

## The outlook for cash – a systematic look at the future of cash

*The Bundesbank has a statutory mandate to supply cash in Germany. As part of the Eurosystem's cash strategy, it is committed to ensuring that euro banknotes and coins remain attractive, available and generally accepted as a form of payment and a store of value. To do so, it must also analyse the underlying conditions influencing the future of cash.*

*The "Cash of the future" study commissioned by the Bundesbank takes a systematic look at the opportunities and challenges awaiting cash in the medium to long-term future. The study constructs three exploratory scenarios for the future of cash. The scenarios describe alternative developments for cash and its environment in Germany up to 2037. Although the scenarios are intrinsically plausible and logical images of the future, they are not forecasts. The scenarios allow insight to be gained into the factors shaping the future of cash and their potential effects. They incorporate diverse perspectives and their results can be incorporated into strategic decision-making.*

*The scenario "The hyperdigital payment world – artificially intelligent, convenient and vulnerable" describes a highly digitalised and thus vulnerable world in which cash plays only a minor role. The scenario "A cash renaissance payment world – smart, self-determined and resilient" posits a partial reversion to cash and its advantages. In this scenario, the use of cash is declining only slowly. The scenario "The vanishing hybrid payment world – pluralistic, segregated and indifferent" describes a hybrid payment landscape characterised by a shift towards greater individuality of living standards, increasing complexity and advancing digitalisation. In this scenario, cash is one means of payment among many, the use of which is steadily declining without any objection from society or government. Although the scenarios describe different payment environments, cash is used in all three scenarios, albeit to varying degrees and for different purposes. Based on the data collected, a world without cash does not appear plausible within the next 15 to 20 years. In all three scenarios, however, access to cash deteriorates and its acceptance and use decrease. The speed and strength of this decline vary. Although each scenario technically features free choice of means of payment, in practice, this choice is no longer guaranteed in two out of the three scenarios, and the stabilising function of cash in times of crisis is also at risk.*

*The social importance of cash is high owing to its unique combination of characteristics. The scenarios clearly show that cash handlers and politicians must act in order to ensure that all members of the public have genuine freedom of choice in means of payment and to safeguard the stabilising function of cash. As a central, neutral player in the cash cycle, the Bundesbank will be involved in shaping payment transactions in Germany in a forward-looking manner, with the aim of ensuring that cash continues to be available in the future.*

## ■ Cash today

*Cash use at high level, albeit declining*

Cash usage in Germany remains at a high level, even by international standards.<sup>1</sup> However, studies on payment behaviour document a steady decline in cash payments,<sup>2</sup> while cashless payment methods are becoming more diverse and popular. They have also been increasingly accepted in previous strongholds of cash use,<sup>3</sup> especially since the coronavirus pandemic. In addition, digitally savvy consumers are increasingly paying via their smartphones or smart watches.<sup>4</sup> The Bundesbank supports people's freedom to choose how they want to pay. From a societal perspective, for reasons of social inclusion and crisis prevention, it is imperative that people continue to have the opportunity to use cash. To this end, euro banknotes and coins must remain available and be generally accepted.

*Analyses show dense network of cash access points, but also initial signs of deterioration*

Empirical analyses have so far rated public access to cash as good. For example, in the Bundesbank's survey on payment behaviour in Germany, 94% of respondents considered the outlay associated with making withdrawals from ATMs or bank counters to be low or very low.<sup>5</sup> An analysis of the spatial distribution and availability of withdrawal locations currently shows a dense network of cash access points. At the same time, the number of ATMs and bank counters has declined in recent years.<sup>6</sup> Reports on the closure of bank branches and dismantled ATMs as well as the first branches that no longer accept cash deposits are regularly published in the media.<sup>7</sup> Moreover, even if the network of cash access points is objectively dense, the individual effort and cost of withdrawing cash may be increased. ATMs often charge for cash withdrawals, for example when the machine does not belong to the banking association of the account-carrying bank. Users who want to circumvent this usually have to take longer journeys.

Poorer access to cash can lead to lower use of cash, thus drawing more attention to the high fixed costs<sup>8</sup> for its supply. In order to reduce

overall fixed costs, cash infrastructure could be downsized, which would kick off a downward spiral. The consequence of this spiral would be the serious limitation of the choice of means of payment in everyday life. Given the reduction of the cash infrastructure that has already taken place and the transmission channel described above, it is therefore no longer a given that people in Germany will continue to be able to use cash to the current extent in the future.

Representative population surveys conducted by the Bundesbank, on the other hand, show that people appreciate cash and wish to remain free to choose how they pay in the future.<sup>9</sup> At the same time, the dismantling of the cash infrastructure increases dependence on commercial providers of cashless payment systems and on the technical infrastructure necessary for such payments. These constraints and dependencies would result in lower resilience throughout the payment landscape, especially in times of crisis.

The Bundesbank has a statutory mandate to supply cash in Germany.<sup>10</sup> In carrying out this mandate, the Bundesbank restricts itself to supplying credit institutions with cash, which in turn provide cash to their customers (consumers and retailers). The Eurosystem's cash strategy is aimed at keeping euro banknotes and coins available and generally accepted as a means of payment and store of value in the

*Without active countermeasures, downward spiral could impact free choice of payment method*

*Downsizing cash infrastructure would reduce resilience of entire payment landscape*

*The Bundesbank is committed to upholding cash as a generally accepted and accessible means of payment*

<sup>1</sup> See Deutsche Bundesbank (2022a) and European Central Bank (2022).

<sup>2</sup> See Deutsche Bundesbank (2022a), p. 26.

<sup>3</sup> Strongholds of cash use are those social and economic situations in which the primary payment method is cash. These include, for example, tips, gifts, fairs, flea markets and payment machines.

<sup>4</sup> See Deutsche Bundesbank (2022a, 2023a).

<sup>5</sup> See Deutsche Bundesbank (2022b).

<sup>6</sup> See Deutsche Bundesbank (2023b).

<sup>7</sup> See, for example, Atzler and Stippler (2023), Heinhaus (2023), Kopp (2023), and Tagesschau (2021).

<sup>8</sup> Fixed costs include the costs of maintaining the cash supply and disposal infrastructure. Examples include costs for ATMs or cash registers.

<sup>9</sup> See Deutsche Bundesbank (2022a). 69% of respondents said that the opportunity to use cash was very or rather important.

<sup>10</sup> See Section 3 (Tasks) Bundesbank Act (BBankG).

future.<sup>11</sup> It is therefore necessary to analyse and, if necessary, adjust the underlying conditions that affect cash's future status as a generally accepted and accessible means of payment.

