repair services can play a crucial role in extending a device's useful life. Repairability is a significant purchase criterion for 67% of the German consumers. To examine repair practices, consumers were surveyed about their experiences with repairing electronic devices.

A majority of consumers has experience with repair services

59% of respondents report having prior experiences with repair services, numbers rising to 76% among the group of sustainability-conscious consumers.

Consumers use a variety of repair methods including independent or authorized repair shops, original equipment manufacturers (OEMs), and self-repair, all of which are being used fairly equally (data not shown).

Despite their experience, consumers often see repairs as being economically unattractive

48% of respondents view repairs as economically unattractive compared to a replacement.

Consequently, 52% indicate that cheaper repair options are crucial for future adoption (data not shown).

Technical hurdles are also key barriers to repair

Repairs are deemed unfeasible by 22% of consumers due to extensive damage or lack of spare parts.

Additionally, 39% believe devices should be designed for longevity, including features like software updates, to make repairs a more viable option (data not shown).

Fig. 12: Adoption rate of repair services

Q.: Have you ever repaired a defective device yourself or had it repaired? (multiple choice)

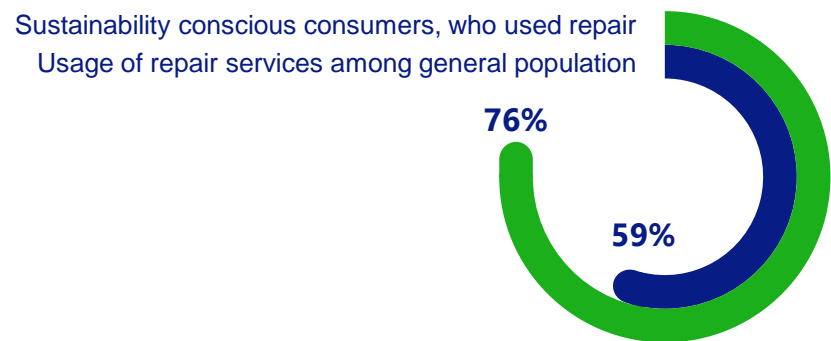
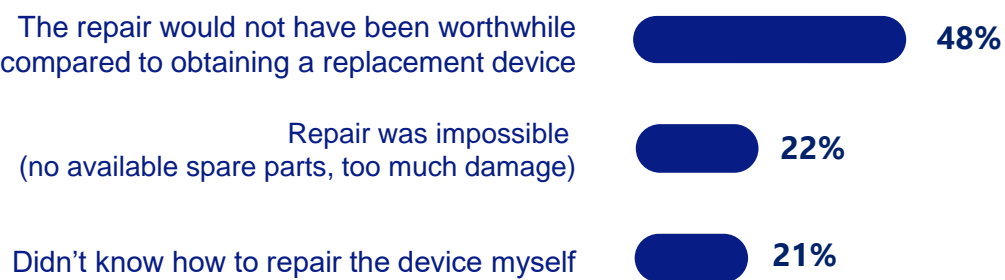


Fig. 13: Top 3 reasons against repair

Q.: Why did you not use any repair services in the past? (multiple choice)



How does the handling of devices post use affect their overall life span?

Selling second-hand is becoming a preferred option for unused devices, which could spur recirculation

How a device is managed at the end of its use determines whether it can be reused or recycled, which thus significantly contributes to its overall environmental impact. Consumers were surveyed on their typical actions and behavior post use.

Consumers become more likely to sell their devices second-hand instead of storing them away in drawers

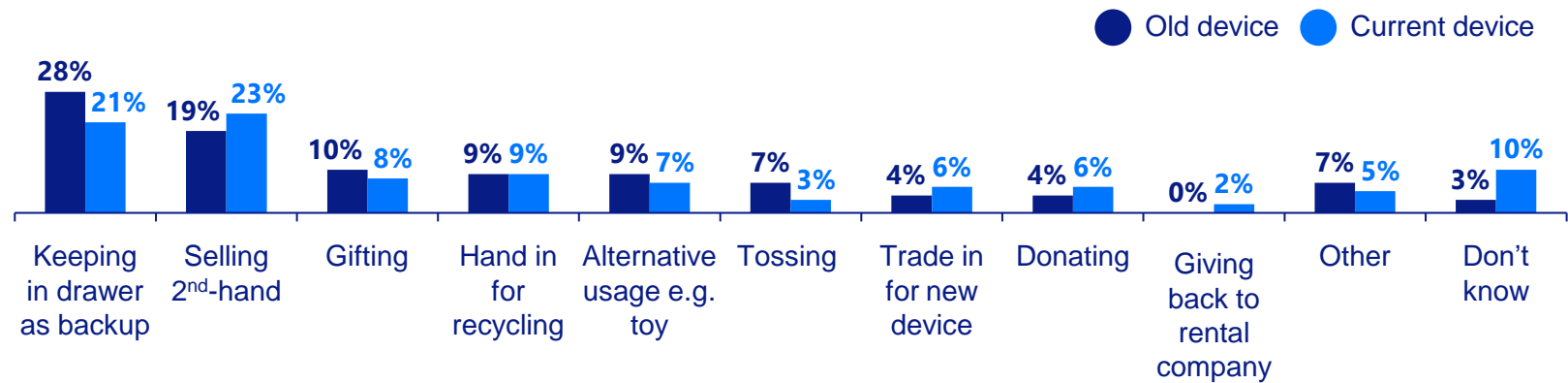
When asked what they did with their previous device, 28% indicate they kept it as a back-up. However, there is a noticeable shift in behavior: only 21% now intend to keep their devices, while 23% plan to sell them second-hand, making this their most preferred option.

Trade-ins are on the rise, albeit starting at a low level

Trade-ins are also becoming more popular. Currently, 4% of respondents have traded in their old devices, and 6% plan to do so with their current devices. Furthermore, 58% of consumers state that selling or trading in their device does not affect their decision to acquire a new one, while 27% say it allows them to switch to a new device at an earlier stage (data not shown).

Fig. 14: Ways of disposal of unused devices

Q.: What did you do with your old device / what are you planning to do with your current device once you don't use it anymore? (multiple choice)



Does resale or trade-in affect consumer behavior?

Resale or trade-in opportunities seem to affect only a fraction of respondents in their decision to buy a new device. The impact of potentially increased purchase frequency will further be investigated in the next report, to be published in March 2025.

“

The supply of used devices is the limiting factor for more second-hand sales. We would like to provide our customers with more second-hand options and we do see the demand for it.



Henning Never, Sustainability Project Lead
Deutsche Telekom

Results of the Customer Survey in the B2B Sector

Insights into the adoption and use of circular business
models amongst business customers

About the survey

The results are representative of the German market.

The data collection, conducted by Institut der deutschen Wirtschaft (German Economic Institute - IW) in June 2024, involved 200 IT procurement representatives from companies across Germany via in-person telephone interviews. Aimed at gathering comprehensive insights into decision criteria and usage behaviors at the company level, the research filled an important gap in current market data on rental, second-hand, and repair models in the business context.

The methodology ensured balanced representation of companies regarding the number of employees, industries, and revenue, providing a solid foundation for analyzing trends and drawing meaningful conclusions about the German B2B market for electronics. The panel included all company sizes from large companies (over €50 million in revenue and more than 250 employees) to smaller companies (under €1 million in revenue and 1 to 49 employees). Responses were weighted based on the German business register, taking into account company size and sector, and industry-focus or service-orientation.

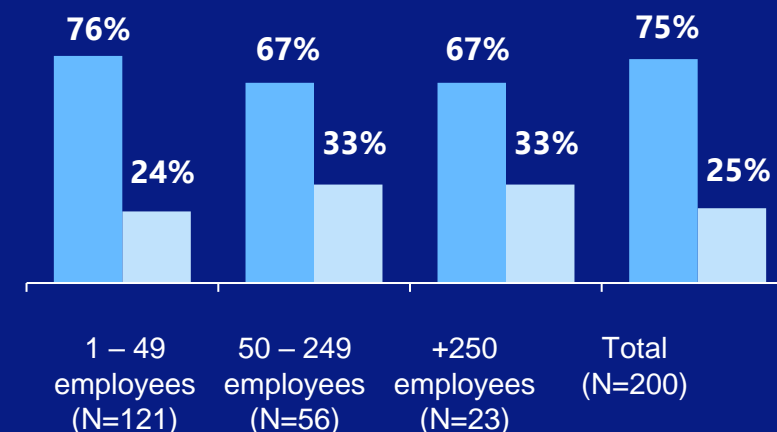
Overall, respondents covered the following device categories:



Due to low rental model penetration in our sample, we could not draw reliable conclusions on this segment. Therefore, a separate survey was conducted amongst customers of everphone, a B2B rental service provider. As these findings are not representative of the general population or the provider's customers, they are presented separately on a highlighted page.

Fig. 15: Composition of the panel

- Industry focused (N=96)
- Service oriented (N=104)



What factors influence the IT procurement strategies of companies?

Sustainability plays an important role for companies procuring IT

About 59 million laptops and 51 million smartphones in Germany are used for business purposes, giving the B2B sector significant scope for circular business models (based on projections of data from the present surveys in B2C and B2B sectors). The fact that businesses typically require large batch sizes of similar devices and that decisions are made by professional management, make the B2B market a particularly interesting playground for circular service providers. Currently, there is limited data on the prevalence of circular business models in the B2B sector and on the purchasing strategies and strategic goals of IT decision-makers.

Flexibility, convenience and sustainability dominate over price as common purchasing criteria

Flexibility, convenience, and sustainability are more prevalent purchasing criteria than price, with only one-third of IT procurement managers citing price as the dominant factor.

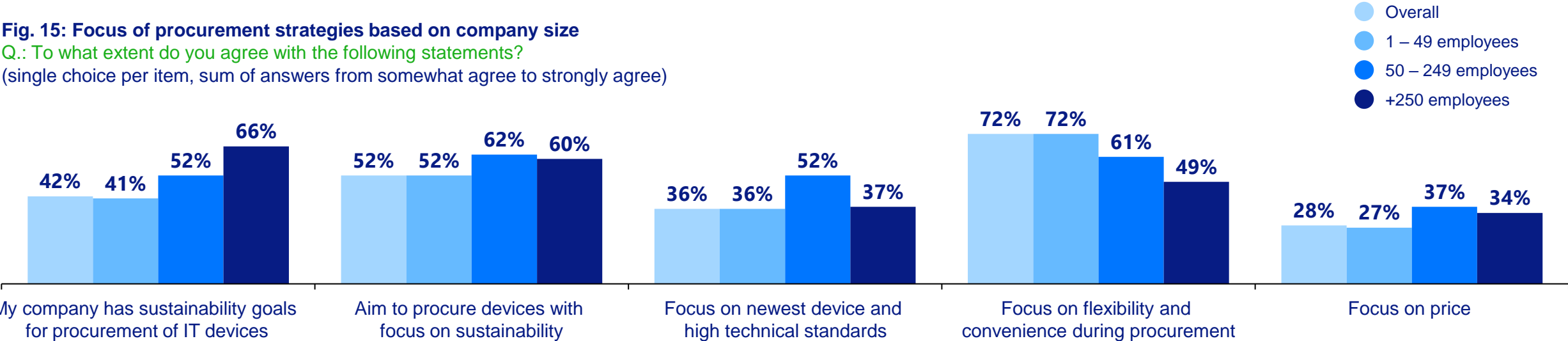
Procurement is sustainability focused

52% of IT equipment managers aim to procure devices with a sustainability focus, and 41% of companies report having dedicated sustainability goals influencing procurement strategies.

Larger companies put sustainability first

Among companies with 250 or more employees, 66% have sustainability goals for tech device procurement, although only 60% actively seek to procure devices with a sustainability focus. Nevertheless, sustainability is the most important purchase criterion for these large companies.