*Looking at the cash of the future requires understanding of complex relationships and interactions*

Analyses of payment behaviour, access to cash or the cost structure in the cash cycle provide important insights on this topic. Cash is embedded in a complex social and economic structure. The demands of the general public run up against the interests of cash handlers and providers of cashless means of payment. These demands and interests are shaped by constant social and economic changes, such as advancing digitalisation. Any outlook for the future of cash must therefore take these factors and relationships into account as far as possible.

*Three scenarios for the future of cash, developed using strategic foresight methods*

The Bundesbank therefore commissioned a study on the topic of "the cash of the future". VDI/VDE Innovation + Technik took lead responsibility for creating the study between February 2022 and November 2023.<sup>12</sup> Three scenarios for the future of cash were developed for the study using strategic foresight (SF) methodologies. These methodologies take a systematic look at the opportunities and challenges of the medium to long-term future. This study drew upon empirical data and the expertise of numerous cash cycle experts and experts from other institutions. The opinion of the general public was incorporated by means of a representative survey and focus groups.

The scenarios describe potential alternative developments for cash and its environment in Germany up to 2037. The scenarios are hypothetical, plausible and logical images of the future. They are not forecasts for futures actually expected to materialise, nor were they selected based on whether they are desirable. What they provide instead is answers to questions about what existing and future trends are likely to shape cash, what future requirements the public and players in the cash cycle might have for cash in the future, and what role cash could

play in the future payment landscape. The scenarios allow the formation of a common understanding of the most prominent factors influencing the cash of the future. These insights allow the Bundesbank to draw conclusions concerning its mandate to supply cash.

This article outlines the process of creating the scenarios. The scenarios themselves are then briefly presented and their main similarities and differences analysed. The article ends by classifying the scenarios and presenting the Bundesbank's conclusions.

## ■ Scenario creation

The scenario method is an established and widely used SF procedure with a wide range of approaches.<sup>13</sup> The study described here uses a key-factor-based scenario approach with a variety of established methods for collecting quantitative and qualitative data. This allows the analysis of factors influencing the field of cash and the cash cycle of the future. The most relevant factors are called key factors. Taken in isolation, key factors can promote or curb cash use. The SF and the methods used in the study are presented in detail in the box near the end of this article, entitled "Methodology of the 'Cash of the future' study" (see pp. 42 ff.).

*Scenarios are developed using established strategic foresight methodologies*

Amongst other things, SF is based on collective knowledge and integrates diverse perspectives and expertise. The inclusion of the specialist knowledge of the Bundesbank's experts and those involved in the cash cycle as well as the public as the users of cash was fundamental to the study.<sup>14</sup> When selecting the methods, it was therefore vital that robust empirical data

*Expertise of cash cycle players and general public integrated into study*

<sup>11</sup> See European Central Bank (2022), and [https://www.ecb.europa.eu/euro/cash\\_strategy/html/index.de.html](https://www.ecb.europa.eu/euro/cash_strategy/html/index.de.html)

<sup>12</sup> The study was carried out by VDI/VDE Innovation + Technik on behalf of the Bundesbank under the "Cash of the future" contract for the Bundesbank. SINUS Markt- und Sozialforschung GmbH were subcontractors. The Bundesbank published the study on 17 January 2024; see Ehrenberg-Silies et al. (2024).

<sup>13</sup> See Weimert and Römer (2021).

<sup>14</sup> See Störmer et al. (2020).

were generated while simultaneously integrating the aforementioned expertise and perspectives. In the case of the public, this was done through focus groups and a representative survey. The framework conditions for this survey and the main results are described in the explanatory notes on “Public perspectives on the future of cash” on pp. 35 ff.

The scenarios thus developed in this study are intended to open up new perspectives on possible and plausible futures of cash. In this way, the scenarios support decision-making and strategy-building as well as communication with different dialogue partners.<sup>15</sup> The scenarios are summarised below.<sup>16</sup>

## ■ Possible futures for cash

Each scenario describes the payment landscape and the circumstances surrounding it in 2037, as well as the trajectories of the key factors that led to the future in question.

### The hyperdigital payment world

The scenario “The hyperdigital payment world – artificially intelligent, convenient and vulnerable” (“hyperdigital payment world”) describes a highly digitalised world. In this scenario, cash has all but disappeared from everyday payment situations and payments between individuals, as it cannot be integrated into digital systems and processes. Cash now only accounts for 15% of transactions overall. It does still get used as a store of value, alongside other methods. For various different reasons, some groups within society have difficulties with – or concerns about – the high degree of digitalisation. People belonging to milieus that tend towards more traditional values, those within a high age bracket (80 years and older) and people with a low level of formal education, especially, take an ambivalent view. On the one hand, for example, cashless means of payment

are perceived as complicated to use; on the other hand, the new payment reality brings improvements to people’s lives, such as facilitating the operation of unstaffed micro-markets where people in rural areas can do their shopping.

Cash payments are now costly for cash handlers. Consequently, the option to pay with cash is only offered if the composition of the local population necessitates it, particularly in the case of public institutions. In this scenario, even settings that used to be strongholds of cash are now largely cash-free. In this highly digitalised environment, convenience and comfort are the core motives driving decisions on how to pay for almost all social groups. Data protection and the shielding of privacy are also cited as motives, though are all but ignored in day-to-day life.

Digitalisation has increased the vulnerability of cashless payments, but that makes no difference to the trust that the public places in these payment solutions and the systems that power them. There are also a plethora of alternative cashless payment solutions. Data leaks are accepted as the price to be paid for digitalisation. The public continues to keep a stock of cash at home for extreme emergencies.

Cash access points are primarily operated by banks and savings banks, though with a hugely thinned-out ATM network. Cashback and cash-in-shop<sup>17</sup> services have been rendered practically impossible by the disappearance of staffed checkouts and reduced options for paying in cash. The low prevalence of cash translates into high cost pressures for cash cycle

*... and entails high costs for cash handlers*

*Three scenarios describe the payment landscape and its setting in 2037*

*In the “hyperdigital payment world” scenario, cash has all but disappeared from everyday life ...*

*In this scenario, access to cash is severely restricted*

<sup>15</sup> See Kosow and Gaßner (2008), p. 15.

<sup>16</sup> Full descriptions of the scenarios can be found in the “Cash of the future” study. See Ehrenberg-Sillies et al. (2024).

<sup>17</sup> Cashback and cash-in-shop are ways of carrying out cash transactions at the point of sale. In the case of cashback, the customer can withdraw cash when paying for their purchase. With cash-in-shop, you can make withdrawals and deposits without first needing to have made a purchase, but it is subject to tighter regulatory requirements in return.

## Public perspectives on the future of cash

As cash users, the general public plays a key role in the cash cycle. In view of this, the “Cash of the future” study<sup>1</sup> examines the future requirements that citizens will have for cash. Cash use depends not only on retailers’ acceptance of and public access to cash, but also on consumer attitudes towards cash versus cashless payment methods. The Bundesbank’s survey on payment behaviour in Germany has already established that frequency of cash use varies based on age and income level. At the same time, however, these attitudes cannot be explained solely by the socioeconomic or demographic characteristics of the respondents, such as age or level of education. They are also influenced by the different societal groups to which the respondents belong: groups which are defined by socio-cultural characteristics such as values. This raises the question of what value orientations and lifestyles are associated with the use of cash. It seemed fitting, then, to use the SINUS milieus model for a lifestyle analysis based on qualitative focus group discussions and a quantitative public survey. The results of this lifestyle analysis were used both for the identification of influencing factors and for the development of the projections.

The SINUS milieus are a model of society used in market and social research that combines persons with similar values and comparable social status into groups of like-minded people. These groups thus produce a differentiated description of the personal worlds people inhabit.<sup>2</sup> Using this tried and tested model allows the study to derive a comprehensive picture of the general public’s payment method preferences and the requirements they have for cash. The chart on p. 36 is a graphical depiction of the

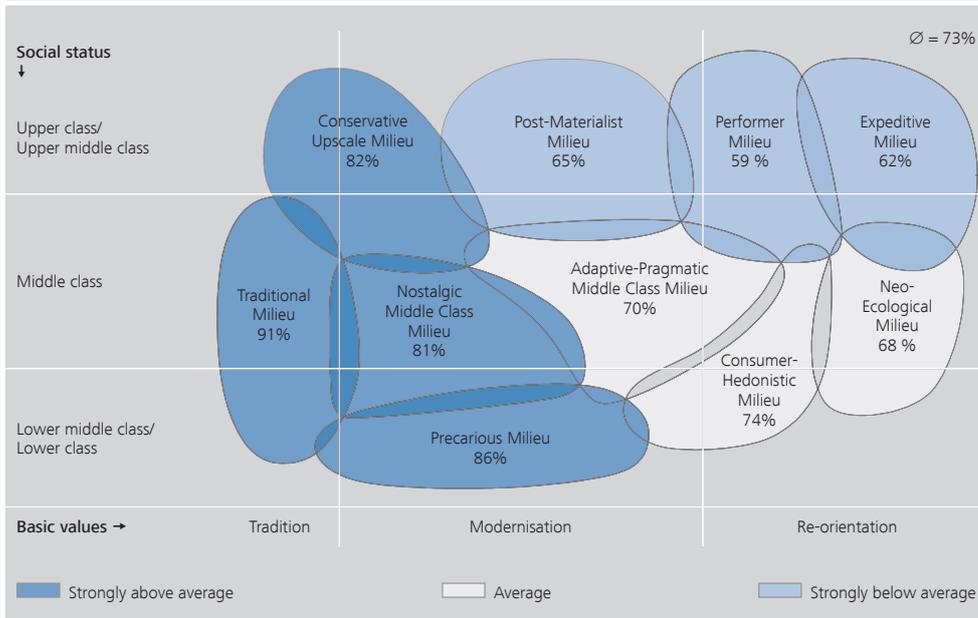
SINUS milieus in a matrix of social status and basic values – these basic values represent fundamental attitudes towards change, roughly speaking. The higher up a milieu is placed, the higher the level of education and income as well as social status, seen from a social sciences perspective. The further to the right it extends, the more modern the basic values of the people within it, in socio-cultural terms. A total of ten different milieus are currently recognised.

The combination of a qualitative and a quantitative research approach made it possible to identify the motives behind the use of cash, as well as to quantify how prevalent these were. For the qualitative focus groups, the ten SINUS milieus were grouped into five segments according to expected similarities in their use of and attitudes toward cash. Based on a semi-structured interview guide, group discussions with between six and eight participants apiece were conducted for each segment. For the public survey, 1,600 online respondents and 400 telephone participants provided information on their use of and attitudes toward cash as well as their expectations for future cash use. In addition, the respondents answered the standardised questions enabling them to be assigned to one of the SINUS milieus. The qualitative part of the analysis focused on the debate surrounding cash, understanding of motives for using cash and corresponding attitudes towards the subject of the study. A quantitative analysis of the survey results revealed the extent of and differences in the distribution of the correspond-

<sup>1</sup> See Ehrenberg-Silies et al. (2024).

<sup>2</sup> Information on the SINUS milieus can be found at <https://www.sinus-institut.de/en/sinus-milieus>

**SINUS milieu® model and perceived importance of having the option to pay with cash\***



Source: SINUS-Institut.

\* Share of "Very important" and "Somewhat important" responses. Basis: n = 2,000 (all respondents). Question: "Generally speaking, how important is it to you to have the option of paying with cash?"

Deutsche Bundesbank

ing attitudes across the individual milieu. The quantitative results are shown in the following.

For seven out of ten respondents, it is important that both they and society as a whole are still able to pay in cash in future. The personal importance of cash is above average in those milieus with more traditional basic values and lower social status (see the dark blue-shaded milieus in the chart). This makes it clear that the usual characterisation of cash users by sociodemographic characteristics alone does not fully reflect the different realities of the respondents' lives. By contrast, the personal importance of cash is much less significant in milieus which are characterised by modern basic values and have a higher social status (see the light blue-shaded milieus in the chart). However, the perceived relevance of cash as a means of payment in society as a whole is similarly high in almost

all milieus, irrespective of social status and value orientation.

Although the personal importance of cash differs depending on an individual's social status and basic values, cash is still firmly entrenched in all societal groups. Only around 17% of all respondents state that they would welcome a world without cash. This percentage is particularly low among those respondents assigned to the traditional segments. In the segments with more modern basic values, on the other hand, slightly more than the average of all respondents said they would welcome a world without cash. Similarly, an average of around 67% across all respondents express concern about the abolition of cash. An above-average number of respondents belonging to the traditional milieus share these concerns, while those belonging to milieus with more modern attitudes worry

about cash being abolished slightly less often.