Fig. 15: Focus of procurement strategies based on company size
Q.: To what extent do you agree with the following statements?
(single choice per item, sum of answers from somewhat agree to strongly agree)



Note: The overall panel consists of 97% of companies with 1-49 employees, reflecting the composition of the German Business Register. As a result, the overall findings closely mirror those of small companies, though they are not identical.

The acquisition of new devices dominates, but rental and second-hand purchase already play a more important role in B2B markets compared to B2C

To gain insights into the current adoption of circular business models in B2B markets, company representatives were surveyed about their purchasing behavior and device inventory management.

While purchasing new devices is the dominant practice, rental and second-hand device acquisitions are also relevant and much higher than in B2C

Approximately 90% of companies predominantly purchase new devices, a trend consistent across various categories. However, already 30% of companies are also buying second-hand smartphones and laptops. Rental is used by about 10% of all companies, primarily for smartphones and laptops.

The adoption of second-hand and rental offerings is significantly higher in the B2B sector than in the B2C sector (second-hand: 21%, rental: 1%, Fig.2).

When asked about their current device inventory, companies reported a significantly smaller fraction of second-hand devices

Only about 7% of all smartphones and 8% of all laptops in use are second-hand. Larger companies have a higher proportion of second-hand devices (14%) compared to smaller companies (7%).

Fig. 16: Used procurement methods for companies in Germany
Q.: Which of the following procurement methods do you normally use for the following types of devices in your company? (multiple choice)

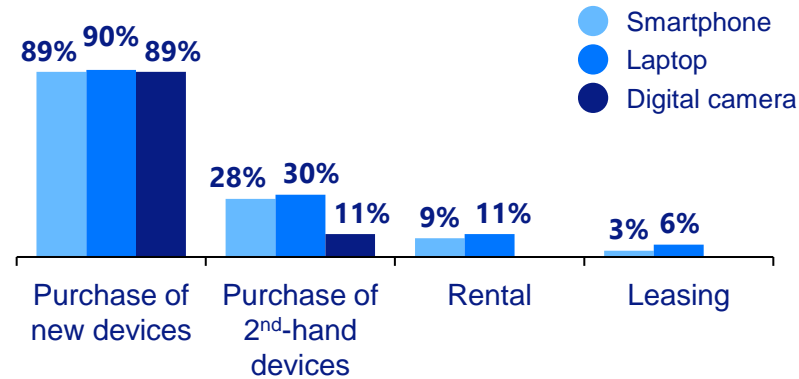
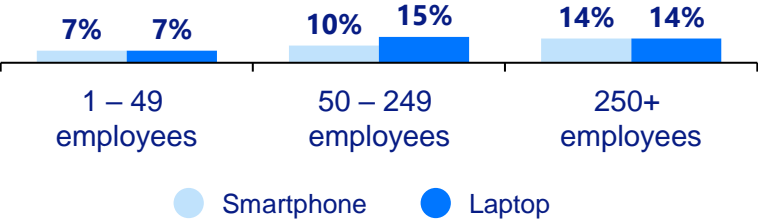


Fig. 17: Share of second-hand devices of total inventory
Q.: What percentage of your total inventory consists of second-hand devices? (single choice)



Mismatch between inventory and adoption rate?

Compared to a market penetration of second-hand devices at 10%, reported procurement practices indicate a much higher acceptance than the actual device inventory suggests. This discrepancy highlights a substantial interest in second-hand offerings among companies and it indicates significant market potential. The higher adoption rate of larger companies may be attributed to their more strongly enforced sustainability goals, including those for IT procurement.

Do companies use second-hand devices for shorter periods than new devices?

Companies use second-hand devices for as long as new ones, but for over a year longer than private consumers

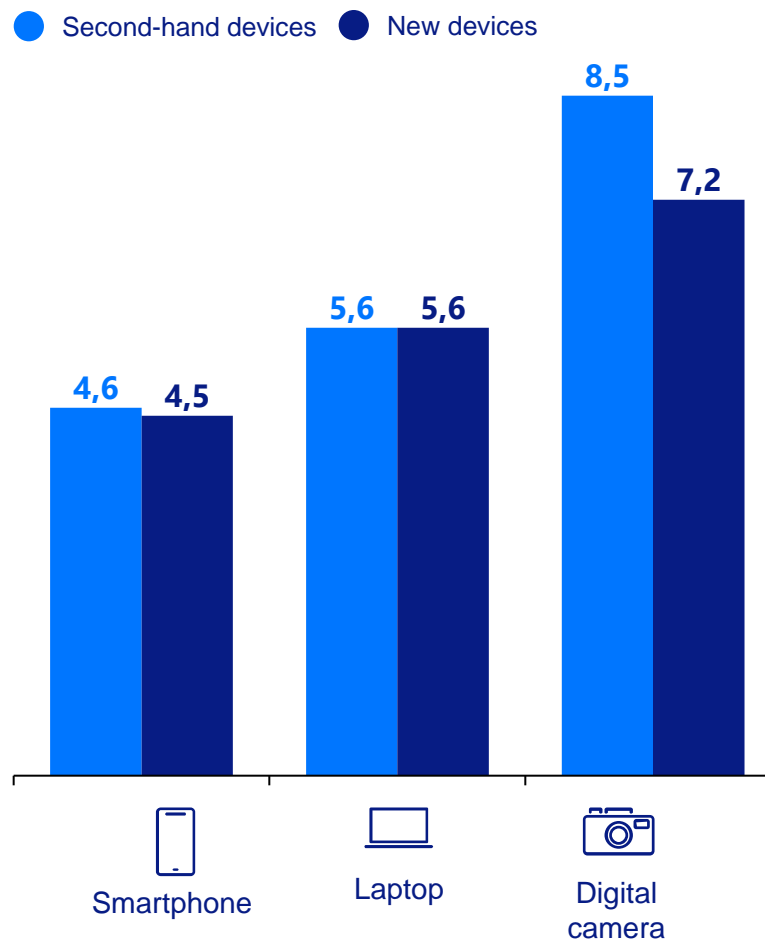
To evaluate the potential for circular offerings to extend the life span of devices, company representatives were surveyed about the usage duration of both new and second-hand devices.

The results indicate no significant differences in usage duration between new and second-hand devices

Specifically, second-hand smartphones in the business context are used for an average of 4.6 years, which is comparable to the 4.5-year usage period of new smartphones. This result aligns with data from the consumer survey, which reveal only minor differences in the usage duration between second-hand and new devices. Notably, devices used in B2B environments are typically used more than a year longer than those in private settings. Furthermore, the average second-hand digital camera in the business environment lasts almost a year longer than a new camera.

Fig. 18: Average usage duration for new and second-hand devices (in years)

Q.: How long do you typically use the following type of device in your company? (single choice, filtered for companies using new or second-hand devices)



“

New is our biggest enemy. The experience of a company buying second-hand for the first time must be impeccable, otherwise we will not win.



Thomas Gros, Co-Founder and CEO
circulee

What drives purchase decisions for electronic devices in the business context?

Sustainability and price are central for second-hand choices – immediate availability, flexibility and data security can be key enablers for additional uptake

Understanding the criteria for choosing a particular procurement option is crucial for adopting circular business models. This section analyzes the motivation for second-hand purchases.

Fast availability is by far the most important reason to procure new devices, but is also important to those buying second-hand

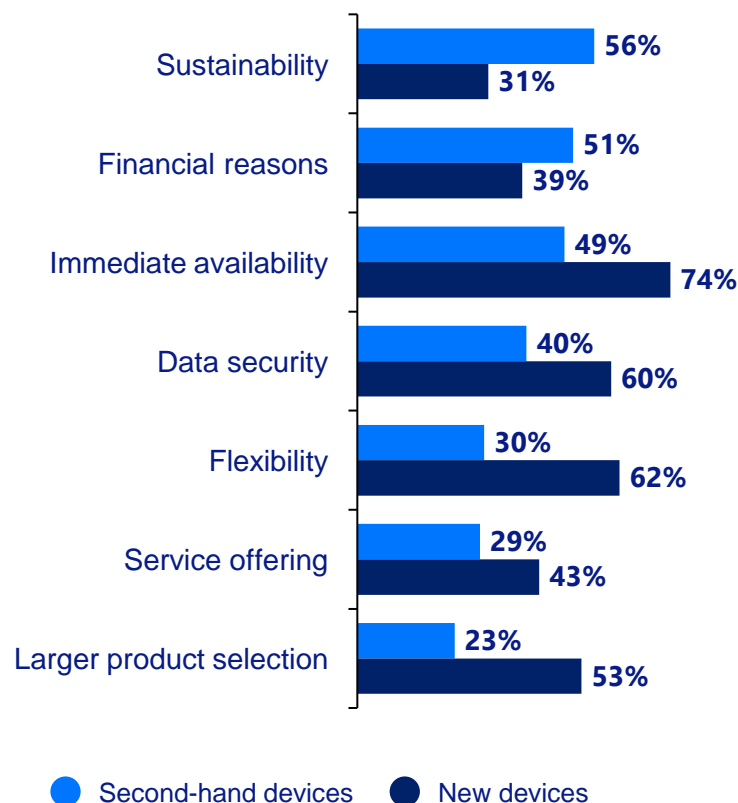
Immediate availability ranks among the top reasons for both new (74%) and second-hand (49%) purchases. Flexibility (62%) and data security (60%) are also significant factors for new devices.

Financial considerations and sustainability are driving second-hand purchases

Sustainability drives second-hand purchases, cited by 56% of the respondents, compared to 31% for new devices. While overall purchasing strategies do not heavily prioritize price, 51% of respondents choose second-hand devices for financial reasons.

Fig. 19: Reasons for procuring new or second-hand devices

Q.: Why do you use the following procurement channels for consumer electronics in your company?
(multiple choice)



Key enablers for increasing second-hand uptake

Immediate availability is crucial for both new and second-hand devices.

The second-hand market faces challenges due to a limited and volatile supply of high-quality devices in sufficient volumes, making consistent availability and flexibility difficult.

Enhancing the supply chain for second-hand electronics could significantly boost their adoption by business customers.

Flexibility and data security rank as the second and third most important reasons for purchasing new devices. To be competitive, second-hand offerings need to address these user needs.

What motivates business customers to rent in the B2B sector?

Services and flexibility are the key strengths of rental offerings for businesses

To gain deeper insights into the behavior of companies engaged in renting devices, we conducted an additional survey with customers of everphone, a B2B rental service provider. We asked the company representatives for their reasons to rent electronic devices. This data was analyzed separately from the main survey. Although it is not representative of the general population, it yields valuable insights into consumer experience with rental offerings*.

The service offerings are the key reason for companies to opt for rental

The most critical criterion for companies renting electronic equipment is the maintenance and repair service (86%), followed by the flexibility of the service (82%) and end-of-life services (67%). Financial considerations are listed among the least important reasons (39%).

Fig. 20: Top 5 reasons for using rentals devices
Q.: Why did you decide to rent the device?
(multiple choice, sum of most / fully agreed with)



Preference for outsourcing electronic device management

Companies exhibit a strong preference for outsourcing the management of electronic devices, whether for repairs, end-of-life handling or external IT support while in use. Outsourcing may also be a strategy for companies to focus on their core competencies and avoid heavy CAPEX investments.

Survey conducted with partner everphone :



- **Survey Format:** Survey conducted online
- **Respondent Recruitment:** Invitations were sent via email to everphone's existing customer base
- **Sample Size:** N = 54 valid responses
- **Renters:** 54 respondents (100%) are currently renting at least one device category

*Responses may be influenced by the specific offerings of everphone.

What hinders the adoption of circular business models in B2B?

Quality concerns and limited flexibility hinder the adoption of second-hand devices, lack of awareness and financial reasons are the main barriers to rental offerings

To understand the main barriers prohibiting the growth of circular business models for electronics in the B2B sector, it is essential to assess the reasons for managers' hesitance in adopting them. Here, IT managers were asked why they avoid rental and second-hand offerings.