Regardless of whether or not respondents welcome a world without cash, around 70% anticipate a general decline in cash usage. By contrast, only around 28% of respondents on average expect their personal use of cash to decrease in future. In particular, those respondents assigned to the modern milieus expect cash usage to decline, both generally speaking and in individual terms. Respondents allocated to the more traditional milieus, on the contrary, anticipate only a small decline in their own use of cash. Provided that these expectations regarding personal cash use are fulfilled, it will be possible to further differentiate between societal groups: those who currently predominantly use cash to pay may also retain this behaviour in future. On the other hand, there is a growing number of people

who are almost exclusively using cashless means of payment. Furthermore, the use of cash might be less strongly tied to age than it was before, while the importance of value orientation and social status would increase.

Differing requirements for the characteristics of payment instruments are probably one reason for this. The parts of society who want to continue paying in cash value it as a means of budget control, amongst other things. For milieus in which cash usage is decreasing, on the other hand, convenience is the main factor in choice of payment method. In these milieus, convenience is attributed more frequently to digital payment solutions, whilst in the other milieus, cash, too, is described as being convenient.

participants. Only a small number of effective cost-cutting measures are implemented. Innovations in the area of digitalisation were introduced too late to have a stabilising effect.

The Federal Government adopts statutory standards to secure a basic level of cash provision for retailers and the general public. In a digitalised society susceptible to outages, the idea is to preserve the cash infrastructure in case of crisis. Cash retains its unique characteristic of being largely independent of technical infrastructure. The digital euro, which is already in use in the reference year 2037, has little impact on the use of cash, as the latter has already declined steeply anyway.

## The cash renaissance payment world

The scenario “A cash renaissance payment world – smart, self-determined and resilient”

(“cash renaissance”) describes a partial return to cash and its advantages. Developments in the 2020s – extreme weather events, a pandemic and wars – illustrated the vulnerability of infrastructure and an economy that depends on globalised and barely diversified supply chains functioning smoothly. Awareness of these developments led to an appetite for a more sustainable way of life, associated with purchasing regional products and services and doing one’s shopping locally. Since cash was typically accepted in such local shops, the decline in cash use abated somewhat. Cash and the digital euro are perceived as instruments for European autonomy. As in the previous scenario, all areas of life are becoming increasingly digitalised; however, advances in the field of artificial intelligence (AI) soon make many people wonder whether this is actually a desirable state of affairs.

Even groups comfortable with digital technologies are deliberately turning more and more to

*Partial return to the advantages of cash in the “cash renaissance” scenario*

*In this scenario, legal standards are supposed to preserve the already greatly diminished cash infrastructure in case of crisis*

*Cash is appreciated and used in this scenario for data minimisation reasons*

cash – and its complement, the digital euro – as a mode of payment, motivated by data minimisation and digital sovereignty. Cash is associated with sovereignty, independence and “constructive rebellion”. It serves as a lifestyle product and a way of setting yourself apart from the mainstream. Younger people and those on small budgets are also increasingly using cash again, or are carrying on using it. These developments radiate well into society’s centre ground. Innovations make cash simpler and faster. For example, 1 and 2 cent coins are abolished, rounding rules are introduced and payment machines with a cash function are increasingly present. Depending on the payment situation, cash and the digital euro – with its low data load – are the payment media of choice. Overall, the share of cash continues to shrink, but the decline is relatively slow.

*Access to cash in this scenario remains good, and acceptance is supported by a recommendation that cash should be accepted*

Access to cash does not get worse than it was in the 2020s. The network of ATMs and bank branches shrinks only slowly, and access via cash services offered by retailers is expanded. Owing to the public’s experiences during crises, people are holding larger amounts of cash as a store of value. There is a high level of awareness that cash can only function as a backup solution in the event of a crisis if there is a strong infrastructure in place when times are normal. The Federal Government thus strengthens cash through regulatory means and recommends that retailers accept cash as a matter of principle. Binding standards are set for access to and acceptance of cash. The importance of euro cash as legal tender is thus underscored through policy.

*Digitalisation and innovations in the cash cycle enable costs to be cut*

The regulations mean that it makes sense for cash cycle stakeholders to invest. Commercial banks were quick to take account of the potential impact of the new regulations on access to cash. They feared that if infrastructure were to be scaled back further, they would find themselves forced to rebuild capacity, and that would be a costly undertaking. Digitalisation and AI applications are deployed in the cash cycle, enabling costs to be brought down and

helping to keep profits up. For retailers, accepting cash becomes more attractive again, as efficiency gains and regulatory support bolstering cash use have meant that the costs of cash supply and removal have come back down after having increased for a time.

## The vanishing hybrid payment world

The scenario “The vanishing hybrid payment world – pluralistic, segregated and indifferent” (“hybrid payment world”) describes a world characterised by a shift towards greater individuality of living standards, lifestyles and personal environments, increasing complexity and progressive digitalisation. The payment landscape is hybrid: different means of payment exist in parallel and are each used by different parts of the population. At the same time, this hybridity is under threat.

Payment behaviour is highly differentiated and depends on what social groups and milieus individuals belong to. People who are open to innovations in payment transactions use cashless means of payment and the digital euro more than cash. Economically restricted or disadvantaged individuals and people looking for simplicity and a good overview of their own expenditure favour cash over the cashless methods. People who do not trust the government or private digital providers and therefore wish to use means of payment that do not involve a lot of data also prefer cash. Irrespective of their individual payment behaviour, all social milieus want to be free to choose how they pay. Nevertheless, cash use is in steady decline in this scenario, falling to 31% of total transactions.

In some erstwhile strongholds cash remains relevant but, even there, its use is declining. The only way that it continues to be used across almost all milieus is as a store of value, albeit to different extents. The decline is gradual and happens without society and policy-

*The “hybrid payment world” scenario sees various types of payment instruments coexisting*

*In this scenario, the share of cash is steadily declining, although there is a high desire for freedom of choice when it comes to payment media*

*Restrictions in terms of access to and acceptance of cash lead to a decline in cash payments in this scenario*

makers taking much notice. Retailers adjust what means of payment they accept to suit the customer base in question and, at the same time, encourage all customers to opt for cashless methods. Cashback and cash-in-shop services are therefore now viable to only a limited extent. Authorities also prefer cashless payments. Both sides justify this behaviour by citing the high costs associated with cash.