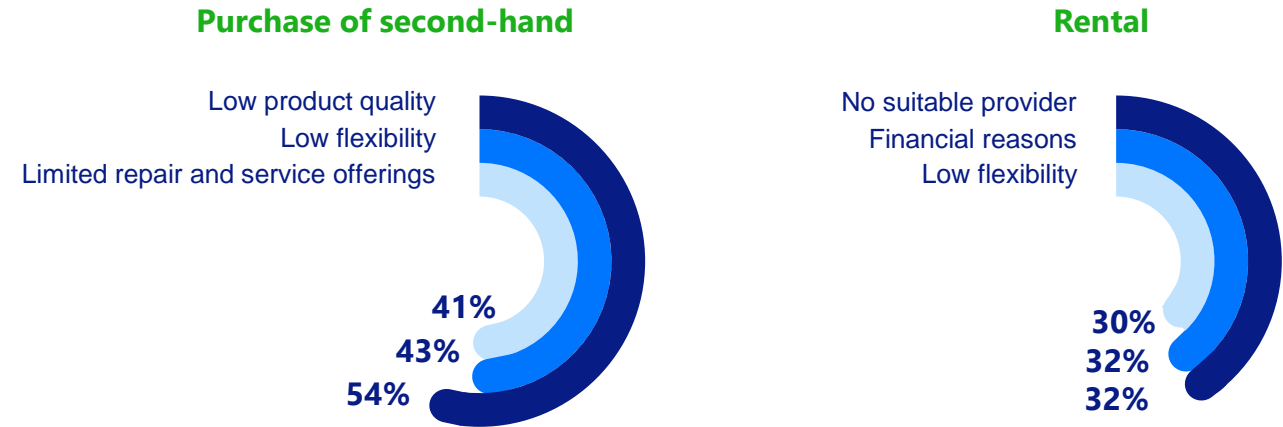
Managers refrain from second-hand purchasing due to a perceived lower device quality and lack of flexibility

Specifically, 54% of IT managers cite low product quality, and 43% report a lack of flexibility as primary reasons. It is important to note that this report does not assess the actual quality of second-hand devices; these perceptions are based on the respondents' views.

Rental solutions are perceived to be financially unattractive and lacking flexibility

Rental solutions are seen as financially unattractive and inflexible. Nearly one-third of respondents mention financial reasons and unfamiliarity with suitable providers as barriers to considering rental options. Additionally, 30% of respondents cite a lack of flexibility as a significant reason for not renting devices. Greater flexibility is also the second most frequently cited reason for purchasing new devices, underscoring its importance for IT managers when selecting procurement methods.

Fig. 21: Top 3 reasons not to use specific procurement methods
Q.: Why don't you use the selected procurement methods for consumer electronics in your company?
(single choice per item, sum of answers from somewhat agree to strongly agree)



Limited awareness of circular offerings among companies

Approximately one-third of companies report being unaware of suitable providers for rental or second-hand offerings. This highlights a significant opportunity for providers of circular business models to enhance their visibility and market presence.

“

Our repair success rate is 80-90%. This means that there is a huge positive impact potential, if more devices were to be repaired.



Anja Krabbe, Manager Customer Care & Business Development
Ingram Micro

What do companies do when devices break?

In companies, broken devices are often discarded, rather than being repaired

The moment a device breaks is pivotal for its lifetime, determining whether it will be discarded or repaired. IT procurement managers were surveyed about their strategies when devices break.

Broken devices are often directly sent to recycling

Approximately 70% of respondents indicate that broken smartphones and laptops are typically disposed of and recycled without attempts to repair.

External repair services are used by more than 50% of companies

About 55% of companies use external repair services, and nearly 40% have devices repaired by OEMs, demonstrating a significant usage of repair services to extend the lifetime of IT devices. Internal repairs are less frequent (e.g. 16-17% for smartphones & cameras), except for laptops (33%).

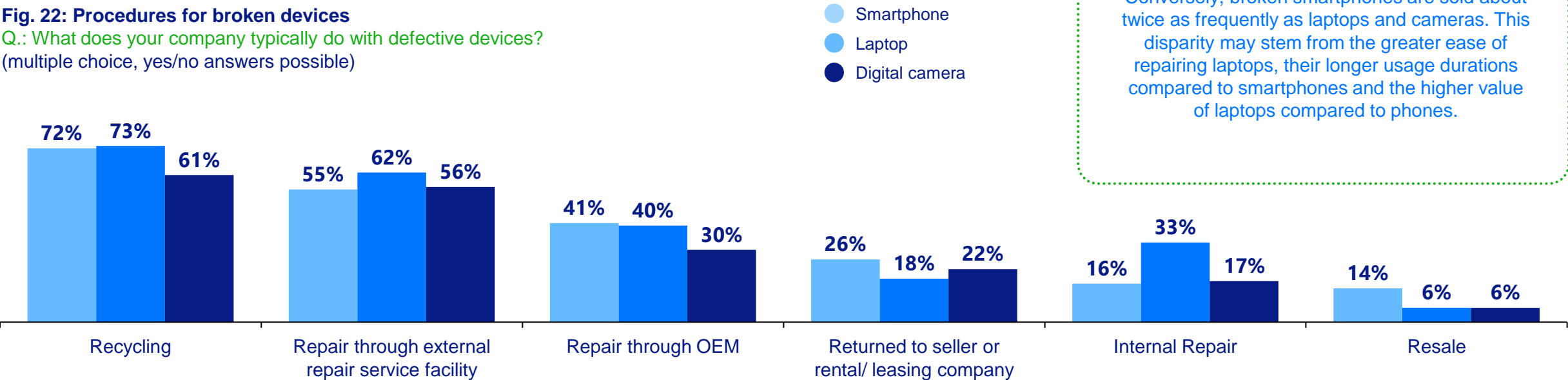


Repairability influences in-house repair practices

Laptops are repaired in-house about twice as often as smartphones or digital cameras. Conversely, broken smartphones are sold about twice as frequently as laptops and cameras. This disparity may stem from the greater ease of repairing laptops, their longer usage durations compared to smartphones and the higher value of laptops compared to phones.