*Cash's gradual decline meets with barely any resistance*

The fixed costs associated with cash have not fallen much at all. Innovations exert only a small amount of leverage on the cost structure. It is growing harder and harder for the public in particular to access cash due to the intense thinning of the ATM and bank branch network. These developments in terms of access and acceptance lead to a gradual decline for cash that is met with hardly any resistance. In this cocktail of circumstances, policymakers do nothing to stabilise the cash infrastructure. This means that the hybrid payment world, and with it the freedom of choice when it comes to payment methods, are increasingly losing ground.

## ■ Analysis of the scenarios

### Use of cash

*Cash is still used in all scenarios*

Cash has not disappeared completely in any of the scenarios. Although the scenarios describe different payment landscapes, cash is used for different reasons in all scenarios. Based on the data collected, a world without cash does not appear plausible within the next 15 to 20 years. However, in all three scenarios, access to cash deteriorates and cash acceptance and use decline, with the pace and intensity of these processes varying.

*In two of the three scenarios, the share of cash payments declines sharply, ...*

The pronounced digitalisation of all areas of life, and the pervasion of cashless means of payment that this favours, lead to a sharp decline in the proportion of cash payments in two scenarios. In the "hyperdigital payment world" scenario, cash accounts for only 15% of total

transactions. In 2021, just under 58% of all payment transactions were still settled in cash.<sup>18</sup> The main drivers of this development are the continued strong growth in online commerce and the growing prevalence of low-staff or staff-free markets equipped with self-service checkout systems, which rarely offer options for paying in cash. Although outages of the technical infrastructure and cyberattacks on cashless payment systems are a feature of life in this scenario, the risks can be mitigated by the existence of a plethora of alternative cashless solutions. The government and firms are also primed and prepared for these kinds of disruption. As in all scenarios, cash is kept at home as an emergency reserve, since it is still valued for its general independence from technical infrastructure. Even the digital euro cannot dilute this unique characteristic in the scenarios. Cash usage also declines sharply in the "hybrid payment world" scenario. Cash payments are expected to account for around 31% of all transactions. Similarly to the first scenario, outages due to technical faults or cyberattacks exert at most a temporary impact on usage behaviour.

For various reasons, including enhanced consumer awareness of data protection issues as well as the desire for a return to a more analogue life and greater simplicity, cash use experiences a much smaller decline in the "cash renaissance" scenario. The proportion of cashless payment instruments therefore grows much more slowly than at the beginning of the 2020s. In addition, this scenario assumes that, owing to a growing awareness of crisis situations and disasters, the use of cash as a store of value and a stockpile in the event of an emergency takes on a much greater role than in the other two scenarios.

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<sup>18</sup> See Deutsche Bundesbank (2022a).

## Acceptance of and access to cash

*... and acceptance and access are key factors influencing cash use*

Cash use in each of the scenarios is heavily influenced by how widely cash is accepted as a means of payment and how easy it is to access. There are marked differences between the scenarios. In the “hyperdigital payment world” scenario, acceptance of cash in retail settings, public institutions and former strongholds of cash usage is barely upheld anymore. In this scenario, digitalisation has led to the widespread prevalence of cashless payment solutions, which are often directly integrated into the process of requesting services digitally or placing an order. Legal requirements for cash acceptance are barely effective in this scenario, as there are so many exceptions to the rules. It is a similar story for cash acceptance in the “hybrid payment world” scenario. While retailers especially are guided by the wishes of their customers when it comes to whether they accept cash or not, customers are also being encouraged to pay using contactless options. In some former cash strongholds, cash still has a footing, but is of declining importance. In this scenario, there is a fundamental obligation to accept cash, but there are a host of exceptions that can be invoked. Acceptance of cash is at its highest in the “cash renaissance” scenario: it is assumed that the Federal Government is moved by an EU regulation in the early 2030s to issue a recommendation that cash should be accepted and introduces binding standards for acceptance. Public authorities are only allowed to refuse to accept cash on efficiency grounds in exceptional cases.

*Access to cash and associated measures vary across scenarios*

In all three scenarios, access to cash continues to take place via banks and saving banks’ branch and ATM network, albeit with severe restrictions in some cases. In the “hyperdigital payment world” and “hybrid payment world” scenarios, this network is heavily pared back compared with the present day and with the “cash renaissance” scenario. This development is a result of the decline in consumer demand for cash. In addition, the downsizing of the

ATM network in these scenarios is accelerated due to the frequent attacks on ATMs with explosives in the 2020s. As the use of cash in retail trade declines in both scenarios and retailers scarcely accept cash payments any more, cashback and cash-in-shop services can no longer be used to withdraw cash at the point of sale, or can only be used to a very limited extent. In the “hyperdigital payment world” scenario, in response to the significant restrictions on access to cash, statutory minimum standards for the basic supply of cash to the public are adopted on the basis of the EU regulation on euro banknotes and coins that this scenario assumes to have been introduced. By contrast, in the “hybrid payment world” scenario, no momentum is created that might lead policymakers to improve access to and acceptance of cash. In the “cash renaissance” scenario, the pace of the decline in banks and savings banks’ branch and ATM network slows down, while retail cash services expand at the same time. Access to cash in this scenario is therefore significantly better. One reason for this development is that, in anticipation of legal provisions, commercial banks would rather maintain the infrastructure, as opposed to rebuilding it, which could potentially be more cost-intensive.

## Freedom of choice, resilience and political pressure to act

Although the freedom to choose between payment instruments is technically assured in all scenarios, it is no longer guaranteed in practice in two scenarios. In the “hyperdigital payment world” scenario, freedom of choice does not exist in practice on account of extensive digitalisation and consumer behaviour. Every consumer can theoretically use cash in the “hybrid payment world” scenario. In practice, however, very limited access to cash means that there is hardly any freedom of choice. In both scenarios, regulatory measures do not go far enough to ensure real freedom of choice in actual fact. However, in the “cash renaissance”

*Freedom of choice is no longer guaranteed in two of the three scenarios*

scenario, freedom of choice continues to be guaranteed in practice, albeit with restrictions. This is due to regulatory intervention by the government in the form of a recommendation on the acceptance of cash and standards for access to cash.

*Cash is needed as a contingency solution in all three scenarios, but ...*

All three scenarios describe cash as the only contingency solution in the event of technical disruptions and as an element that provides confidence in times of crisis. Even the digital euro is only regarded as a short-term contingency solution in the event that offline use is possible. Sensitivity to the risks of outages affecting cashless payment instruments, cyber-crime and crises is evaluated differently in the scenarios. In the “hyperdigital payment world” and “hybrid payment world” scenarios, sensitivity is described as being low. In the “hyperdigital payment world” scenario, outages are countered by solutions of a technical nature: alternative payment instruments are used and government and economic entities’ cyber defence is perceived to be strong. The general public has set aside cash reserves for widespread and broad-based power outages. Just like in the “hybrid payment world” scenario, experiences of outages and crises in the “hyperdigital payment world” scenario have no impact on the behaviour of the general public.

*... stabilising regulatory measures are only used as a response in the “cash renaissance” scenario*

In the “cash renaissance” scenario, political pressure to act is described as being high. This is due to greater sensitivity to crises and disasters both in government and among the general public, coupled with the awareness of the importance of cash for civil society. Policymakers are aware of the implications for cash use arising from restrictions on acceptance and access. Corresponding regulatory intervention is therefore considered likely. This is not the case in the other two scenarios. Hardly any political pressure to act exists; minimum standards for supplying the general public are established (“hyperdigital payment world” scenario) or monitoring is carried out without any specific recommendations for action (“hybrid payment world” scenario). As a consequence, cash use

cannot be stabilised in either of these scenarios, while the regulatory intervention in the “cash renaissance” scenario slows down the decline in the use of cash.

## Cash cycle

Regulatory measures also have implications for the cash cycle. The decline in the use of cash in all scenarios heightens pressure to reduce the fixed costs required to maintain the infrastructure for supplying and removing cash. The scenarios describe different developments with regard to the introduction of adjustments and innovations to the cash cycle that could lower costs. In the “cash renaissance” scenario, it is assumed that stakeholders in the cash cycle consider innovations and adjustments to be sensible on account of the regulatory measures. Consequently, effective cost-cutting measures are implemented in the cash cycle. Furthermore, this scenario assumes that digitalisation and AI applications can be used productively in the cash cycle. As a result, the fixed costs of cash decrease and the access to and acceptance of cash stabilises, meaning that cash use declines to a lesser degree. In the other two scenarios, a generally lower level of political support makes the benefits of innovations in the cash cycle that are relatively cost-intensive seem small. Stakeholders in the cash cycle therefore implement only very few effective measures and at too late a stage to have a stabilising effect. This results in the fixed costs of cash hardly decreasing. Instead, the infrastructure is scaled back.

*In the scenarios, innovations to reduce the fixed costs of cash in the cash cycle depend on political support for cash*

## ■ Need for action

Cash is of great importance for society as a whole. This is shown both by regular surveys conducted by the Bundesbank<sup>19</sup> and by preliminary results of the study presented here.<sup>20</sup> The

*Scenarios show a future with cash, but also mounting pressure on cash*

<sup>19</sup> See Deutsche Bundesbank (2022a).

<sup>20</sup> See the box entitled “Public perspectives on the future of cash” on pp. 35 ff.

## Methodology of the “Cash of the future” study

### Strategic foresight

“Strategic foresight” methods help enterprises, institutions and organisations to identify developments on which they are able to exert an influence and also play an active role in shaping them by taking appropriate measures. At the same time, strategic foresight supports its users in preparing themselves for developments that they are unable to influence as well as in remaining operational during times of crisis. Overall, these methods aim to lay the foundations for forward-looking decisions and strategies in a complex and uncertain world.<sup>1</sup> In this context, strategic foresight is widespread not only among governments and international organisations, but also in corporate and academic contexts.<sup>2</sup>

An approach commonly used in strategic foresight is the scenario approach,<sup>3</sup> which develops multiple exploratory and hypothetical visions of the future – or “scenarios” – for a predefined subject area. These scenarios not only describe alternate futures, but also outline the pathways that might lead to them. The “Cash of the future” study constructs exploratory scenarios that include possible and plausible, but not necessarily desirable, developments.<sup>4</sup>

The scenarios primarily serve the purposes of decision-making and strategy-building. To this end, they must be developed in an unbiased and open-minded way. They also draw attention to the potential development trajectories and interdependencies of influencing factors as well as reveal any boundaries of knowledge. In this way, the scenarios open up different perspectives and make potential futures more conceivable and more tangible.

### Scenario construction process

The selected approach towards scenario construction is divided into multiple steps. First, the scenario field was defined. The scenario field describes the topic of investigation, the future of which is to be depicted by the scenarios.<sup>5</sup> In the study presented here, the topic of investigation comprised euro cash, the use of cash and the cash cycle in Germany in 15 to 20 years’ time. These aspects were to be placed in a social, political, technical, economic, environmental and legal context. Cash was defined as a physical means of payment that is transferable from person to person and that is issued by the central bank. Although the scenario field focused on cash in Germany, developments in cashless means of payment as well as international aspects also had to be taken into consideration owing to the position of cash in the domestic and international payments landscape. These

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<sup>1</sup> See Störmer et al. (2020) and Fraunhofer Institute for Systems and Innovation Research ISI (2022), p. 4. Here, a study on the institutionalisation of strategic foresight commissioned by the German Federal Government states that strategic foresight paves the way for “prudent, innovative and transformative policy that allows simmering issues and crises to be identified at an early stage and tackled proactively, and competently addresses complex cross-sectional challenges”.

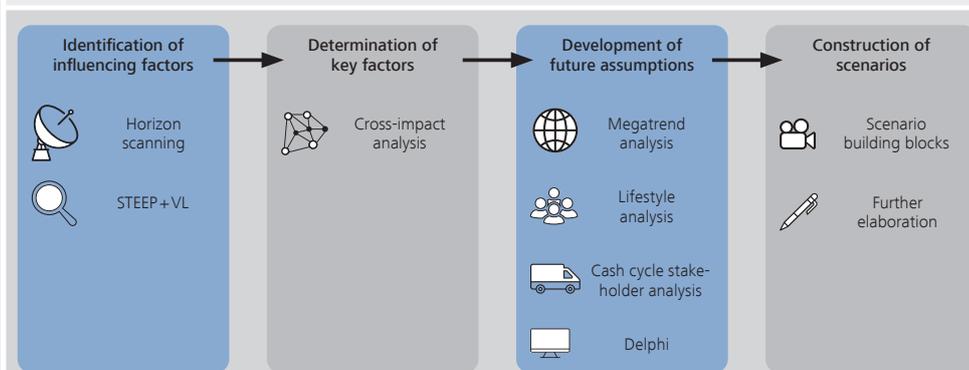
<sup>2</sup> Examples of the use of strategic foresight using various methodological approaches include the Shell Scenarios (<https://www.shell.com/energy-and-innovation/the-energy-future/scenarios.html>), the studies conducted by Zukunftsbüro for VORAUS:schau! commissioned by the German Federal Ministry of Education and Research ([https://www.vorausschau.de/vorausschau/de/home/home\\_node.html](https://www.vorausschau.de/vorausschau/de/home/home_node.html)), and the studies conducted by the Competence Centre on Foresight at the European Commission’s Joint Research Centre ([https://knowledge4policy.ec.europa.eu/foresight\\_en](https://knowledge4policy.ec.europa.eu/foresight_en)).