Fig. 22: Procedures for broken devices

Q.: What does your company typically do with defective devices? (multiple choice, yes/no answers possible)



What motivates companies to opt for repair?

Warranty and internal effort are key criteria for companies when deciding whether to repair broken devices

Understanding the primary criteria and motivations behind companies' strategies for managing broken devices is essential for the impact assessment and evaluating potential levers.

Warranty coverage and outsourcing options are paramount for companies

For smartphones and laptops, approximately 88% of companies cite warranty as the primary criterion in deciding how to manage defective devices. Other top criteria across all device categories include minimizing internal effort, the age and general condition of the device, and the financial costs of repair services. Sustainability ranks as the fifth most cited criterion for phones and laptops.

Price plays a significant role in device repairs

While a minority of companies focus primarily on price in their procurement strategy (see Fig. 15), financial costs for repair services are important when handling defective devices. For laptops (79%) and smartphones (64%), financial considerations rank among the top four decision criteria.

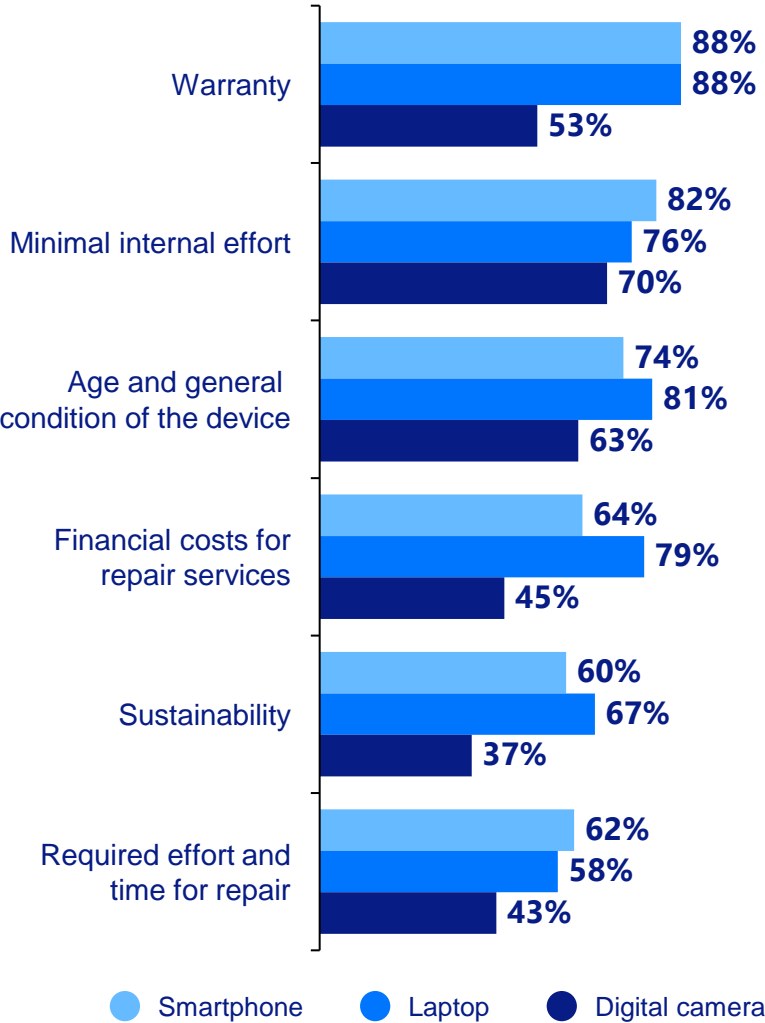
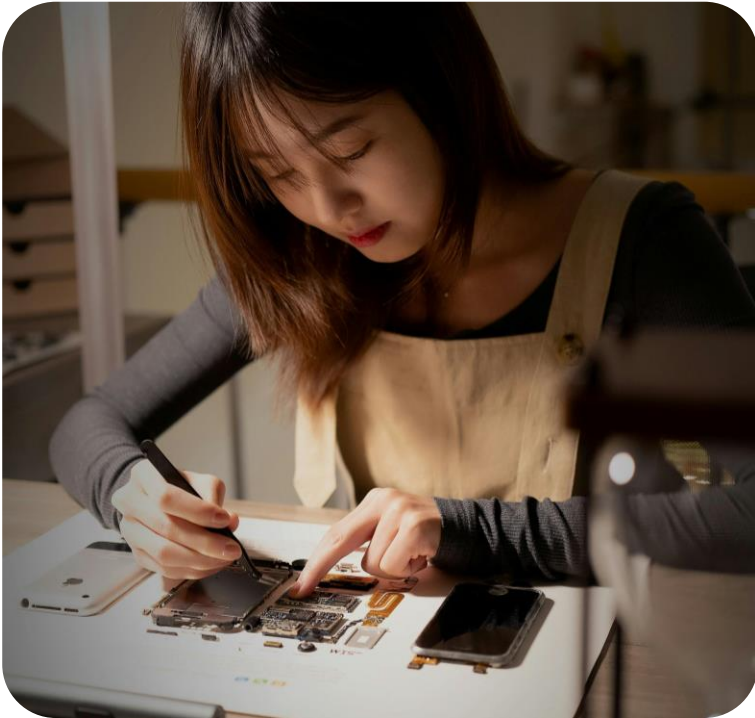


Fig. 23: Decision factors on how to handle defective devices

Q.: What criteria does your company use to decide what should be done with a defective device?
(multiple choice, yes/no answers possible)



What do companies do when they no longer need a device?

Many devices that are sorted out end up in storage rather than being recycled or sold for refurbishment

A company's disposal choice at the end of a device's use cycle determines its further potential use and environmental impact. Hence, company representatives were surveyed about their typical disposal strategies.

Most companies (70%) recycle their unused devices, yet a substantial proportion (60%) keep smartphones and laptops in storage

This tendency suggests significant potential for additional usage cycles.

Almost one in three companies donate their devices, and a similar percentage uses buyback options from IT providers.

The data also reveals that smartphones are resold more frequently than laptops. Conversely, laptops are more often returned to rental and leasing companies, correlating with higher uptake of rental and leasing for laptops than for smartphones (see Fig. 16).

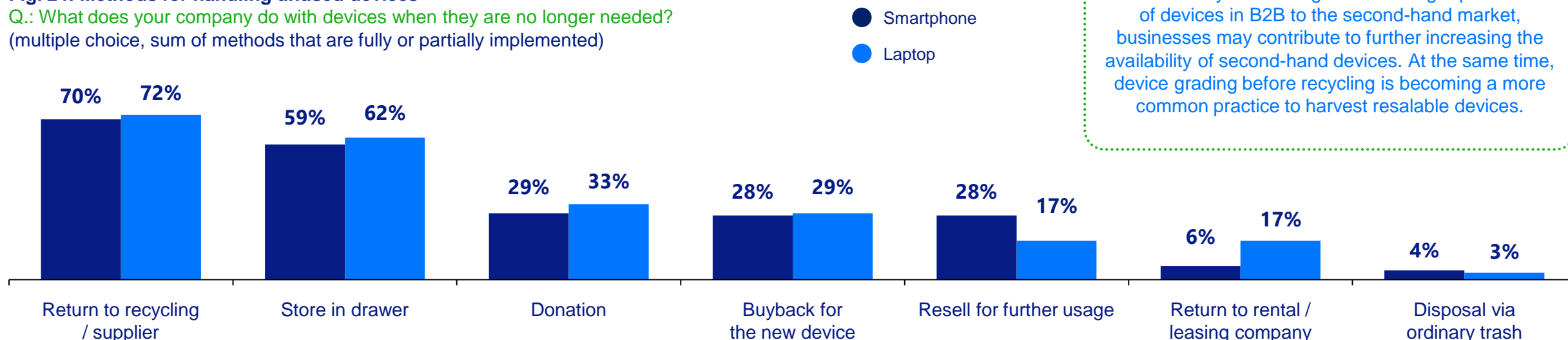


Current disposal practices indicate significant potential to boost the supply of second-hand devices

As noted in the B2C section, a reliable supply chain for second-hand devices is crucial for offering faster availability and greater flexibility in both B2C and B2B markets. By channeling the often large quantities of devices in B2B to the second-hand market, businesses may contribute to further increasing the availability of second-hand devices. At the same time, device grading before recycling is becoming a more common practice to harvest resalable devices.

Fig. 24: Methods for handling unused devices

Q.: What does your company do with devices when they are no longer needed?
(multiple choice, sum of methods that are fully or partially implemented)



Conclusion & Outlook

The market potential for circular offerings is enormous – to maximize their positive environmental impact, they need to be designed with a focus on user needs and changing behaviors

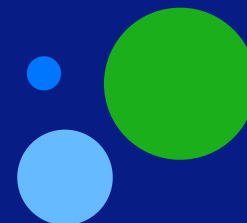
Circular business models, such as second-hand and rental services, have the potential to significantly mitigate the environmental impact of electronics by extending their life span and increasing utilization. However, their true effectiveness depends on user behavior throughout the entire use phase and the potential behavior changes these new offerings may induce.

Our insights reveal substantial market potential for second-hand and rental offerings of electronic devices in both B2C and B2B markets.

In the B2C sector, consumers are ready to adopt circular offerings, with rentals projected to increase eight-fold and second-hand purchases expected to double, according to consumer intentions. To unlock this potential, providers need to address concerns about quality, enhance financial attractiveness, and invest in building trust—such as through improved services and warranty offerings. A key area to boost circular offerings is converting consumers who exhibit a strong preference for ownership and new devices, encouraging a shift in mindset. How devices are treated at the end of their usage cycle is also critical for extending their useful life. Our findings suggest a shift in consumer behavior, with more people opting to resell their devices rather than keeping them as backups. This shift could help reduce the stockpiling of devices in drawers and further spur recirculation.

The reported long-term use of second-hand devices underlines the impact potential of circular offerings. However, also potential rebound effects need to be considered, as indicated by a reported increase in consumption. The effects of such changes in behavior have to be further investigated to assess the full impact of circular offerings.

In the B2B sector, circular options are already more established compared to B2C. Sustainability has become the top purchasing criterion for large corporations, with many companies having set clear goals for sustainable IT procurement. Sophisticated services and flexibility are key selling points for rental models, often outweighing pure financial considerations. Quick access to devices, a larger product selection and enhanced trust in data security may further spur the uptake of second-hand products. The fact that 70% of companies still report recycling as their primary method for disposing of devices and inclination to retain devices for back-up purposes suggests a substantial untapped potential in harvesting B2B second-hand devices for repair and reuse across both B2B and B2C.



Stay tuned!

**The final report of
UNDRESS Circularity will be
published in March 2025.**

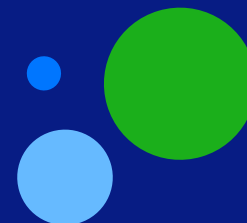
This market report offers valuable insights into the use of devices in both private and business contexts.

However, we are not stopping here. Through the UNDRESS Circularity project, we will continue to collaborate with our partners in the coming months to advance an aligned impact assessment methodology for circular offerings.

We will map the current industry system and integrate the market data from this report with device level data provided by participating partner companies to analyze typical device flows, while also considering international trade.

Based on these insights, we will identify key factors for impact assessment and design a step-by-step guide for analyzing circular device journeys.

The final report, due in March 2025, will provide key insights into device usage and flows, offering a practical guide and actionable recommendations for impact assessments focused on the actual use of devices. This will enhance transparency and accuracy in evaluating the environmental impact of circular business models beyond electronics, bringing us a step closer to achieving a truly resource-efficient circular economy.