<sup>3</sup> See Weimert and Römer (2021).

<sup>4</sup> See Kosow and Gaßner (2008), p. 24. “Exploratory” scenarios illustrate possible future developments, starting from the present situation, primarily answering the question “what if?”. “Desirable” scenarios, by contrast, provide information on how something should be and how this might be achieved.

<sup>5</sup> See Kosow and Gaßner (2008).

### Key-factor-based scenario approach of the study and the foresight methods used



Source: Ehrenberg-Sillies et al. (2024).  
 Deutsche Bundesbank

are not at the centre of the investigation, however.

Using a number of established methods from the field of futures studies, the factors that could potentially have an impact on the scenario field were then identified. From these influencing factors, key factors were selected and analysed. The key factors are the influencing factors that have the largest impact on how cash develops going forward and, at the same time, are subject to the greatest degree of uncertainty in this regard.

In order to analyse the key factors, hypotheses on their possible future development were then derived. These hypotheses were based on data from the results of the previous steps of the process. Alongside these data-driven results, the authors' empirical knowledge and subjective assumptions were also drawn upon when further elaborating the potential future developments. This concerned, for example, the stability of or changes in trends. The hypotheses were checked for plausibility and evaluated with regard to their relevance and probability of occurrence using a systematic, two-stage survey (Delphi method) of experts from various specialist backgrounds.

In order to construct the scenarios, three development trajectories (projections) were elaborated for each key factor on the basis of the hypotheses. They follow the MECE principle (mutually exclusive and collectively exhaustive). The projections are based on the possible developments that the experts assumed to be likely. To construct each scenario, one projection was selected for each key factor and the various projections were combined to form an internally consistent scenario.<sup>6</sup> For three scenarios, three clearly distinct projections are usually produced for each key factor.

The chart above shows how the individual methods used were allocated to each of the steps described here, according to their thematic focus.

Some of the foresight methods were used in more than one of these steps. Horizon scanning, for example, also provided insights for the development of future as-

<sup>6</sup> This was carried out using a morphological box following Franz Zwicky. This allowed the combinations of projections to be analysed with regard to the consistency of their content as well as any frictions. See Kosow and Gaßner (2008), p. 49.

sumptions, while the megatrend, lifestyle,<sup>7</sup> and cash cycle stakeholder analyses yielded additional influencing factors. For this reason, the study deviated from the sequence of steps shown here and these methods were employed before the cross-impact analysis. In the following, the methods are described in chronological order.

### Horizon scanning

After the scenario field was identified, one of the methods used to identify influencing factors was horizon scanning. Horizon scanning enables online sources to be systematically searched for information in the context of the topic of investigation within predefined search fields. This allows potentially relevant trends, developments and technologies as well as weak signals to be discovered. Weak signals are early information about possible impending changes that are not immediately obvious. Examples of weak signals include newly disseminated opinions and ideas or changes in the legal framework.<sup>8</sup> Using this method, initial information, data and analytical relationships for possible factors influencing the future of cash were collected. The search fields defined within the framework of the study included, for example, characteristics of cash such as inclusion, avoidance of negative interest rates, and logistics and services related to cash. The search strategy utilised a combination of automated searching of online data sources based on text mining<sup>9</sup> and artificial intelligence (AI) methods as well as research in secondary data to evaluate the results. The data sources for this part of the analysis included research data from academic publications contained in the Scopus database, the Federal Government's funding database (*Förderkatalog des Bundes*), the European Commission's Community Research and Development Information Service (CORDIS), as well as current media coverage and specialist news blogs. Horizon

scanning revealed signs that, for example, some retail chains could be starting to refuse to accept cash and that the use of cash might no longer be able to be taken for granted, even in its traditional strongholds. At the same time, horizon scanning showed that initial resistance to the displacement of cash was already starting to form.<sup>10</sup> The information obtained through this method was supplemented by findings from semi-structured interviews with experts conducted in the period from April to August 2022.

### Megatrend analysis

The megatrend analysis examined highly influential trends with regard to their potential impact on the requirements of a payment instrument and the future of cash use. Unlike short-term trends, megatrends have a long-term and global impact and affect a wide variety of areas in everyday life, politics, the economy and society. Evidence of megatrends as well as their effects are apparent even today, and they have the potential to usher in transformations in a lasting way.<sup>11</sup> The megatrend analysis was carried out through literature research and analysis. The literature analysis covered accounts of megatrends published by public organisations, academic institutions, and private sector enterprises. The megatrends considered relevant for cash were each analysed with regard to their impact on the topic of investigation, their causes, and the

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<sup>7</sup> Information on these methods can be found in the box entitled "Public perspectives on the future of cash" on pp. 35 ff.

<sup>8</sup> For more detailed information on weak signals, see Ansoff (1980) and Lasinger and Lasinger (2011).

<sup>9</sup> Text mining enables unstructured texts to be analysed for recurring patterns and new insights.

<sup>10</sup> For more detailed information, see Ehrenberg-Silies et al. (2024), pp. 60 ff.

<sup>11</sup> For a definition of megatrends and further information, see, for example, <https://www.baks.bund.de/de/aktuelles/methoden-zur-strategischen-vorausschau-megatrends>

pace of their development. This step of the analysis suggests, for example, that the “individualisation” and “pluralisation” megatrends will lead to widening social disparity, which could in turn result in differing expectations of cash among the public. Another example of a megatrend is increasing digitalisation, which could also lead to a further spread of cybercrime.<sup>12</sup>

### Cash cycle stakeholder analysis

Moreover, the aims and scope for action among the stakeholders involved in the cash cycle<sup>13</sup> are key to the construction of the scenarios. The cash cycle stakeholder analysis was conducted in the form of semi-structured interviews with cash cycle stakeholders.<sup>14</sup> Through these interviews, it was possible to capture opportunities for innovation and possibilities for cutting costs as well as potential incentives and parameters for maintaining cash infrastructure. For example, costs could be reduced by implementing measures that make the routes travelled by cash-in-transit companies shorter or more flexible.<sup>15</sup>

### Framework conditions analysis

The framework conditions analysis verified whether the influencing factors that were identified in the previous steps covered all of the categories of a STEEP+VL analytical model. STEEP+VL consists of the categories Social, Technological, Economic, Ecological, Political, Values and Legal. This made it possible to consolidate any influencing factors that were identified simultaneously in several of the preceding analyses. In addition, this step of the analysis highlighted any categories in which only a small number of influencing factors could be identified and that thus called for further research. For example, based on the outcome of this analysis, further research was conducted into legislative proposals from the European Com-

mission in the areas of cash acceptance, access to cash, and the digital euro.<sup>16</sup>

Overall, the previous steps of the process resulted in the identification of a total of 49 influencing factors, which were narrowed down to the ten most important key factors in the subsequent step, the cross-impact analysis.