Additional Information

UNDRESS Circularity provides a framework for standardized impact measurement for circular business models

As the transition to a circular economy accelerates, companies are increasingly adopting models like product-as-a-service, second-hand sales, and repair services to optimize resource use and reduce consumption. This shift is driven by both market trends and regulatory pressures, such as the EU taxonomy and repair policies. However, quantifying the environmental benefits of these circular models remains a challenge due to the lack of standardized methods and data on emissions avoided, resources saved, and waste prevented.

The "Undress Circularity" industry consortium aims to address this by developing a framework to assess the environmental impact of rental and second-hand business models, with a focus on the electronics sector as a key example.

The study provides the missing puzzle piece for circular impact assessment

It will explore various product segments, including smartphones, laptops, cameras, and gaming consoles, with the goal to formulate a standardised impact measurement approach to guide businesses, investors, policy makers, etc. in sustainable decision-making.

Key innovations:

- **Focused on the use phase of products.** The project provides insights into the impact from changes in the access and use of products induced by different access options, thus complementing current impact assessments focused on product carbon footprint
- **Based on real industry data.** 12 core industry partners contribute proprietary data to support the creation of a framework based on actual device flows and create unique insights into the implementation of circular business models
- **Designed for practitioners.** Industry partners contribute deep industry experience and ensure practical relevance; a diverse group of associated partners ensure alignment with ongoing regulatory, standardization and assessment processes
- **Built jointly with relevant stakeholders.** The project has a focus on providing clear steps for practical use and empowering industry practitioners to assess and optimize their business models

Key outcomes:

- Practical step-by-step guide to assess the impact of specific circular business models
- Latest data on consumer behavior on access options and device use for individual users (B2C) and in the business context (B2B)
- Industry system map and key insights into industry dynamics and actors
- Unique insights into circular business model practices and actual product flows across lifetime
- Concrete case studies from pioneering companies to make results tangible

While the project is focusing on the B2C and B2B electronics sector in Germany, the outcomes will yield insights that are transferable to the use phase of other product categories in different industries. Thus the project will contribute an important puzzle piece to the assessment of environmental impact from circular business practices, enhancing the development of a truly resource-efficient circular economy.

Designed and led by Circularity, UNDRESS Circularity is realized with key stakeholders of the circular economy ecosystem

Associated Stakeholders

Provide feedback and input to ensure broad expertise and ensure alignment with ongoing regulatory, standardization and assessment processes



Core Industry Partners

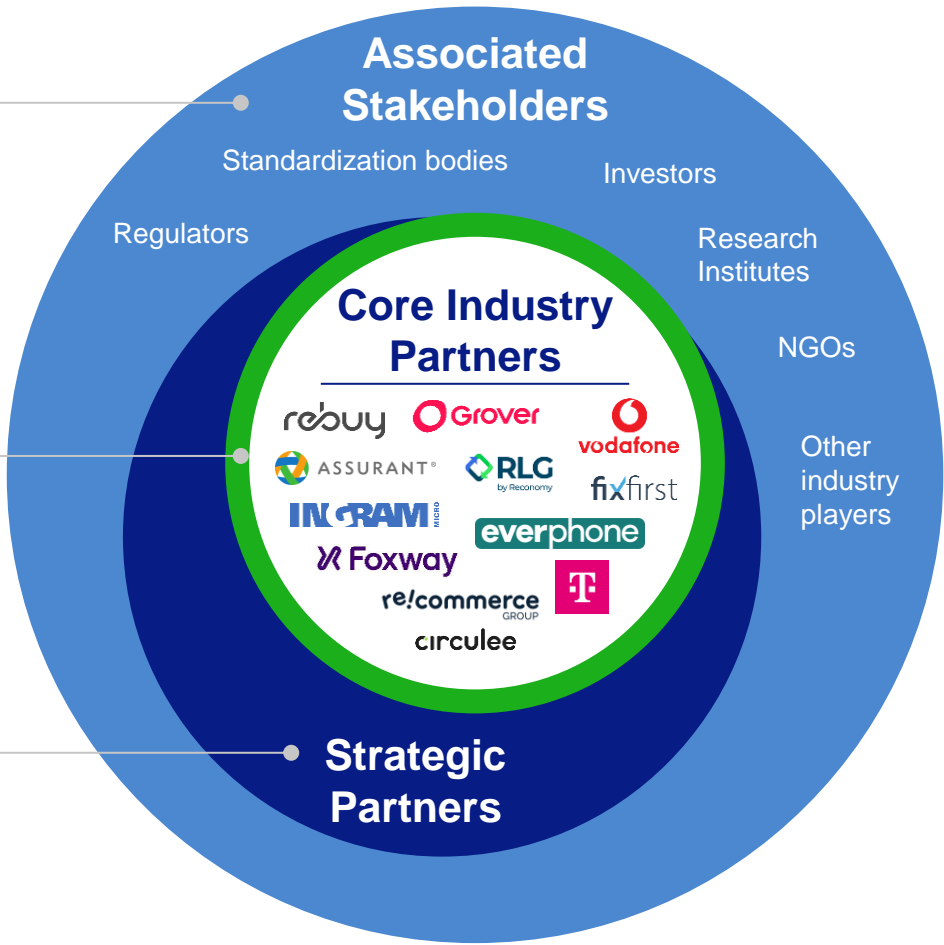
Contribute actively throughout the project period e.g., by providing data and industry insights

Strategic Partners

Support the overall project and contribute their network and advice



SMAC - AZ 38989/01



Implemented by:



Circularity leads the project in content and execution and orchestrates the collaboration



Fraunhofer IZM provides expertise and performs the data assessment and modelling

SYSTEMIQ supports the conceptual design, industry systems map and interpretation of results

Circularity is the professional Do-Tank and Consultancy for the Circular Economy

We support companies in their circular transformation and facilitate cooperations along and across value-chains to develop circular solutions.

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Visit our [website](#) and sign up to our newsletter to receive the latest news.

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We also thank all our industry partners for the valuable feedback and contributions!

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