### Cross-impact analysis

Each individual influencing factor impacts the topic of investigation to a different degree. In order to analyse the direction and magnitude of their impact, a cross-impact analysis was carried out. Cross-impact analyses originate from the field of technology foresight. Based on expert assessments, this method discusses and analyses interactions between influencing factors within complex systems.<sup>17</sup>

In the “Cash of the future” study, this analysis was also used to narrow the scope down to core key factors. In this context, experts from a variety of specialist areas were involved. Representatives of organisations, enterprises, special interest groups and research institutions related to the topic of investigation were invited to participate in a workshop. In two groups, they discussed a total of 15 influencing factors that had been preselected as the most relevant through a survey of the experts. As a result of the cross-impact analysis, ten key factors were identified. These are cash acceptance, ac-

<sup>12</sup> For more detailed information, see Ehrenberg-Silies et al. (2024).

<sup>13</sup> For a description of the cash cycle in Germany, see Deutsche Bundesbank (2011).

<sup>14</sup> The interviews took place in the period from June to July 2022 and lasted between 60 and 90 minutes each. The selection of interviewees covered commercial banks, printing works, cash-in-transit companies, and digital service providers in the cash cycle.

<sup>15</sup> See Ehrenberg-Silies et al. (2024), pp. 80 ff.

<sup>16</sup> See European Commission (2023a, 2023b).

<sup>17</sup> See Weimer-Jehle (2015).

cess to cash, the cash cycle, consumer requirements, retail, the digital euro, the prevalence of cashless means of payment, trust, crises and uncertainty, and societal good.<sup>18</sup>

### The Delphi method

The Delphi method refers to a multi-stage systematic survey of experts that reveals consensus and disagreement with regard to future developments. For the study discussed here, a two-stage online survey was conducted amongst experts from the fields of academia and foresight, the cash cycle, and social associations.<sup>19</sup> For the questionnaire, the authors of the study formulated hypotheses on the future development of each of the previously defined key factors based on the results obtained so far.<sup>20</sup> In the first stage of the survey, the participants assessed these hypotheses with regard to their probability of occurrence. As part of

the online survey, participants were also asked to estimate what proportion cash would represent in the future payment mix. These estimates were in turn used in the scenarios. The results of the first stage of the survey were presented back to the participants in the second stage. They were then given the opportunity to make new assessments in light of the overall results from the first stage.

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<sup>18</sup> The “societal good” key factor describes the particular significance of cash for the inclusion of various groups in society and also as a contingency solution during times of crisis.

<sup>19</sup> The first stage of the survey was conducted in December 2022 and the second stage of the survey was conducted in March 2023. Out of a total of 101 persons invited to participate, 67 took part in the first stage. Of these, 55 agreed to participate in the second stage. Ultimately, 41 persons completed the second stage of the survey.

<sup>20</sup> In both stages of the survey, the questions on the cash cycle key factor were answered only by experts in this area (34 in the first stage and 26 in the second stage).

three devised scenarios are not forecasts and it is uncertain whether any of the developments described will occur. However, the scenarios show data-based potential developments for cash and the resulting consequences for society. In the study, evidence was found for all the developments described that makes them possible and plausible. Cash plays a role in all of the scenarios, albeit a minor one in some cases. No evidence was found that suggests it is plausible or likely that cash will disappear completely from the payment landscape in future. Nevertheless, the scenarios also show that pressure on cash and the cash cycle will increase. In the absence of appropriate measures, a downward spiral could be set in motion. The public’s freedom to be able to choose between paying either with cash or cashless means of payment depending on their preference should therefore no longer be seen as a given for the future.

Therefore, the scenarios should be the starting point for further analysis of the future of cash. If genuine freedom of choice of payment instrument is to be maintained for all members of society, in order to ensure a stable supply of cash in the event of a crisis, amongst other things, all of the scenarios reveal the need for action by stakeholders in the cash cycle and in politics. The scenarios subsequently enable starting points for measures to be identified that will help maintain cash as an attractive, widely accepted, easily accessible and competitive means of payment.

As part of the Eurosystem’s cash strategy, the Bundesbank is committed to ensuring that cash remains available and is generally accepted. As a central and neutral participant in the cash cycle – with a statutory mandate to supply cash – it will help shape cash payments in Germany in a forward-looking way and will strive to ensure that cash remains a core physical product. The Bundesbank will continue to pro-

*Scenarios reveal the need for action by all stakeholders in the cash cycle and in politics*

*The Bundesbank will help shape cash payments in Germany in a forward-looking way and is committed to ensuring cash remains a core physical product*

vide an efficient and future-proof branch network. In addition, it provides a range of services tailored to the needs of its cash business management partners.

concept and develop and establish appropriate measures. The scenarios and the study also provide a tool for exchanging ideas with civil society about the societal benefits of cash and an adequate cash supply level.

*In doing so, the Bundesbank relies on cooperation with stakeholders in the cash cycle ...*

In addition, the Bundesbank is stepping up cooperation with a wide range of stakeholders in the cash cycle. To this end, it is inviting high-level representatives from the associations of cash actors, public authorities as well as other experts to the National Cash Forum for the first time in February 2024 to discuss relevant aspects of cash payments. The Bundesbank is also seeking dialogue with civil society about the desired future of cash and necessary activities. On the basis of the "Cash of the future" study, all stakeholders can discuss desirable developments together, draw up a tangible future

The study represents only part of the Bundesbank's activities to identify developments concerning cash. The Bundesbank will continue to investigate the use of cash by the general public, as well as access to and acceptance of cash in Germany. These analyses enable changes in cash payments to be identified and evaluated at an early stage. They are and will remain important instruments for the Bundesbank to perform its statutory mandate to supply cash. Furthermore, society and policymakers are also invited to discuss the future of cash.

*... and on further analyses of the development of cash*

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